THE HONG KONG POLYTECHNIC UNIVERSITY

DEPARTMENT OF BUILDING AND REAL ESTATE

Building & Real Estate Scheme

BSc (Hons) in

Building Engineering & Management

Surveying

For Student Intake 2025-2026
Four-year Curriculum

September 2025

This Programme Requirement Document is subject to review and changes which the programme offering University / Faculty / Department / School can decide to make from time to time. Students will be informed of the changes as and when appropriate.

This document should be read in conjunction with the Academic Registry Handbook on Academic Regulations and Procedures.

Department of Building and Real Estate
Faculty of Construction and Environment

September 2025

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Part I

General Information

The BRE Scheme comprises 3 undergraduate programmes of Majors (Discipline Specific Requirements).

- BSc (Hons) in Building Engineering and Management
- BSc (Hons) in Surveying
- BSc (Hons) in Architectural Studies

- BSc (Hons) in Building Engineering and Management is accredited by the Hong Kong Institution of Engineers (HKIE), Chartered Institute of Building (CIOB) and Hong Kong Institute of Construction Managers.

- BSc (Hons) in Surveying is accredited by the Hong Kong Institute of Surveyors (HKIS), Royal Institution of Chartered Surveyors (RICS) and the Hong Kong Institute of Construction Managers (HKICM).

- BSc (Hons) in Architectural Studies is accredited by the Hong Kong Institute of Architects (HKIA) and Architects Registration Board (ARB) Part I (pre-professional).

Aims of BRE Scheme

The aim of the Scheme is to provide an appropriate platform for the students within an academic environment to develop his/her knowledge, skills and abilities by application of the methods and practices involved in the building and real estate industry. We aim to produce students with a careful balance of intellectual, vocational and practical constituents relating to building and real estate with independent thinking, an inquiry mind, confidence and professionalism.

General Outcomes of BRE Scheme

These general scheme outcomes are to be achieved through the specific outcomes of the different undergraduate programmes (Majors).

Upon successful completion of the different BSc (Hons) programmes of the BRE Scheme, the student is expected to possess the following abilities:

(i) To synthesize logical solutions to solve building related problems with a creative and imaginative mind.
(ii) To utilize modern instruments, methods, skills and techniques to implement construction methods, contracts, documents, and codes.
(iii) To apply basic technical concepts and technology to solve building problems.
(iv) To apply basic management and procurement concepts and techniques in planning land and construction resources, and in construction and maintenance processes.
(v) To apply legal knowledge in construction works, contracts, maintenance, building and property management.
(vi) To apply basic economic principles in real estate and building construction.

(vii) To identify and analyse diversified problems arising from the changing socio-economic environmental of the real estate market and construction industry.
(viii) To provide fundamental knowledge-based support for professional decisions.

Attributes for All-Roundedness

These all-rounded attributes are common to all the programmes under the Scheme.

Graduates of this Scheme will attain:

(i) The skills to identify, analyse and solve problems.
(ii) An understanding of professional, social and ethical responsibilities.
(iii) The ability to communicate effectively.
(iv) The ability to reflect on knowledge gap for lifetime learning.
(v) The ability to contribute as team member and to lead effectively.
(vi) The ability to transfer and replicate knowledge and skills to other industries/domains.
(vii) The ability to identify contemporary issues.

This document focuses to describe the 4-year programmes leading to the award of (i) BSc (Hons) in Building Engineering and Management, (ii) BSc (Hons) in Surveying and (iii) BSc (Hons) in Architectural Studies. It is the Departmental policy to maintain commonality in subject teaching within the BRE Scheme and across the three programmes, wherever it is feasible and still maintains the discipline specialism and academic quality. Besides the maintenance of the general aims and outcomes and all rounded attributes of the BRE scheme through the specific outcomes of the programmes, the Scheme Committee would review and revise, where necessary, the content, operations and management of the award programmes, incorporating all changes approved for their commencement.

Graduate attributes and institutional learning outcomes for undergraduate degree programmes

Socially responsible leaders with a strong sense of national pride and a global outlook

Be able to Care about and understand local, national and global issues, and be able to think globally, act responsibly, and lead with integrity and pride for the benefit of society and a sustainable future.

Future-ready professionals who possess technical acumen

Be able to integrate and apply in-depth discipline knowledge and specialised skills, leverage changing and emerging technologies for work, function in variable interdisciplinary contexts, and demonstrate professionalism and entrepreneurial spirit at work.

Critical thinkers and creative problem solvers

Be able to critically evaluate information and arguments, draw logical and informed conclusions, identify problems and formulate innovative solutions, in both professional and everyday contexts.

Effective communicators and collaborators

Be able to communicate effectively in English and Chinese in professional and everyday contexts*, collaborate with people from diverse backgrounds and different perspectives, and contribute to effective teamwork and positive group dynamics.

Adaptable and resilient lifelong learners

Committed to continual learning and self improvement, engage in learning with a sense of purpose, manage their own learning, adapt to different learning situations, and deal effectively with the arising tress and challenges.

*The expectation to communicate Chinese does not apply to foreign students.

BSc (Hons) in Building Engineering & Management

1. General Information

1.1 *Summary of Programme Details of the Major:*

Name of University:	The Hong Kong Polytechnic University
Faculty:	Construction and Environment (FCE)
Department:	Building and Real Estate (BRE)
Title of Major:	**BSc (Hons) in Building Engineering & Management**
Mode of Attendance:	Full-time (FT)
Mode of Operation:	Credit-Based Programme
Duration:	Full-time four years
Total Credits Requirements:	120 credits (plus 2 training credits for FT)
Commencing:	September 2025
Level of Award:	BSc (Hons) in Building Engineering & Management

1.2 *Contributing Departments / Centres*

Host Department: Building and Real Estate (BRE)

Contributing Departments and Centre:

- English Language Centre (ELC)
- Chinese Language Centre (CLC)
- Department of Civil & Environmental Engineering (CEE)
- Department of Land Surveying & Geo-informatics (LSGI)
- Industrial Centre (IC)

1.2.1 **Programme Planning Committee**

Head of the Department
Associate Head (Teaching)
Undergraduate Scheme Chair
BEM Award Co-ordinator

BSc (Hons) in Surveying

1. General Information

1.1 *Summary of Programme Details of the Major:*

Name of University:	The Hong Kong Polytechnic University
Faculty:	Construction and Environment (FCE)
Department:	Building and Real Estate (BRE)
Title of Major:	**BSc (Hons) in Surveying**
Mode of Attendance:	Full-time (FT)
Mode of Operation:	Credit-Based Programme
Duration:	Full-time four years
Total Credits Requirements:	120 credits (plus 2 training credits for FT)
Commencing:	September 2025
Level of Award:	BSc (Hons) in Surveying

1.2 *Contributing Departments / Centres*

Host Department: Building and Real Estate (BRE)

Contributing Departments and Centre:

- English Language Centre (ELC)
- Chinese Language Centre (CLC)
- Industrial Centre (IC)

1.2.1 **Programme Planning Committee**

Head of the Department
Associate Head (Teaching)
Undergraduate Scheme Chair
SUV Award Co-ordinator

1.3 *Scheme / Programme Structure and Mode of Study*

1.3.1 Structure

The Department offers the BSc (Hons) Building and Real Estate Scheme consisting of three Majors of full-time honours degree awards, namely:

- BEM BSc (Hons) in Building Engineering & Management
- SUR BSc (Hons) in Surveying
- AS BSc (Hons) in Architectural Studies

1.3.2 Programme (Award) Credits

A subject within the programme has an allocated credit value. In terms of student effort, a student is expected to do 40 (average) hours of study to earn a credit.

The graduation requirement for an honours degree award is to complete 120 credits including the 27 credits of General University Requirements (GUR); 6 credits of Free Electives and the 87 credits of Major (Discipline Specific Requirement (DSR) including compulsory (core) and elective subjects. Apart from the above, students of the BSc (Hons) in Building Engineering & Management, BSc (Hons) in Architectural Studies and BSc (Hons) in Surveying have to fulfil the stipulated work integrated education (WIE).

The normal workload of a full-time student within a semester is 15-18 credits.

1.3.3 Academic Year Structure and Duration

The academic year consists of two teaching semesters, each of thirteen weeks, plus a Summer Term of seven weeks' duration. There is normally an examination period that may include Saturday(s) at the end of each semester, and at the end of the Summer Term. Assessment of a subject will usually be completed at the end of the stipulated semester in which it is presented.

The normal duration for completion of an honours degree award is 4 years.

1.4 *Progression Pattern*

There is a specified progression pattern and curriculum for the programmes. Notwithstanding any alterations, which the Department may consider necessary, students are expected to follow the progression pattern and curriculum unless special approval or credit transfer or exemption has been granted.

Notwithstanding any alterations, which the Department may consider necessary, students are expected to follow the progression pattern and curriculum unless special approval or credit transfer or exemption has been granted.

Progression Pattern Summary (2025-26 cohort intake) **120 academic credits + 2 training credits (WIE)**
BSc (Hons) in Building Engineering and Management

Stage 1 (Semester 1) (Total Credits = 16)		**Stage 1 (Semester 2) (Total Credits = 14)**		**Stage 1 (Summer Semester)**
GUR GUR GUR	LCR Subject 1 (ELC) LCR Subject 2 (CLC) Healthy Lifestyle (0)	GUR	LCR Subject 3 (ELC)	BRE299 Work-Integrated Education (WIE)* (2)
MM1031 (GUR)	Introduction to Innovation and Entrepreneurship (MM) (1)	CE1002 (GUR)	Introduction to AI and Data Analytics for Construction and Environment (FCE) (2)	
CE1001	Construction and Environmental Professionals in Society (FCE)	AP10001 (Faculty Compulsory 2 with GUR with CAR D)	Introduction to Physics[##]	
AMA1140 (Faculty Compulsory 1)	Mathematics for Construction and Environment			
APSS 1L01 (GUR)	Leadership & Intra-Personal Development – Tomorrow’ s Leaders (APSS)	(Free Elective 1) (Free Elective2)	Free Elective Free Elective	

Stage 2 (Semester 1) (Total Credits = 19)		**Stage 2 (Semester 2) (Total Credits = 18)**		**Stage 2 (Summer Semester)**
GUR	CAR Subject 1(Cluster D) [##]	GUR	CAR Subject 2 (Cluster M)	BRE299 Work-Integrated Education (WIE)* (2)
ELC3421	English for Construction & Environmental Professionals	AMA290	Engineering Mathematics	
BRE350	Project Management & Procurement	BRE262	Project Studio	
CSE20290	Introduction to Geotechnology	LSGI2961	Engineering Surveying	
BRE258	Industrial Safety I (1)	BRE349	Building Services I	
BRE2031	Environmental Science	BRE265	Introductory Construction Technology & Materials	
BRE263	Construction Economics & Finance			

Stage 3 (Semester 1) (Total Credits = 17.25)		**Stage 3 (Semester 2) (Total Credits =11.25)**		**Stage 3 (Summer Semester) (Total Credits = 0.25)**
BRE204	Structure I	BRE302	Structure II	BRE365 International Study** (0.25)
BRE365	International Study** (0.25)	BRE3261	Building Maintenance Planning and Technology (2)	
BRE366	Analytical Skills & Methods (2)	BRE345	Measurement, Documentation & Estimating	
BRE370	Intermediate Construction Technology & Materials	BRE364	Construction Contract Law & Administration	
BRE472	Information Technology & Building Information Modelling for Construction Management	BRE365	International Study** (0.25)	
GUR	CAR Subject 3 (Cluster A)			
GUR	Service-Learning			

Stage 4 (Semester 1) (Total Credits = 13.75)		Stage 4 (Semester 2) (Total Credits = 10.5)		
BRE365	International Study** (0.25)	BRE426	Geotechnical & Foundation Engineering	
BRE4393	Temporary Work Design (1.5)	BRE4281	Construction Engineering Management	
BRE453	Building Services II			
BRE461	Environmental Impact & Assessment	BRE4393	Temporary Work Design (1.5)	
BRE462	Advanced Construction Technology	BRE466	Capstone Project # (3)	
BRE466	Capstone Project # (3)			

Remarks

Language and Communication Requirements Subjects (LCR)
Cluster Area Requirements Subjects (CAR)

All subjects carry 3 credits each, unless otherwise stated in brackets, e.g. (2)

* BRE299 Work-Integrated Education (WIE) with 2 training credits is to be carried out in the Summer Semester of either Stage 1 or Stage 2. WIE must be satisfactorily completed prior to graduation.

BEM students may take BRE299 for WIE in Industrial Centre during summer semester at either Stage 1 or Stage 2.

** BRE365 International Study is a 1-credit core subject spanning across 4 semesters from Semester 1 of Stage 3 to Semester 1 of Stage 4. Students need to commence their study tour preparation, organization and liaison work from Semester 1 of Stage 3. Students will usually launch their study tours in the Summer Semester of Stage 3.

BRE466 Capstone Project is a 6-credit core subject spanning across 2 semesters from Semester 1 to Semester 2 of Stage 4.

AP10001 Introduction to Physics is equivalent to the CAR subject AP1D05 Introduction to Physics, i.e., students completed AP10001 will also meet the CAR(D) requirement. However, students are required to take an extra subject to make up the credit requirements for exemption.

Students with the following academic qualifications are exempted from taking AP10001. These students are required to take a free elective subject to make up the credit requirements:

- HKDSE: Level 3 or above in Physics as a single Science subject or a component of the Combined Science (sub-score)
- GCEAL: B Grade or above in Physics
- IB: 6 or above in Physics (HL)
- JEE: Students who had attended the JEE Exam of Physics or Integrated Science
- Others: will be considered on a case-by-case basis

Completing AP10001 Introduction to Physics" meets the Cluster-Area Requirement (D): Science, Technology and Environment. The following table shows the Cluster Area Requirements (CAR) required by different major programmes under the Faculty of Construction and Environment (FCE):

Department	**Programme**	**Required Cluster Area Requirements (CAR)**
Department of Building Environment and Energy Engineering (BEEE)	BEng (Hons) Building Sciences and Engineering	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation
Department of Building and Real Estate (BRE)	BSc (Hons) Architectural Studies BSc (Hons) Building Engineering and Management BSc (Hons) Surveying	• CAR (A): Human Nature, Relations and Development • CAR (D): Science, Technology and Environment • CAR (M): Chinese History and Culture
Department of Civil and Environmental Engineering (CEE)	BEng (Hons) Civil Engineering BEng (Hons) Environmental Engineering and Sustainable Development	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation
Department of Land Surveying and Geo-Informatics (LSGI)	BSc (Hons) Land Surveying and Geo-Informatics BSc (Hons) Urban Informatics and Smart Cities	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation

Students can switch programmes within the same discipline towards the end of the first year of studies through a ranking assessment, which takes into account their entrance qualification score, Year One GPA, and interview performance. Students admitted to programmes offered by BRE do not have to take a CAR(D) subject, however, they must take (an) extra subject(s) to make up the credit requirements.

The subject offering departments reserve the rights to review/revise the subjects to be offered and the time of offer. Subjects to be offered as electives to students are subjected to the fulfilment of any pre-requisite or co-requisite requirements and time-table constraints.

Progression Pattern Summary (2025-26 cohort intake) ***120 academic credits + 2 training credits (WIE)**
BSc (Hons) in Surveying

Stage 1 (Semester 1) (Total Credits = 16)		**Stage 1 (Semester 2) (Total Credits = 14)**		**Stage 1 (Summer Semester)**
GUR	LCR Subject 1 (ELC)	GUR	LCR Subject 3 (ELC)	BRE299 Work-Integrated Education (WIE)* (2)
GUR	LCR Subject 2 (CLC)			
GUR	Healthy Lifestyle (0)	CE1002 (GUR)	Introduction to AI and Data Analytics for Construction and Environment (FCE) (2)	
MM1031	Introduction to Innovation and Entrepreneurship (MM) (1)			
CE1001	Construction and Environmental Professionals in Society (FCE)	AP10001 (Faculty Compulsory2 with CAR D) (GUR)	Introduction to Physics ##	
AMA1140 (Faculty Compulsory 1)	Mathematics for Construction and Environment	(Free Electives 1)	Free Elective	
APSS1L01 (GUR)	Leadership & Intra-Personal Development – Tomorrow's Leaders (APSS)	(Free Elective 2)	Free Elective	
Stage 2 (Semester 1) (Total Credits = 19)		**Stage 2 (Semester 2) (Total Credits = 18)**		**Stage 2 (Summer Semester)**
GUR	CAR Subject 1 (Cluster D) ##	GUR	Service-Learning	BRE299 Work-Integrated Education (WIE)*
GUR	CAR Subject 2 (Cluster M)	GUR	CAR Subject 3 (Cluster A)	
ELC3421	English for Construction & Environmental Professionals	BRE2171	Planning and Development: Theories and Practices (2)	
BRE350	Project Management & Procurement	BRE2061	Legal Context for Building and Construction Professionals in Society (2)	
BRE258	Industrial Safety I (1)			
BRE2031	Environmental Science	BRE2691	Introductory Integrated Professional Workshop I (2)	
BRE263	Construction Economics & Finance	BRE349	Building Services I	
		BRE265	Introductory Construction Technology & Materials	

Stage 3 (Semester 1) **(Total Credits for BS Disciplines = 17.25)** **(Total Credits for QS, GP, PD and PFM Disciplines = 14.25)**		**Stage 3 (Semester 2)** **(Total Credits for All Disciplines = 11.25)**		**Stage 3 (Summer Semester)** **(Total Credits = 0.25)**
BRE336	Development Control Law	BRE3261	Building Maintenance Planning and Technology (2)	BRE365 International Study** (0.25)
BRE365	International Study** (0.25)	BRE365	International Study** (0.25)	
BRE366	Analytical Skills & Methods (2)	BRE369	Integrated Professional Workshop II	
BS and QS Discipline-Specific Subjects[#1]				
BRE204	Structure I (BS only)	BRE345	Measurement, Documentation & Estimating	
BRE363	Construction Economics	BRE364	Construction Contract Law & Administration	
BRE370	Intermediate Construction Technology & Materials			
BRE472	Information Technology & Building Information Modelling for Construction Management			
GP, PD and PFM Discipline-Specific Subjects[#1]				
BRE315	Property Valuation	BRE337	Property Law	
BRE371	Introduction to Property Management	BRE362	Urban Economics & Property Investment	
BRE397	Property Management Accounting			

Stage 4 (Semester 1) **(Total Credits for GP, PD and PFM Disciplines = 15.25)** **(Total Credits for BS, QS Disciplines = 12.25)**		**Stage 4 (Semester 2)** **(Total Credits for BS, GP, PD and PFM Disciplines = 12)** **(Total Credits for QS Discipline = 15)**		
BRE365	International Study** (0.25)	BRE469	Integrated Professional Workshop III	
BRE466	Capstone Project[#] (3)	BRE466	Capstone Project[#] (3)	
BS Discipline-Specific Elective Subjects				
BRE415	Dispute Resolution	BRE435	Design, Adaptation & Conversion	
BRE453	Building Services II	BRE437	Facility Management	
BRE461	Environmental Impact & Assessment			
QS Discipline-Specific Elective Subjects				
BRE415	Dispute Resolution	BRE439	Engineering Contract Procedures	
BRE453	Building Services II	BRE440	Cost & Value Management	
BRE461	Environmental Impact & Assessment	BRE442	Forecasting & Competition in the Built Environment	
GP, PD and PFM Discipline-Specific Elective Subjects		**GP and PFM Discipline-Specific Elective Subjects**		
BRE427	Applied Property Investment	BRE418	Real Estate Development	
BRE4291	Real Estate Marketing	BRE436	Applied Property Valuation	
BRE465	Asset Management	**PD Discipline-Specific Elective Subjects**		
BRE463	Business Valuation and Accounts	BRE418	Real Estate Development	
		BRE464	Urban Planning	

Remarks

Language and Communication Requirements (LCR)
Cluster Area Requirements (CAR)

[#] BRE466 Capstone Project is a 6-credit core subject spanning across 2 semesters from Semester 1 to Semester 2 of Stage 4.

All subjects carry 3 credits each, unless otherwise stated in brackets, e.g. (2).

* BRE299 Work-Integrated Education (WIE) with 2 training credits is recommended to be carried out in the Summer Semester of either Stage 1 or Stage 2. WIE must be satisfactorily completed prior to graduation.

[#1] Surveying students are required to opt ONE Discipline from the 5 surveying disciplines: Building Surveying (BS), General Practice Surveying (GP), Planning & Development (PD), Property & Facility Management (PFM) and Quantity Surveying (QS) offered by the Department prior to Stage 3 studies.

** BRE365 International Study is a 1-credit core subject spanning across 4 semesters from Semester 1 of Stage 3 to Semester 1 of Stage 4. Students need to commence their study tour preparation, organization and liaison work from Semester 1 of Stage 3. Students will usually launch their study tours in the Summer Semester of Stage 3.

[##] AP10001 "Introduction to Physics" is equivalent to the CAR subject AP1D05 "Introduction to Physics", i.e., students completed AP10001 will also meet the CAR(D) requirement. However, students are required to take an extra subject to make up the credit requirements, and students may opt to take a CAR subject or Free Elective Subject.

Students with the following academic qualifications are exempted from taking AP10001. These students are required to take a free elective subject to make up the credit requirements:

- HKDSE: Level 3 or above in Physics as a single Science subject or a component of the Combined Science (sub-score)
- GCEAL: B Grade or above in Physics
- IB: 6 or above in Physics (HL)
- JEE: Students who had attended the JEE Exam of Physics or Integrated Science
- Others: will be considered on a case-by-case basis

Completing AP10001 Introduction to Physics meets the Cluster-Area Requirement (D): Science, Technology and Environment. The following table shows the Cluster Area Requirements (CAR) required by different major programmes under the Faculty of Construction and Environment (FCE):

Department	**Programme**	**Required Cluster Area Requirements (CAR)**
Department of Building Environment and Energy Engineering (BEEE)	BEng (Hons) Building Sciences and Engineering	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation
Department of Building and Real Estate (BRE)	BSc (Hons) Architectural Studies BSc (Hons) Building Engineering and Management BSc (Hons) Surveying	• CAR (A): Human Nature, Relations and Development • CAR (D): Science, Technology and Environment • CAR (M): Chinese History and Culture
Department of Civil and Environmental Engineering (CEE)	BEng (Hons) Civil Engineering BEng (Hons) Environmental Engineering and Sustainable Development	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation
Department of Land Surveying and Geo-Informatics (LSGI)	BSc (Hons) Land Surveying and Geo-Informatics BSc (Hons) Urban Informatics and Smart Cities	• CAR (A): Human Nature, Relations and Development • CAR (M): Chinese History and Culture • CAR (N): Cultures, Organisations, Societies and Globalisation

Students can switch programmes within the same discipline towards the end of the first year of studies through a ranking assessment, which takes into account their entrance qualification score, Year One GPA, and interview performance. Students admitted to programmes offered by BRE do not have to take a CAR(D) subject, however, they must take (an) extra subject(s) to make up the credit requirements.

The subject offering departments reserve the rights to review/revise the subjects to be offered and the time of offer. Subjects to be offered as electives to students are subjected to the fulfilment of any pre-requisite or co-requisite requirements and time-table constraints.

2. Admission

2.1 *Admission*

Students admitted to the undergraduate programmes offered by the Department will undergo a common first year curriculum. Students would continue their prescribed study programme / major or to select other programmes / major offered by all departments within the Faculty of Construction and Environment after the first year of study. Students are required to indicate their priority on preferred programmes / majors by the end of Semester 2 in the first year of study. If a student prefers a new programme / major to pursue in upper years, he/she will be subjected to a selection and ranking mechanism to determine the eligibility on changing the programme / major.

2.2 *General Minimum Entrance Requirements*

(a) For those apply on the basis of the Hong Kong Diploma of Secondary Education (HKDSE)*:

- Level 3 in English Language

AND

- Level 3 in Chinese Language

AND

- Level 2 in Mathematics

AND

- Achieved “Attained” in Citizenship and Social Development

AND

- Level 3 in two elective subjects

* There are 7 levels of performance of every subject of HKDSE with Level 5** being the highest and Level 1 being the lowest. Please refer to the conversion table for converting HKDSE score to admission score for prioritization.

- Each HKDSE subject (including other languages and applied learning subjects) is assigned a weighting factor of either x5, x7 or x10 and each programme will have their own weighting factors for HKDSE subjects

- An attainment at "Attained" in "Citizenship and Social Development" is required for meeting the entrance requirement but NOT included in the admission score calculation.

- Undergraduate programmes offered by the Department will use the “Best 5” HKDSE subjects score (weighted) to compile the admission score for prioritization.

Conversion Table for HKDSE Score to Admission Score for prioritization

HKDSE Result	Converted Score
5**	8.5
5*	7
5	5.5
4	4
3	3
2	2
1	1

* Preferred HKDSE subject(s) with the highest weighting (x10) in admission score calculation:

BSc (Hons) in Architectural Studies
English

BSc (Hons) in Building Engineering and Management
English
Mathematics (including extended module M1 and M2)
Physics or Combined Science with Physics as one of the components

BSc (Hons) in Surveying
English

(b) For applicants applying for admission on the basis of other qualifications (Non-JUPAS and Non-local admissions), details on entrance requirements and admission process are to be referred to the prevailing Handbook on Academic Regulations and Procedures of the University and to be considered by the Department on case-by-case basis.

2.3 *Admission Procedures*

For applicants seeking admission via JUPAS, essentially the admission procedures will follow the prevailing JUPAS system adopted by tertiary education institutions in Hong Kong SAR.

For local and non-local applicants seeking admission via Non-JUPAS route, the Scheme Chair, and Award Co-ordinator of respective programme will be responsible for the admission process in conjunction with the Enrolment Officer of the Department.

All applicants will normally be selected on the basis of academic merits. For JUPAS applicants who have fulfilled the minimum entrance requirements for admission, aggregate weighted scores of HKDSE subjects will be adopted for prioritizing applicants for JUPAS iteration. Interview may be arranged and the interview score received by applicants will be used for adjusting the priority of JUPAS applicants. For Non-JUPAS and Non-local applicants, applications will be considered on case-by-case basis.

Portfolio submission and aptitude test, together with interview are adopted in addition to academic merits to select eligible candidates for seeking admission to the programme BSc (Hons) in Architectural Studies.

Admission for applicants nominated under the Outstanding Sportsmen Recommendation Scheme (OSRS); the JUPAS Sub-system for School Principal's Nominations (SPNS); the School Nomination Direct Admission Scheme (SNDAS), the Special Talents Admission & Recognition Scheme (STARS), and etc., administered by the University are to be referred to the corresponding sections of the University on admission and general enquiry, contained therein in the prevailing Handbook on Academic Regulations and Procedures.

Details on alternative entry route are to be referred to the prevailing Academic Handbook and applications. Applications will be considered on case-by-case basis, and subject to the availability of appropriate vacancy in the relevant programme(s) of Major(s).

2.4 *Policy to Permit Students to Transfer from One Major to Another*

(a) Applications for transfer of study within the University will be considered on case-by-case basis, subject to the prevailing regulations and procedures stipulated by the University. The University's Academic Regulations and Procedures for the 4-year Undergraduate Degree Majors (Programmes) govern the transfer of study within the University and between institutions.

(b) The Department of Building and Real Estate will consider each application on its own individual merit. The Department reserves the right not to grant transfer within the BRE Scheme.

Part II

Curriculum Design

3. University Framework on Curriculum Design of the PolyU 4-year Undergraduate Degree Programmes

The Department under the auspices of the Faculty of Construction and Environment is responsible to develop an appointment and coherent curriculum for the programme of each Major under the BRE Scheme within the broad University framework, which is in turn aligned with the programme outcomes of each Major and its requirements of the relevant professional/accreditation body/bodies.

3.1 *The Board University Framework*

Generic Learning Outcomes of the 4-Year Undergraduate Degree Curriculum

The overarching goal of the 4-year undergraduate degree curriculum is to promote the all-round development of human potentials to the fullest extent for the professions. PolyU will aim at nurturing and developing students with abilities/attributes that will prepare graduates to become "practical dreamers" and to be responsible global citizens in the 21st century. In addition to developing professional competence in a chosen discipline and multidisciplinary perspectives with a broad knowledge base, the generic learning outcomes that will be targeted are as follows: critical thinking, innovative problem solving, effective communication, lifelong learning, and social responsibility and global citizenship.

Underlying Principles in Designing the 4-Year Undergraduate Degree Structure

The ultimate aim of the new 4-year undergraduate degree structure is to benefit PolyU's students by providing a more flexible, student-centred, holistic professional education that is consistent with PolyU's goals and mission. To achieve this aim, the structure must be able to:

- re-affirm PolyU's mission and strategic objectives of achieving excellence in professional education, applied research and partnership,
- promote all-round development of human potentials to the fullest extent possible for the professions,
- provide more flexibilities for students both in admission and in their programme choice to suit the different backgrounds, aspirations and needs of the more diversified student intake.

Defining Characteristics of the 4-Year Undergraduate Degree Curriculum

Faculty Common First-Year Curriculum (FCFE)

The first-year experience is critical in shaping a student's development. The Faculty Common First-Year Curriculum (FCFC) should provide an introductory exposure to a variety of disciplines offered by the Faculty to help students explore and navigate their disciplinary interest and potential majors. The curriculum should include components that develop positive learning attitudes and behaviours from the outset of their academic journey at PolyU.

The Faculty Common First-Year Curriculum include foundational elements that provide a broad base of knowledge and skills. It should prepare students for further study in their chosen fields and equip them with essential skills (critical thinking, evidence-based reasoning, writing and verbal communication, and digital literacy) for personal and professional success.

Outcome-Based Education (OBE)

In line with PolyU's continued commitment to OBE, the provisions of General University Requirements and profession-specific requirements will be designed in accordance with the intended learning outcomes of the University and the programme, taking into account the views of the professional body and societal need.

General University Requirements (GUR)

The 27 credits of GUR will be distributed as follows:

Table 3.1 GUR areas and credits distribution

Areas	**Credits**
▪ Artificial Intelligence and Data Analytics Requirement (AIDA)	2
▪ Innovation and Entrepreneurship Requirement (IE)	1
▪ Language & Communication Requirements (LCR)	9
o English	(6)
o Chinese	(3)
▪ Leadership Education and Development (LEAD)	3
▪ Service-Learning (SL)	3
▪ Cluster-Area Requirements (CAR)	9
• 3 credits from each of the following 4 cluster areas	
o Human Nature, Relations and Development	(3)
o Science, Technology and Environment	(3)
o Chinese History and Culture	(3)
o Culture, Organizations, Societies and Globalisation	
And of which must fulfil 2 additional requirements:	
• English Reading and Writing (ER/EW) Requirements	
• Chinese Reading and Writing (CR/CW) Requirements	
▪ Healthy Lifestyle (non-credit bearing)	Nil
Total GUR credits	27

GUR subjects are to be academically rigorous for expanding students' intellectual capacity. These subjects will introduce a particular discipline, covering its foundational pre-suppositions, the structure of its knowledge domain, its approach of enquiry and study methodologies, as well as its major trends of development. These subjects should be well illustrated with appropriate examples and made attractive even to non-Majors students. Some of the GUR subjects should challenge students to analyse a major global or local issue from multidisciplinary perspectives, and to tackle the associated problems holistically. Consistent with the University's objective of developing students' critical thinking and language and communication skills, some GUR subjects should have an intensive reading, writing and presentation component built into the learning and assessment process. CAR subjects relating to healthy lifestyle may also be offered to enable students to further pursue this topic more rigorously.

Language & Communication Requirements (LCR)

The overall aim of the requirements is to facilitate students in satisfying the University's objectives of biliteracy and/or trilingualism in terms of their:

- general language proficiency
- language knowledge and skills necessary for effective study at university level
- literacy skills (reading and writing)
- language knowledge and skills necessary for entry into the Broad Discipline's discourse communities

These four aspects are addressed in the four major components of the overall English and Chinese language requirements, which must be fulfilled as part of the graduation requirements;

(i) Language & Communication Requirements (LCR) in English (6 credits) and Chinese (3 credits)
(ii) Writing Requirement (W)
(iii) Reading Requirement (R)
(iv) Discipline-specific Language Requirements

The 9 credits of LCR are the *minimum* credits that students are required to take as GUR. Programmes can stipulate further language and communication requirements within their DSR, according to the needs of their discipline. Requirements in writing and oral communication can further be integrated into students' professional studies and assessed accordingly.

Students will be required to take suitable languages subjects with reference to their HKDSE languages attainments. Students who can demonstrate that they have achieved the desired level (based on an assessment made by ELC or CLC as appropriate) may apply for subject exemption or credit transfer of the LCR subject or subjects concerned.

Students who are non-Chinese speakers (NCS), or whose Chinese standards are at junior secondary level or below, will also be subject to LCR-Chinese requirements. Different Chinese subjects will be designed and offered to suit the language background and standard of these groups of students. They will, however, by default be exempted from the Reading and Writing Requirements in Chinese and the Discipline-Specific Language Requirement in Chinese.

Cluster-Area Requirements (CAR)

Students have to choose and successfully complete a total of 9 credits from CAR subjects.

Students are required to fulfil the Writing (W) and Reading (R) Requirement in English and Chinese, by taking CAR subjects approved as meeting the W and R Requirements.

Other GUR Subjects

Students must complete 6 other credits under GUR, including 3 credits each on Leadership Education and Development and Service-Learning, respectively. In addition, all students must complete a non-credit bearing requirement on Healthy Lifestyle.

Leadership Education and Development

All students must successfully complete one 3-credit subject in the area of Leadership Education and Development, which is designed to enable students to (1) understand and integrate theories, research and concepts on the qualities (particularly intra-personal Education qualities) of effective leaders in the Chinese context, (2) develop greater self-awareness and a better understanding of oneself, (3) acquire interpersonal skills essential for functioning as an effective leader, (4) develop self-reflection skills in their learning, and (5) recognise the importance of the active pursuit of knowledge on an intra-personal Education and l level and its relationship to leadership qualities.

Free Electives

Free electives under the 4-year Ug degree programmes refer to any subjects (including CAR subjects) offered by the University, unless otherwise specified.

Service Learning

All students must successfully complete one 3-credit subject designated to meet the Service-Learning Requirement, in which they are required to (1) participate in substantial community service or civic engagement activities that will benefit the service users or the community at large in a meaningful way, (2) apply the knowledge and skills acquired from their Major or other learning experiences at the University to the community service activities, and (3) reflect on their service-learning experience in order to link theory with practice for the development of a stronger sense of ethical, social and national responsibility.

Artificial Intelligence and Data Analytics Requirement (AIDA)

All students must successfully complete one 2-credit subject in the area of Artificial Intelligence and Data Analytics, which is designed to (i) demonstrate an understanding of the foundational concepts of Artificial Intelligence and Data Analytics (AIDA); (ii) acquire basic skills in using AIDA technologies and applications; (iii) articulate examples of how the adoption AIDA could enhance their chosen disciplines; and (iv) demonstrate an awareness of global contemporary ethical issues and impact from AIDA applications in daily life.

Innovation and Entrepreneurship Requirement (IE)

All students must successfully complete one 1-credit subject in the area of Innovation and Entrepreneurship, which is designed to (i) demonstrate an elementary understanding of innovation and entrepreneurship; (ii) appreciate the importance of innovation and entrepreneurship in local and global community; (iii) appreciate the applications and implications of the latest technologies on entrepreneurship and innovation in their chosen disciplines; and (iv) identify ethical issues in entrepreneurship and innovation.

Discipline-Specific Requirements (DSR)

To prepare our graduates to be versatile and adaptive to meet the fast changing needs of the profession and the society in the 21st century, the discipline-specific curriculum at the undergraduate level aims at developing students' fundamental discipline-specific knowledge and the skills they need to function effectively as a beginning professional in their chosen field. Particular emphasis shall also be given to the development of students' generic competencies in the professional context within the discipline-specific curriculum.

DSR subjects form the major components of an undergraduate degree curriculum and are collectively referred to as "Major". The word "Major" will however not appear on the award parchment.

There must be a mandatory requirement in DSR for students to complete 2 subjects (each of minimum 2 credits) which contain the necessary embedded language requirements in English and in Chinese.

Work Integrated Education (WIE)

All programmes shall include the mandatory requirement for WIE.

Capstone Project

All programmes are required to include in its DSR a Capstone Project/experience (minimum of 3 credits) such that students' learning experience accumulated over the entire undergraduate study will be consolidated in a project or thesis in their final year. This capstone experience will help students develop their generic competencies, as well as prepare them for professional practice in the workplace, for further academic pursuits, and for lifelong learning. These subjects shall include specific elements of study directed toward cultivating the following desired graduate attributes:

- Socially responsible leaders with a strong sense of national pride and a global outlook
- Future-ready professionals who possess technical acumen
- Criteria thinkers and creative problem solvers
- Effective communication and collaborators
- Adaptable and Lifelong learning

A summary of the curriculum structure and graduation requirements for 4-year full-time undergraduate programmes (based on a single discipline Major) is given in Section 3.2 and 3.3.

3.2 *University Graduation Requirements for 4-year Full-time Undergraduate Degree*

All candidates qualifying for a 4-year Full-time Undergraduate Degree must meet:
1. the University Graduation Requirements, and
2. the specific graduation requirements of their chosen programme of study (Majors and Secondary Major, Minors).

The minimum University Graduation Requirements are explained in the sections below. For the graduation requirements of specific programmes of study (Majors and Minors), candidates should refer to the relevant section of the Programme Requirement Document or consult the programme-offering departments concerned.

Summary of University Graduation Requirements

To be eligible for a PolyU Bachelor's Degree under the 4-year full-time undergraduate curriculum, a student must:

1. Complete successfully a minimum of 120 credits.
2. Earn a cumulative GPA of 1.7 or above at graduation.
3. Complete successfully the mandatory Work-Integrated Education (WIE) component as specified by their programme/major.
4. Satisfying the National Education (NE) Requirement.
5. Satisfy the following requirements in general education.

Table 3.2 Requirements of GUR and credits distribution

▪ Artificial Intelligence and Data Analytics Requirement (AIDA)	2 credits
▪ Innovation and Entrepreneurship Requirement (IE)	1 credit
▪ Language & Communication Requirements (LCR)	9 credits
o English (6 credits) o Chinese (3 credits)	
▪ Leadership Education and Development (LEAD)	3 credits
▪ Service-Learning (SL)	3 credits
▪ Cluster-Area Requirements (CAR) • 3 credits from each of the following 4 cluster areas: o Human Nature, Relations and Development o Science, Technology and Environment o Chinese History and Culture o Culture, Organizations, Societies and Globalisation And of which must fulfill 2 additional requirements: • English Reading and Writing (ER/EW) Requirements • Chinese Reading and Writing (CR/CW) Requirements	9 credits
▪ Healthy Lifestyle (non-credit bearing)	Nil
	Total = 27 credits

Language and Communication Requirements (LCR)

English

All undergraduate students must successfully complete two 3-credit English language subjects as stipulated by the University (Table 3.1). These subjects are designed to suit students' different levels of English language proficiency at entry, as determined by their HKDSE score or the English Language Centre (ELC) entry assessment (when no HKDSE score is available). Students who are weaker in English at entry (with a HKDSE score of Level 3 with one or two sub-scores below Level 3) are required to take one or two extra credit-bearing English Language Enhancement subject(s) offered by ELC in their area(s) of weakness, as a pre-requisite for taking English LCR subjects.

Students who can demonstrate that they have achieved a level beyond that of the LCR proficient level subjects as listed in Table 3.2 (based on an assessment by ELC) may apply for subject exemption or credit transfer of the LCR subject or subjects concerned.

Table 3.3: English LCR Subjects (3 credits each)

	Subject		
English language competence level	**Practical English for University Studies**	**English for University Studies**	**Any LCR Proficient level elective subject in English (Table 3.4)**
HKDSE Level 4 and above or equivalent	--	Subject 1	Subject 2
HKDSE Level 3 or equivalent	Subject 1	Subject 2	--

Table 3.4: Proficient level elective subjects for DSE Level 4 students and above (or equivalent) (3 credits each)

	Subject Title	**Subject Code**
LCR Proficient level elective subjects	Advanced English Reading and Writing Skills	ELC2011
	Persuasive Communication	ELC2012
	English in Literature and Film	ELC2013
	Advanced English for University Studies	ELC2014

* Students entering the University with specified attainment grades in certain public examinations can be given credit transfer or exemption for one or both LCR English subjects. For the subject exempted, students must take any other subject to make up the 3 credits. For the subject granted credit transfer, student do not need to take any other subject to make up the credits. For details, please consult your programme offering department.

Chinese

All undergraduate students are required to successfully complete one 3-credit Chinese language subject as stipulated by the University (Table 3.5). These Chinese subjects are designed to suit students' different levels of Chinese language proficiency at entry, as determined by their HKDSE score or the Chinese Language Centre (CLC) entry assessment (when no HKDSE score is available). Students who are weaker in Chinese at entry (with HKDSE sub-scores of Level 2) will be required to take one or two extra credit-bearing Chinese Enhancement subject(s) offered by CLC, in their area(s) of weakness, as a pre-requisite for taking the Chinese LCR subject. Students can also opt to take additional Chinese LCR subjects in their free electives.

Students who are non-Chinese speakers (NCS), or whose Chinese standards are at junior secondary level or below, will also be required to take one LCR subject specially designed to suit their language background and entry standard as shown in Table 6.

Students who can demonstrate that they have achieved a level beyond that of the course "Advanced Communication Skills in Chinese" (based on an assessment made by CLC) may apply for subject exemption or credit transfer of the LCR subject concerned.

Table 3.5: Chinese LCR Subjects (3 credits each)

Subject Code	Subject Title	MoI
CLC1104C	University Chinese	Cantonese
CLC1104P	University Chinese	Putonghua

For non-Chinese speaking students or students whose Chinese standards are at junior secondary level or below:

Depending on your Chinese Language Centre entry assessment result, one subject from Table 3.5 will be pre-assigned to you as Chinese LCR. You are also exempted from the Chinese Reading and Writing Requirements of CAR.

Table 3.6: Chinese LCR Subjects for non-Chinese speakers or students whose Chinese standards are at junior secondary level or below

Subject Code	Subject Title
CLC1151	Chinese I (for non-Chinese speaking students)
CLC1152	Chinese II (for non-Chinese speaking students)
CLC2151	Chinese III (for non-Chinese speaking students)
CLC2154	Chinese IV (for non-Chinese speaking students)
CLC2152	Chinese Literature – Linguistic and Cultural Perspectives (for non-Chinese speaking students)

* Students entering the University with specified attainment grades in certain public examinations can be given credit transfer or exemption for the LCR Chinese subjects. For the subject exempted, students must take any other subject to make up the 3 credits. For the subject granted credit transfer, student do not need to take other subject to make up the credits. For details, please consult your programme offering department.

Writing Requirement

In additional to the LCR in English and Chinese explained above, all students must also, among the Cluster Areas Requirement (CAR) subjects they take (see section (e) below), pass one subject that includes the requirement for a substantial piece of writing in English and one subject with the requirement for a substantial piece of writing in Chinese.

Reading Requirement

All students must, among the CAR subjects they take, pass one subject that includes the requirement for the reading of an extensive text in English and one subject with the requirement for the reading of an extensive text in Chinese.

A list of approved CAR subjects for meeting the Writing Requirement (with a "W" designation) and for meeting the Reading Requirement (with an "R" designation) is shown at: https://www.polyu.edu.hk/ous/GURSubjects/

Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR-Chinese and CAR-Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.

Note: In addition to the LCR in General Education Requirements, students also have to complete 4 credits of discipline-specific language requirements (2 credits in English and 2 credits in Chinese) as specified in the curriculum requirements of their Major.

Leadership Education and Development

All students must successfully complete one 3-credit subject in the area of Leadership Education and Development, which is designed to enable students to (1) understand and integrate theories, research and concepts on the qualities (particularly intra-Education and Development l qualities) of effective leaders in the Chinese context, (2) develop greater self-awareness and a better understanding of oneself, (3) acquire interpersonal skills essential for functioning as an effective leader, (4) develop self-reflection skills in their learning, and (5) recognise the importance of the active pursuit of knowledge on an intra-personal and interpersonal level and its relationship to leadership qualities.

A list of designated subjects for meeting the leadership and intra-personal development requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

Service-Learning

All students must successfully complete one 3-credit subject designated to meet the service-learning requirement, in which they are required to (1) participate in substantial community service or civic engagement activities that will benefit the service users or the community at large in a meaningful way, (2) apply the knowledge and skills acquired from their Major or other learning experiences at the University to the community service activities, and (3) reflect on their service learning experience in order to link theory with practice for the development of a stronger sense of ethical, social and national responsibility.

These subjects may take the form of:

- An open-to-all GUR subject,
- A GUR service-learning subject targeted for students with certain background, or
- A DSR subject that fulfils the requirements of the service-learning requirement as well as the discipline-specific requirements.

Students who have satisfied the Service-Learning Requirement via a customized DSR subject will be required to take another 3-credit subject to make up for the total credit requirement.

A list of designated subjects for meeting the service-learning requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

Cluster Areas Requirement (CAR)

Students have to choose and successfully complete a total of 9 credits from CAR subjects according to their own interests, with 3 credits to be selected from each of the 4 cluster areas.

Students are required to fulfil the Writing (W) and Reading (R) Requirement in English and Chinese, by taking CAR subjects approved as meeting the W and R Requirements.

Other GUR Subjects

Students must complete 6 other credits under GUR, including 3 credits each on Leadership Education and Development and Service-Learning, respectively. In addition, all students must complete a non-credit bearing requirement on Healthy Lifestyle.

Healthy Lifestyle

Students are required to complete the following components: (i) sports training/participation, (ii) e-learning modules, and (iii) lectures/talks. The syllabus covers physical health, mental health, social health, spiritual health, values and priorities on healthy behaviour with reference to competing priorities in life, reflections on healthy living, and plans for self-improvement or maintaining healthy behaviour. Details of the programme can be found at:
https://www.polyu.edu.hk/ous/GURSubjects/HLS.php

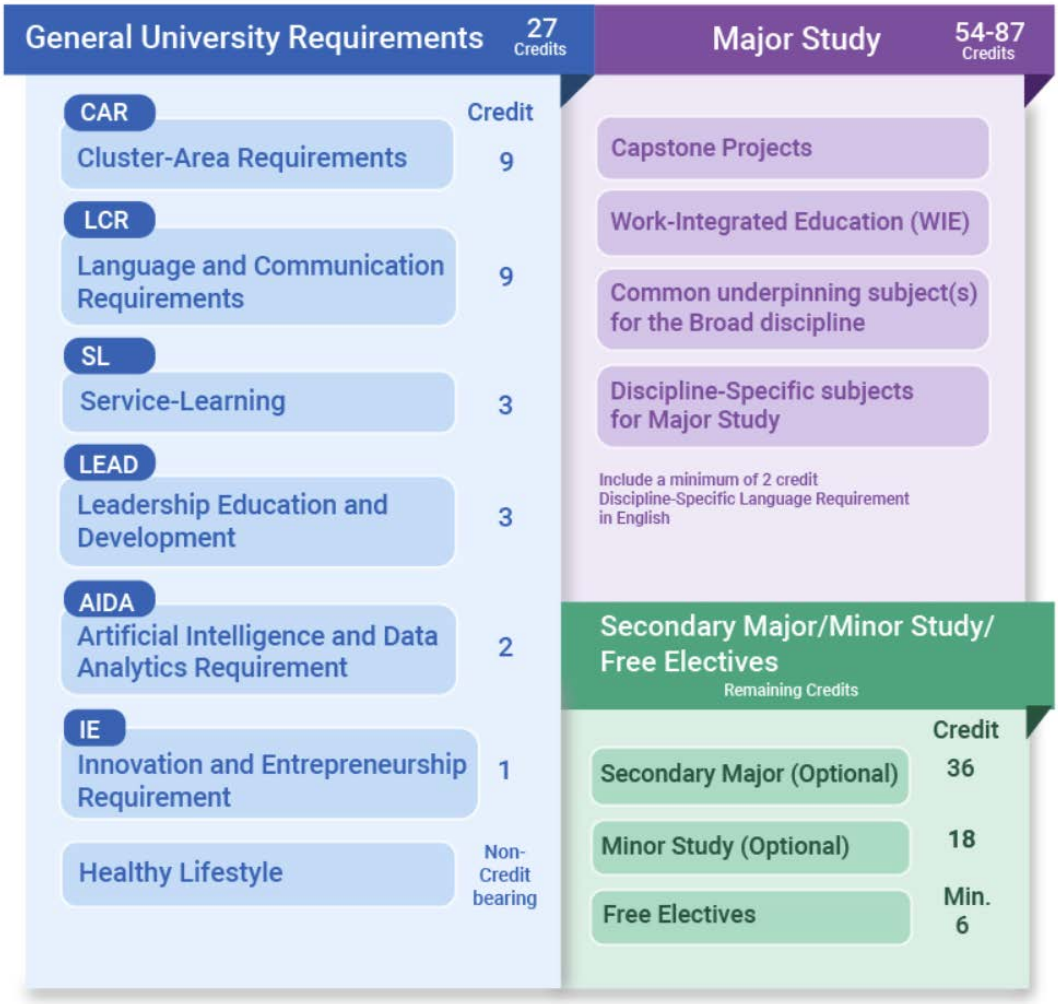
Artificial Intelligence and Data Analytics Requirement (AIDA)

All students must successfully complete one 2-credit subject in the area of Artificial Intelligence and Data Analytics, which is designed to (i) demonstrate an understanding of the foundational concepts of Artificial Intelligence and Data Analytics (AIDA); (ii) acquire basic skills in using AIDA technologies and applications; (iii) articulate examples of how the adoption AIDA could enhance their chosen disciplines; and (iv) demonstrate an awareness of global contemporary ethical issues and impact from AIDA applications in daily life.

Innovation and Entrepreneurship Requirement (IE)

All students must successfully complete one 1-credit subject in the area of Innovation and Entrepreneurship, which is designed to (i) demonstrate an elementary understanding of innovation and entrepreneurship; (ii) appreciate the importance of innovation and entrepreneurship in local and global community; (iii) appreciate the applications and implications of the latest technologies on entrepreneurship and innovation in their chosen disciplines; and (iv) identify ethical issues in entrepreneurship and innovation.

3.2 ***Curriculum Structure and Graduation Requirements for 4-year undergraduate programmes (applicable to a single discipline Major, or a Major plus a Minor)***



Note: The minimum credit requirement for graduation is 120.

4. Curriculum Design: General University Requirements

General University Requirements (GUR) Structure

Table 4.1 GUR areas and credits distribution

GUR Requirements	**Credits**
▪ Artificial Intelligence and Data Analytics Requirement (AIDA)	2 credits
▪ Innovation and Entrepreneurship Requirement (IE)	1 credit
▪ Language & Communication Requirements (LCR)	9 credits
o English (6 credits) o Chinese (3 credits)	
▪ Leadership Education and Development (LEAD)	3 credits
▪ Service-Learning (SL)	3 credits
▪ Cluster-Area Requirements (CAR) • 3 credits from each of the following 4 cluster areas: o Human Nature, Relations and Development o Science, Technology and Environment o Chinese History and Culture o Culture, Organizations, Societies and Globalisation And of which must fulfill 2 additional requirements: • English Reading and Writing (ER/EW) Requirements • Chinese Reading and Writing (CR/CW) Requirements	9 credits
▪ Healthy Lifestyle (non-credit bearing)	Nil
	Total = 27 credits

5. Curriculum Design of the Discipline-Specific Major in Building Engineering & Management

5.1 *Programme Philosophy*

Origins of the Programme

From 1987 until 1992, the Department offered an unclassified B.Sc. Degree course in Building Technology and Management. The unclassified Degree course was accredited then by both Council of National Academic Accreditation (CNAA) and Chartered Institute of Building (CIOB).

In 1993, the unclassified Degree course of Building Technology and Management was successfully upgraded to an Honours Degree course with Honours for student intake from 1992 and was accredited by the Hong Kong Council for Academic Accreditation (HKCAA), the Chartered Institute of Building (CIOB) and the Hong Kong Polytechnic Academic Validation and Review Committee. The new title of BSc (Hons) in Building Engineering and Management was introduced to replace the former course titled BSc (Hons) in Building Technology and Management. The changed title was approved by the Senate held in February, 1999.

In formulating the aims and philosophy of the Programme, the Programme Planning Committee is cognisant of the following fundamental considerations:

<u>The Construction and Real Estate Industry</u>

The construction and real estate industry is interdisciplinary by nature. The whole process of real estate development, from site identification, through acquisition, evaluation, funding, design, construction, marketing and management (during occupation) is carried out by an interdisciplinary project team. A key factor in the successful delivery of built facilities is the achievement of cohesion in the project team. The professionals who make up the team will provide specialist skills in their own area. However, it is important that they have an understanding of the abilities and services which are provided by other professionals within the construction and real estate industry and sometimes beyond.

The need for this interdisciplinary and integrated approach is already established and it will continue to grow with the constraints which impinge on modern real estate development. Project teams need to work together to solve the problems of time, cost, safety, environmental protection and quality construction in providing the client with the completed building.

The requirements of the construction industry and its related professions are constantly changing under the influence of global economy. There will be continued demand for graduates who are able to cope with and manage changes as well as to keep up-to-date technological knowledge. Construction technology, management, communication and information technology within the industry are advancing in importance, as is the need to be aware of the financial context within which construction decisions are made.

It is crucial that the Department plays a role in the response to the challenges facing the industry by assisting, guiding and leading the development of the industry. The Department already has excellent relationships with the industry in research, consultancy, participation in the work of the professional bodies, providing continuing professional development programmes, as well as an Advisory Committee which is very supportive in general and with respect to this programme in particular.

The Changing Face of Hong Kong

Hong Kong is a small territory comprising some 1060 square kilometres and its transformation from a poor and under developed economy in the 1950's to a modern, prosperous, industrialized and international city of the 1990's has been remarkable. In a matter of forty years, the entrepot port, with a post-war population of 600,000 and with very limited industrial development, has grown into a highly urbanised and industrialised export and re-export led economy, with a population of over six million.

Hong Kong has close ties with and been greatly benefited by the Mainland China ever since China has been practising an 'open-door' economic policy since 1981. With Mainland China's move to modernization, massive building works have commenced on the Mainland. At the same time, Hong Kong is changing its role to a knowledge-based economy. Hong Kong is regarded to be one of the main sources for the provision of technological knowledge and management expertise to China, particularly in the construction and real estate market due to its proximate location.

In July, 1997 saw the political formalities finalised: the return of sovereignty whilst Hong Kong's business and commercial connections with Mainland China have already well established particularly so with Guangdong province and the Pearl River Delta. Hong Kong is benefiting from Mainland China's thriving economic growth. In increasing international competitiveness, Hong Kong is to continue to provide expertises in construction engineering, management skills and construction economics to Mainland China. In addition, the recent rapid expansion of the Macau construction sector has also offered ample opportunities to our graduates. This growth in the construction activities is expected to continue until the next decade.

The construction and real estate industry is among Hong Kong's most important in terms of investment expenditure. Land is still in demand for housing, business and industry. As a result of the constraint of limited usable land supply, it has led to the erection of much higher buildings and more diversified and integrated building complex developments with deep basement construction to maximize the return from the use of available land. The building industry has to work at great speed and overcome site and construction problems using construction techniques, mechanical equipment and production management suitable for fast and safe construction. The infrastructures development is vital to the revival of Hong Kong's economic growth in the 21st century.

At the same time there should be a large volume of building construction for the development of land areas at the location of Kai Tak and the development surrounding the current airport in Chap Lap Kok. All these construction works require a large number of efficient construction manager/building engineers with a sound base of construction engineering and production management fundamentals.

Fundamental construction engineering principles and production management techniques, innovative technological knowledge, skills in information technology, the awareness of the effects of environmental problems and the international climate in socio-economic and political situations are required for local demands in her changing to a knowledge-based economy as well as in sustaining her established link with Mainland China in expertise and financial services.

Rationale for the Programme

By examining the inter-relationships between construction technology and management, their current knowledge, status and philosophy may be unfolded. Construction technology is founded as a branch of applied science, whilst construction management is a management discipline devoted to engineering organization and efficiency in production. With the recent developments in the construction industry, construction technology and management do not only ensure efficient site production but also the integration and co-ordination of many different elements in construction. These include:

* design and production disciplines
* incorporation of building services
* construction cost monitoring
* maintenance planning and management

Thus, there has been a significant trend of developing the position of the construction manager to the decision making role not only in the production phase but, sometimes also, in the design phase. This is more so with the move of building works to the design of fast-track construction, design and build, prefabrication and the like. In enhancing his/her consultative ability, the construction manager has been developing additional professional services for the client. These professional services have broadened the range of knowledge and skills offered by the building (production) engineering particularly in the area of engineering design and the different construction processes. Hence, the construction managers concern the design and management of efficient building construction process other than a building production manager.

Construction technology and management can be regarded as a building (production) engineering discipline. It ensures an orderly, purposeful and planned way to build; to identify; to define and to solve constructional problems as well as to integrate the client's and consultants' requirements. Fulfilling these requirements requires intellectual and creative people and this will result in the construction of quality buildings incorporating new construction concepts and processes. Furthermore, it also provides the concepts and techniques to integrate and co-ordinate different building disciplines, bearing cognizance of the socioeconomic and socio-political climate together with environmental problems and the contextual outlook. The construction industry is a dynamic process through which building production is integrated efficiently with society’s purposes and engineering values.

In summary, in the role of a building engineer/construction manager, besides being an efficient manager, the graduate must also be an effective innovator of change within the organization and the industry at large. The programme is therefore structured to develop the student's ability to communicate effectively and to interact in leading role ascribed by the construction industry.

Philosophy of the Programme

Undergraduate education in building must be intrinsically be associated with the industry that this programme endeavours to serve. The programme is designed to provide a programme of study which is both academically rigorous and provides the specific professional expertise in the production engineering/management discipline, so that graduates may play a leading proactive role within the construction industry.

Without overloading individual subject on the programme as a whole, the student efforts will be directed toward coordinating and integrating the construction engineering and construction managerial aspects of the construction industry. The degree programme has been developed to provide a broad, yet rigorous, grounding of education in the engineering technology and management principles and concepts, applied construction economics and legal studies of building construction, whilst at the same time developing students' abilities to be innovative and creative in solving unique construction problems.

To this end, the programme has been structured to provide four areas of study, namely technology, management, context and integrative studies.

Engineering-Technology: The necessary science and engineering underpinning the knowledge base and the professional practice for the programme.

Management: The initiative and abilities necessary for the control and coordinating of the people and processes and resources of construction projects.

Context: The scope, limitations and constraints of the environment within which the construction manager operates, such as economic, legal and social framework.

Integration (Integrative Studies) through Projects & Capstone Project: The holistic and integrative ability to create synergy within terms and projects. It focuses on the fundamental understanding of the requirements of the programme. It relates closely to the integrating project subjects used to provide both horizontal integration of the subject units and a vertical link for curriculum development. Throughout the programme, the knowledge and techniques of research for the design, analysis and computation of data are emphasized.

The programme therefore aims to produce graduates who are innovative, imaginative and can initiate and respond to change by the application of their skills and knowledge.

It is this framework for the programme that offers the graduate the expertise, flexibility and opportunity to develop a wider range of mental abilities so facilitating the development of the proactive role in the construction industry.

5.2 *Programme Aims*

The BEM programme aims to produce graduates who can develop into highly competent and professional building engineers for Hong Kong, China and the international market. It aims to equip students with the knowledge and ability in the production of buildings and facilities so that they will be able to contribute effectively to project and facilities management teams engaged in complex building projects.

The changing demands of the construction industry require that the graduate is capable of leading the profession forward by adopting a dynamic approach to the future development of the profession. This programme is designed so that the graduate will continue to develop professionally during his professional career.

5.3 *Specific Programme Outcomes*

Programme outcomes refer to the intellectual abilities, knowledge, skills and attributes that an all-rounded preferred graduate from BEM programme should possess.

To ensure fulfilment of the goal of developing all-round students with professional competence, it is required that outcome statements encompass the following two categories of learning outcomes:

5.3.1 **Professional/Academic Knowledge and Competence**

Upon successful completion of the programme, the graduate is expected to action the following abilities:

(i) To possess knowledge of building engineering principles, processes and methods for the successful completion of all types of construction projects.
(ii) To use the techniques, skills and engineering principles for different types of construction.
(iii) To apply construction management knowledge and skills in personnel, financial and operational practices and communication aspects required for efficient building production.
(iv) To identify, structure and analyse diverse problems arising from the changing social, economic, environmental and technological pressures.
(v) To solve identified construction problems with appropriate solutions.
(vi) To evaluate alternative strategic options.
(vii) To select appropriate construction materials, practices and methods in compliance with sustainable development.
(viii) To exercise professional judgement in the consideration of alternatives in complex situations.

5.3.2 **Attributes for All-roundedness**

As all undergraduate programmes are under the BRE Degree scheme, the attributes for all-roundedness listed are the same under the scheme.

Upon successful completion of the programme, the students are expected to possess the following attributes for all-roundedness:

(i) To possess skills to identify, analyse and solve problems.
(ii) To have an understanding of professional, social and ethical responsibilities.
(iii) To communicate effectively.
(iv) To reflect on knowledge gap for life time learning.
(v) To contribute as team member and to lead effectively.
(vi) To identify contemporary issues.

Note: PolyU aspires to develop all its students as all-round graduates with professional competence, and has identified a set of highly valued graduate attributes can be developed through the curricular activities of this programme, some (including the all-rounded attributes of 'B4 to reflect on knowledge gap for life time learning and B6 to identify contemporary issues' contained therein in the curriculum mappings of the Majors in BSc (Hons) in Building Engineering & Management and BSc (Hons) in Surveying) are primarily addressed through co-curricular activities offered by faculties, departments, and various teaching and learning support units of the University. Students are encouraged to make full use of such opportunities to develop these attributes.

5. Curriculum Design of the Discipline-Specific Major in Surveying

5.1. *Philosophy of the Major*

Origins of the Major

The Department of Building and Real Estate together with its predecessors together have over 80 years of experience delivering surveying education. It now runs a four-year Surveying programme, which has proved to be one of the university's most popular among high achievers. It offers advanced subjects in the third and fourth years with electives in Building Surveying, General Practice Surveying, Planning and Development, Property and Facility Management, and Quantity Surveying.

It has been our aim to offer a course that is academically rigorous and professionally relevant, a course that will prepare its graduates for life-long learning, and both immediate and long-term employability. The course is underpinned by the academic disciplines of economics, urban sustainability policy, management and technology, whilst complemented and supplemented with inter-disciplinary integrated projects, summer placements through Work Integrated Education and exchange programmes. Students will learn to apply transferrable knowledge to solve built environment problems from various perspectives. Striving to provide an education that is professionally relevant, we have been inviting guest speakers and, capitalizing on our rich alumni network, asking our distinguished alumni to share their experience with our students. Our graduates will be equipped with broad knowledge of building and real estate in a global context, as well as basic surveying skills that would facilitate their continuous professional development and progression to assume a wide range of key roles in the profession and industry.

The Programme aims to prepare students with fundamental knowledge and skills in the inter-disciplinary professions of land, property and construction for their immediate employability and lifelong learning. The Programme underpins surveying studies with the disciplines of economics, urban sustainability policy, management and technology. Graduates will enter the professions of building surveying, quantity surveying, property & facility management, planning & development, or general practice surveying as graduate trainees but with full potentials to readily become full-fledged professional surveyors and finally take leading and strategic roles in the profession and business of land, property and construction and make contributions to the community through their chosen professional services.

Identification of specific challenges which the course is designed to meet

The general aims and outcomes of the course is to provide educational programmes in the construction and real estate sectors which enable students to develop their full potential for academic and personal development within their chosen professional discipline, thus contributing to the Department's mission of achieving excellence in the context of construction and real estate. We shall provide an appropriate platform for our students within an academic environment to develop his/her knowledge, skills and abilities by application of the methods and practices involved in the building and real estate industry. We aim to produce students with a careful balance of intellectual, vocational and practical constituents relating to building and real estate with independent thinking, an inquiry mind, confidence and professionalism. Our students will have received a rigorous professional education upon graduation to continue to develop professionally during their career as changing demands of the construction industry require graduates capable of leading the profession forward by adopting a dynamic approach to the future development of the profession and life-long learning for his/her personal development. Students will also be equipped with both technical and social skills to navigate the opportunities and challenges presented by the era of artificial intelligence.

The construction and property sectors have always played pivotal role in Hong Kong economy. The development, investment, construction and maintenance of properties have always been capital-intensive. It is perhaps more so in the case of Hong Kong because local land prices have been among the highest in the world, and construction costs are among the highest, if not the highest, in the world. Hong Kong is the regional if not global financial centre in Asia, as well as the leader in the syndication of bank loans for property development and infrastructure projects. With the further development of debt market, the securitization of particularly real assets and increasing sophistication in financial engineering, the role of surveyors as economic advisors will become all the more crucial in the future. Due to the increasing sophistication in financial engineering, project complexity is poised to grow.

Besides financially complex, property development and construction have always been legally, technologically and managerially complex. There is a complex set of institutional, legislative and regulatory frameworks that surveyors work with in the business of land, property and construction. Due to the public's increasing awareness on environmental protection and conservation, the planning, building and environmental regulations are expected to become more stringent. Once a project goes to the design and construction stage, surveyors face the frequent quest for technological and managerial innovations for sustainable construction. To make the most efficient and effective use of resources including time, materials, technology and human resources; surveyors need to be able to identify, adopt and adapt such innovations as concurrent and lean construction, advanced and proprietary technology, web-based project management and delivery, and inter-organizational partnership and strategic alliances.

With the increasing stock of buildings and the growing concern for public health, there is consequent exigency on the part of the surveying profession to fulfilling the rising aspiration of the public to live in a safe, healthy, productive and engaging built environment. Besides, as more businesses come to regard their properties as strategic assets, there arises the opportunities for the surveying profession to cater for their need of corporate asset and facility management services. To play an instrumental role in raising living standards and managing what are generally the most valuable assets of companies, surveyors need to be competent in all the technological and social-economic aspects of building, maintenance and property management.

Surveyors manage the productive and profitable use of land, property and construction resources. Their careers have always been challenging, and the more so in the future. Clients and users themselves are getting more sophisticated, knowledgeable and thus demanding. Advances from basic and applied research from the academic community and industry will present surveyors with complex challenges. To contribute to the well-beings of the community by providing specialized services in enhancing the built environment, surveyors of the future need to be educated in the four inter-woven and inseparable subject areas that underpin the body of knowledge of the surveying profession: technology, management, urban sustainability policy and economics in the context of land, property and construction. The Building and Real Estate Department seek to offer a 'generic' surveying programme to meet these needs.

5.2 *Rationale for Generic Surveying*

In the property, infrastructure and construction sectors in Asia and beyond, there is an increasing trend of privatization, vertical integration and foreign participation. It is attributed to both globalization and de-regulation of markets, particularly consequent to the accession of an increasing number of countries, including China Mainland, to the World Trade Organization. With further integration of the local economy with that of the Mainland, and with the increasing integration of the property and financial markets, there emerges the need for the surveying professionals that are also competent in providing integrated services.

With increasing opening up of markets come the increasing market competition and thus the need for achieving optimal business efficiency. In Hong Kong, there is an increasing trend of vertical integration of professional and business services, innovative property and construction financing, private participation in public services, and securitization of direct properties. There is increasing complexity in every aspect of the entire project delivery process including innovative financing and legal arrangements, complex contract documentation, and integrated design, construction and maintenance of buildings and infrastructure projects. As the Construction Industry Review Committee advocated, there should be less segmentation within the property and construction industry, and innovative project delivery process will involve further integration of hereto generally separate and compartmentalized professional disciplines. Their recommendations have been accepted and strategies and policies will be designed and implemented to encourage further integration of the development, construction and maintenance processes.

Future surveyors will be presented with the challenges brought about by the fundamental changes in the philosophy and logistics of project delivery. The quest for sustainable development and construction, and the new paradigms in property development, construction and maintenance will require the next generation of surveyors to adopt a holistic approach to tackle problems. Future generations of surveyors must be equipped with a broad-based knowledge in each of the traditional surveying disciplines including building surveying, general practice surveying, planning & development, and quantity surveying. As we have witnessed, new modes of project delivery and process, resulting from further integration and privatization for example, have the effect of changing or even demolishing the traditional boundaries of surveyors' works. For example, with the growth of various forms of Public Private Partnership, quantity surveyors need to understand how the unorthodox and ad-hoc financing and legal arrangements would impact on contract documentation and administration. Similarly, building surveyors need to address how the arrangements would impact on building maintenance and facility management. Another example involves the securitization of assets. General practice surveyors need to understand the effect of securitization and its impacts on property valuation, and on building management and the procurement of maintenance contracts, which are usually done by building surveyors and quantity surveyors in the past.

Our next generation of surveyors must be able to comprehend the broad issues concerning land, property and construction so as to be able to work best in his or her chosen surveying disciplines, which themselves are also likely to change. They should be well prepared to grasp opportunities such as the Belt and Road initiatives can offer. They have to be well poised for post-graduate and life-long learning, as what they will have learnt will never be enough. Yet, they will be able to adopt and adapt basic skills and re-apply them in another setting such as China Mainland, and identify and fill their knowledge gaps through life-long learning. In order to be prepared for this life-long quest for learning, they will be trained to think conceptually and in an abstract way in this course. They will be required to think beyond how tasks are performed into why they are performed at all. Procedures and practices will be forever changing to suit the forever changes in the social-economic, legal, political and technological aspects of the built environment.

However, we believe that an understanding of the generic principles and fundamentals of the surveying profession will enhance the self-learning ability of our students when they graduate. And this learning ability can be best cultivated by taking an integrated and holistic approach to appreciate how everything is connected with each other in the education and profession of surveying. This generic degree will provide our students with the basic framework on which to build their career.

5.3 *Philosophy of the Major*

This generic course emphasizes the interconnections rather than the divisions among the four major professional surveying disciplines. Students will be given the opportunity to learn the essential elements of basic science and professional practice through an integrated approach. Professional ethics runs as a consistent thread throughout the curriculum, and will form a key ingredient in professional practice. Graduates will be ready to proceed to postgraduate training and lifelong personal and professional development. The design of the new course reflects educational principles, as follows. Undergraduates will acquire basic skills so that core competencies could be built on during the post-graduate training period. They shall be able to identify, acquire and sharpen specialist ones that may arise or change over from time to time in the future.

5.4 *Programme Aims of the Major*

The Programme aims to prepare students with fundamental knowledge and skills in the inter-disciplinary professions of land, property and construction for their immediate employability and lifelong learning. The Programme underpins surveying studies with the disciplines of economics, urban sustainability policy, management and technology. Graduates will enter the professions of building surveying, quantity surveying, planning & development, property and facility management, or general practice surveying as graduate trainees but with full potentials to readily become full-fledged professional surveyors and finally take leading and strategic roles in the profession and business of land, property and construction and make contributions to the community through their chosen professional services.

5.5 *Programme Outcomes of the Major*

Programme outcomes refer to the intellectual abilities, knowledge, skills and attributes that an all-round preferred graduate from surveying programme should possess.

To ensure fulfilment of the goal of developing all-round students with professional competence, it is required that outcome statements encompass the following two categories of learning outcomes:

5.5.1 **Professional/Academic knowledge and competencies**

Upon successful completion of the programme, the students and expected to attain the following abilities:

(i) To comprehend and identify issue and problems concerning land, property and construction at project level.
(ii) To comprehend and identify issue and problems concerning land, property and construction at corporate level.
(iii) To comprehend and identify issue and problems concerning land, property and construction at industry level.
(iv) To comprehend and identify issues and problems concerning land, property and construction at marco social-economic and political level.
(v) To advise clients through rendering surveying services.
(vi) To identify, formulate and solve problems related to the surveying profession and real estate industry.

(vii) To analyse and interpret data of the industry.
(viii) To formulate and implement strategies, policies and solutions for sustainable development and construction.

5.5.2 **Attributes for all-roundedness**

As all undergraduate programme are under the BRE Degree scheme, the attributes for all-roundedness listed are the same under the scheme.

Upon successful completion of the programme, for all-roundedness, the students are expected:

(i) To possess skills to identify, analyse and solve problems.
(ii) To have an understanding of professional, social and ethical responsibilities.
(iii) To communicate effectively.
(iv) To reflect on knowledge gap for life time learning.
(v) To contribute as team member and to lead effectively.
(vi) To identify contemporary issues.

Note: PolyU aspires to develop all its students as all-round graduates with professional competence, and has identified a set of highly valued graduate attributes can be developed through the curricular activities of this programme, some (including the all-rounded attributes of 'B4 to reflect on knowledge gap for life time learning and B6 to identify contemporary issues' contained therein in the curriculum mappings of the Majors in BSc (Hons) in Building Engineering & Management and BSc (Hons) in Surveying) are primarily addressed through co-curricular activities offered by faculties, departments, and various teaching and learning support units of the University. Students are encouraged to make full use of such opportunities to develop these attributes.

6. Intended Learning Outcomes (ILOs), Programme Structure and Curriculum Mapping of the Discipline-Specific Requirements (DSR) of the Major in Building Engineering & Management

The total credits for graduation on BSc (Hons) in Building Engineering & Management is 120 credits (including GUR 27 credits + Free Elective 6 credits + DSR 87 credits).

The following shows the proposed distribution of the 87-credit Discipline curriculum (no. of credits in brackets):-

[The 27-credit GUR is not shown in this DSR distribution table.]

Mapping of Programme Intended Learning Outcomes to Institutional Learning Outcomes

Graduate Attributes and Institutional Learning Outcomes for Undergraduate Degree Programmes

PolyU is committed to nurturing competent professionals who are also

* Socially responsible leaders with a strong sense of national pride and a global outlook
* Future-ready professionals who possess technical acumen
* Critical thinkers and creative problem solvers
* Effective communicators and collaborators
* Adaptable and resilient lifelong learners

The institutional learning outcomes for these attributes are provided as follows:

(i) **Socially responsible leaders with a strong sense of national pride and a global outlook:** Be able to Care about and understand local, national and global issues, and be able to think globally, act responsibly, and lead with integrity and pride for the benefit of society and a sustainable future.

(ii) **Future-ready professionals who possess technical acumen:** Be able to integrate and apply in-depth discipline knowledge and specialised skills, leverage changing and emerging technologies for work, function in variable interdisciplinary contexts, and demonstrate professionalism and entrepreneurial spirit at work.

(iii) **Critical thinkers and creative problem solvers:** Be able to critically evaluate information and arguments, draw logical and informed conclusions, identify problems and formulate innovative solutions, in both professional and everyday contexts.

(iv) **Effective Communicator and Collaborators:** Be able to communicate effectively in English and Chinese in professional and everyday contexts*, collaborate with people from diverse backgrounds and different perspectives, and contribute to effective teamwork and positive group dynamics.

(v) **Adaptable and resilient lifelong learners:** Committed to continual learning and self improvement, engage in learning with a sense of purpose, manage their own learning, adapt to different learning situations, and deal effectively with the arising stress and challenges

*The expectation to communicate in Chinese does not apply to foreign students.

6.1 *Intended Learning Outcome of BEM programme*

To ensure fulfilment of the goal of developing all-round students with professional competence stipulated by the University, it is required that outcome statements encompass the following two categories of learning outcomes:

A. Professional/Academic Knowledge and Competence

Upon successful completion of the programme, the graduate is expected to action the following abilities:

(i) To possess knowledge of building engineering principles, processes and methods for the successful completion of all types of construction projects.
(ii) To use the techniques, skills and engineering principles for different types of construction.
(iii) To apply construction management knowledge and skills in personnel, financial and operational practices and communication aspects required for efficient building production.
(iv) To identify, structure and analyse diverse problems arising from the changing social, economic, environmental and technological pressures.
(v) To solve identified construction problems with appropriate solutions.
(vi) To evaluate alternative strategic options.
(vii) To select appropriate construction materials, practices and methods in compliance with sustainable development.
(viii) To exercise professional judgement in the consideration of alternatives in complex situations.

B. Attributes for All-roundedness

As all undergraduate programmes are under the BRE Scheme, the attributes for all-roundedness listed are the same under the scheme.

Upon successful completion of the programme, the students are expected to possess the following attributes for all-roundedness:

(i) To possess skills to identify, analyse and solve problems.
(ii) To have an understanding of professional, social and ethical responsibilities.
(iii) To communicate effectively.
(iv) To reflect on knowledge gap for life time learning.
(v) To contribute as team member and to lead effectively.
(vi) To identify contemporary issues.

Table Relationship between the programme intended learning outcomes (ILOs) of the BEM and the Institutional learning outcomes of PolyU

Institutional Learning Outcomes					
ILOs of BEM Programme (Category A)	Socially responsible leaders with a strong sense of national pride and a global outlook	Future-ready professionals who possess technical acumen	Critical thinkers and creative problem solvers	Effective communicators and collaborators	Adaptable and resilient lifelong learners
(i)	X	X	X	X	
(ii)		X	X	X	X
(iii)			X	X	
(iv)	X	X	X		X
(v)		X	X		
(vi)		X	X	X	X
(vii)	X	X	X		X
(viii)			X	X	X
ILOs of BEM Programme (Category B)	Socially responsible leaders with a strong sense of national pride and a global outlook	Future-ready professionals who possess technical acumen	Critical thinkers and creative problem solvers	Effective communicators and collaborators	Adaptable and resilient lifelong learners
(i)		X	X	X	
(ii)	X		X	X	X
(iii)			X	X	X
(iv)	X	X			X
(v)			X	X	
(vi)	X	X	X	X	

6.2 *Components of the Major in Building Engineering & Management Curriculum*

The curriculum comprises four major components, distributed into four years of study other than the 27-credit General University Requirements (GUR).

- The major component of Building Engineering and Management focuses on the academic discipline of technology due to the engineering technology nature of the Major and Management. It is engineering oriented. 24 subjects are grouped under the four academic disciplines of Technology, Management, Urban sustainability policy and Real Estate Economics.

- 4 subjects on Project Studio, International Study, Analytical Skills and Methods and Capstone Project (6 credits) totalling 12 credits grouped under the category of "Project & Capstone Project".

- 1 subject on English for Construction and Environmental Professionals, and Industrial Safety respectively totalling 4 credits grouped under the last column of "Professional Languages, Safety & Electives".

It is the Faculty and Discipline-Specific requirements that students take the professional English and Chinese subjects for enhancement of their communication skills in their chosen profession. Since there will be site visits to supplement classroom lectures, students will be required to obtain a Green Card through attending the Industrial Safety course.

The 27-credit General University Requirements are for students' whole person development as well as to further enhance their languages and communication skills in particular English as the medium of instruction of the University.

6.3 ***Programme Structure & Curriculum***

6.3.1 In Stage 1 to 2 (Level 1 to 3), there are altogether 14 core subjects under the 5 academic disciplines.

a. Technology: AMA1140 Mathematics for Construction and Environment, CE1001 Construction and Environment Professionals, AP10001 Introduction to Physics, BRE2031 Environmental Science, BRE265 Introductory Construction Technology & Materials LSGI Engineering Surveying and BRE349 Building Services I are foundation subjects for AMA290 Engineering Mathematics, BRE370 Intermediate Construction Technology & Materials, BRE3261 Building Maintenance Planning and Technology and BRE453 Building Services II.

b. Real Estate Economics: BRE263 Construction Economics & Finance is to underpin BRE345 Measurement, Documentation and Estimating.

c. Management: BRE350 Project Management & Procurement is to underpin BRE4281 Construction Engineering Management.

6.3.2 In Stage 3 (Level 3), students will explore a variety of specific knowledge related to construction engineering and construction management. BRE204 Structure I is introduced to underpin BRE302 Structure II.

BRE364 Construction Contract Law & Administration grouped under the Urban Sustainability Policy is vital to construction project. BRE472 Information Technology and Building Modelling for Construction Management is to equip students with latest practical knowledge in the use of technology in construction project.

6.3.3 In Stage 4 (Level 4), students will focus on and be further enhanced in building engineering and management with such core subjects like BRE4393 Temporary Work Design, BRE461 Environmental Impact & Assessment, BRE426 Geotechnical & Foundation Engineering, BRE453 Building Services II and BRE4281 Construction Engineering Management. Moreover, students will choose 2 elective subjects for extending their professional knowledge to other related professional disciplines.

BRE466 Capstone Project underpinned by BRE366 Analytical Skills & Methods is a culmination to exhibit students' learning and knowledge in their chosen discipline-specific.

Table 6.2 Programme Structure and Curriculum of the Major in Building Engineering and Management (BEM) [Discipline-Specific Requirement (DSR)]

Stage 4 (24 Credits)	BRE462 Advanced Construction Technology (3)					
	BRE461 Environmental Impact and Assessment (3)					
	BRE453 Building Services II (3)					
	BRE4393 Temporary Work Design (3)					
	BRE426 Geotechnical and Foundation Engineering (3)			BRE4281 Construction Engineering Management (3)	BRE466 Capstone Project (6)	
Stage 3 (23 Credits)	BRE472 Information Technology & Building Information Modelling for Construction Management (3)					
	BRE370 Intermediate Construction Technology and Materials (3)					
	BRE326 1 Building Maintenance Planning and Technology (2)					
	BRE302 Structure II (3)				BRE366# Analytical Skills and Methods (2)	
	BRE204# Structure I (3)	BRE345 Measurement Documentation and Estimating (3)	BRE364# Construction Contract Law & Administration (3)		BRE365 International Study (1)	
Stage 2 (18 Credits)	LSGI2961 Engineering Surveying (3)			BRE350# Project Management & Procurement (3)		
	CSE20290 Introduction to Geotechnology (3)					
	AMA290 Engineering Mathematics (3)				BRE262 Project Studio (3)	ELC3421 English for Construction & Environmental Professionals (3)
Stage 2 (13 Credits)	BRE349# Building Services (3)					
	BRE265# Introductory Construction Technology & Materials (3)					
	BRE2031# Environmental Science (3)					
		BRE263# Construction Economics and Finance (3)				BRE258 Industrial Safety I (1)
Stage 1 (9 credits)	CE 1001# Construction and Environmental Professionals in Society (3) AMA 1140 #Mathematics for Construction and Environment (3) AP10001 #Introduction to Physics (3)					
87 Credits)	Technology	Real Estate Economics	Law	Management	Projects and Capstone Project	Professional Languages, Safety,
	56 Credits	6 Credits	3 Credits	6 Credits	12 Credits	4 Credits

* All BRE Level 3 and Level 4 core subjects of a particular Major or discipline are offered as electives to students of another Major or discipline within the BRE Department (exclusive of subjects offered by APSS), subject to the fulfilment of any pre-requisites and co-requisites requirements and time-table constraints.

Common core subjects

6.4 *Curriculum Mapping: BSc (Hons) in Building Engineering & Management*

This curriculum map gives a holistic view of the degree to which each intended learning outcome will be taught and assessed in your programme.

The following indicators (I, R, A) to show the treatment of the programme outcome in a subject:

I	(Introduced)	That the learning leading to the particular intended outcome is introduced in that subject.
R	(Reinforced)	That the learning leading to the particular intended outcome is reinforced in that subject.
A	(Assessed)	That the performance which demonstrates the particular intended outcome is assessed in that subject

6.4.1 ***Level 1 and 2 Subjects***

		Subject Codes														
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE2031	BRE204	BRE265	BRE262	BRE263	BRE350	AMA1140	AMA290	CSE20290	LSGI2961	CE1001	AP1001			
A1	To possess knowledge of building engineering principles, processes and methods for the successful completion of all types of construction projects	IA	I	IA			RA			IA	IA					
A2	To use the techniques, skills and engineering principles for different types of construction	I	IRA	IA					IA	IA	IA					
A3	To apply construction management knowledge and skills in personnel, financial and operational practices and communication aspects required for efficient building production						RA									
A4	To identify, structure and analyse diverse problems arising from the changing social, economic, environmental and technological pressures	I		I	IA	IA										
A5	To solve identified construction problems with appropriate solutions		RA	IA			RA			IA	IA					

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE2031	BRE204	BRE265	BRE262	BRE263	BRE350	AMA1140	AMA290	CSE20290	LSGI2961	CE1001	AP10001			
A6	To evaluate alternative strategic options		IR				RA				I					
A7	To select appropriate construction materials, practices and methods in compliance with sustainable development	IA		IA												
A8	To exercise professional judgement in the consideration of alternatives in complex situations		I							I						
	All-rounded Attributes															
B1	To possess skills to identify, analyse and solve problems	IA			I		A		IA	IA	IA	IA				
B2	To have an understanding of professional, social and ethical responsibilities				IA								IA			
B3	To communicate effectively	IA	I	IA	IA	IA	A		I		I	I	I			
B4	To reflect on knowledge gap for life time learning				IA											
B5	To contribute as team member and to lead effectively	IA	I	IA	I	IA	A									
B6	To identify contemporary issues				IA						I					

6.4.2 ***Level 3 Subjects***

		Subject Codes																
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE302	BRE326	BRE345	BRE349	BRE370	BRE364	BRE365	BRE366	BRE472		ELC3421	BRE258					
A1	To possess knowledge of building engineering principles, processes and methods for the successful completion of all types of construction projects	IR			IA	RA		RA		IR			IR					
A2	To use the techniques, skills and engineering principles for different types of construction	IRA		IA	RA	RA				RA			IRA					
A3	To apply construction management knowledge and skills in personnel, financial and operational practices and communication aspects required for efficient building production		I			I	RA	RA		A								
A4	To identify, structure and analyse diverse problems arising from the changing social, economic, environmental and technological pressures					IR		RA	RA									
A5	To solve identified construction problems with appropriate solutions	IRA	IA	IA	RA	RA	RA		RA	R								
A6	To evaluate alternative strategic options	R	IA		RA	R		RA	RA									

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE302	BRE3261	BRE345	BRE349	BRE370	BRE364	BRE365	BRE366	BRE472		ELC3421	BRE258					
A7	To select appropriate construction materials, practices and methods in compliance with sustainable development	I	IA			IRA		RA										
A8	To exercise professional judgement in the consideration of alternatives in complex situations	IR						R	RA				IR					
	All-rounded Attributes																	
B1	To possess skills to identify, analyse and solve problems		I	IA	RA	IR	RA	RA	A	IA			IR					
B2	To have an understanding of professional, social and ethical responsibilities	I				I		IA										
B3	To communicate effectively		I	IA	RA		RA	RA	A	A		IRA	IRA					
B4	To reflect on knowledge gap for life time learning						R	I	IRA	I								
B5	To contribute as team member and to lead effectively	R	I		RA	R		RA		A								
B6	To identify contemporary issues		I		I	IRA	R	R	A	R			I					

6.4.3 ***Level 4 Subjects***

		Subject Codes																
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE426	BRE4281	BRE4393	BRE453	BRE461	BRE462	BRE466										
A1	To possess knowledge of building engineering principles, processes and methods for the successful completion of all types of construction projects	IR			RA	RA	RA											
A2	To use the techniques, skills and engineering principles for different types of construction	IRA	R		RA	RA	RA	A										
A3	To apply construction management knowledge and skills in personnel, financial and operational practices and communication aspects required for efficient building production		RA				R											
A4	To identify, structure and analyse diverse problems arising from the changing social, economic, environmental and technological pressures		RA			RA	RA	RA										
A5	To solve identified construction problems with appropriate solutions	IRA		RA	RA		R	RA										
A6	To evaluate alternative strategic options			RA		RA	R	RA										

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE426	BRE4281	BRE4393	BRE453	BRE461	BRE462	BRE466										
A7	To select appropriate construction materials, practices and methods in compliance with sustainable development			I R A		R A	R A	R										
A8	To exercise professional judgement in the consideration of alternatives in complex situations	I	R				R	RA										
	All-rounded Attributes																	
B1	To possess skills to identify, analyse and solve problems	I		A	RA	RA	RA	A										
B2	To have an understanding of professional, social and ethical responsibilities				R	RA												
B3	To communicate effectively		RA	A			RA	A										
B4	To reflect on knowledge gap for life time learning		R				R	IRA										
B5	To contribute as team member and to lead effectively	RA				R	R											
B6	To identify contemporary issues		R		R	R	RA	A										

*(E) = Elective

6. Intended Learning Outcomes (ILOs); Programme Structure and Curriculum Mapping of the Discipline-Specific Requirements (DSR) of the Major in Surveying

The total credits for graduation on BSc (Hons) in Surveying is 120 credits (including GUR 27 credits + Free Elective Subjects 6 credits + DSR 87 credits).

The following shows the proposed distribution of the 87-credit Discipline curriculum (no. of credits in brackets):

[The 27-credit GUR is not shown in this DSR distribution table.]

6.1 *Intended Learning Outcome of Surveying programme*

To ensure fulfilment of the goal of developing all-round students with professional competence stipulated by the University, it is required that outcome statements encompass the following two categories of learning outcomes:

A. Professional/Academic knowledge and competencies

Upon successful completion of the programme, the students and expected to attain the following abilities:

(i) To comprehend and identify issue and problems concerning land, property and construction at project level.
(ii) To comprehend and identify issue and problems concerning land, property and construction at corporate level.
(iii) To comprehend and identify issue and problems concerning land, property and construction at industry level.
(iv) To comprehend and identify issues and problems concerning land, property and construction at marco social-economic and political level.
(v) To advise clients through rendering surveying services.
(vi) To identify, formulate and solve problems related to the surveying profession and real estate industry.
(vii) To analyse and interpret data of the industry.
(viii) To formulate and implement strategies, policies and solutions for sustainable development and construction.

B. Attributes for All-roundedness

As all undergraduate programmes are under the BRE Scheme, the attributes for all-roundedness listed are the same under the scheme.

Upon successful completion of the programme, the students are expected to possess the following attributes for all-roundedness:

(i) To possess skills to identify, analyse and solve problems.
(ii) To have an understanding of professional, social and ethical responsibilities.
(iii) To communicate effectively.
(iv) To reflect on knowledge gap for life time learning.
(v) To contribute as team member and to lead effectively.
(vi) To identify contemporary issues.

Table 6.1 Relationship between the programme intended learning outcomes (PILOs) of the SUR and the Institutional learning outcomes of PolyU

Institutional Learning Outcomes					
ILOs of SUV Programme (Category A)	Socially responsible leaders with a strong sense of national pride and a global outlook	Future-ready professionals who possess technical acumen	Critical thinkers sand creative problem solvers	Effective communicators and collaborators	Adaptable and resilient lifelong learners
(i)		X	X		
（ii）		X	X		
(iii)		X	X		X
(iv)	X	X	X		
(v)		X	X	X	
(vi)	X	X	X	X	X
(vii)			X	X	
(viii)	X	X	X	X	X
ILOs of SUV Programme (Category B)	Socially responsible leaders with a strong sense of national pride and a global outlook	Future-ready professionals who possess technical acumen	Critical thinkers and creative problem solvers	Effective communicators and collaborators	Adaptable and resilient lifelong learners
(i)		X	X	X	
(ii)	X	X	X	X	X
(iii)			X	X	X
(iv)	X				X
(v)			X	X	
(vi)	X	X	X	X	

6.2 *Components of the Major in Surveying Curriculum*

The curriculum comprises five major components, evenly distributed into four years of study other than the 27-credit general University Requirements (GUR):

Compulsory Core Foundation Subjects

- 7 Core subjects under the four academic disciplines of Technology, Urban Sustainability Policy, Management and Real Estate Economics.

- 6 subjects on Integrated Professional Workshop I, II, III, Project Studio, International Study, Analytical Skills and Methods and Capstone Project (6 credits) totalling 17 credits grouped under the category of "Projects & Capstone Project".

Professional Languages and Safety Subjects

2 subjects on University English, Chinese and Industrial Safety totalling 4 credits under the last column of "Professional Languages, safety and electives". It is the Faculty and Discipline Specific Requirements that students take the Professional English and Chinese subjects for enhancement of their communication skills in their chosen professions. Since there will be site visits to supplement classroom lectures, students will be required to obtain a green land through attending the Industrial Safety course.

The 27-credit General University Requirements are for students' whole person development as well as to further enhance their languages and communication skills in particular English as the medium of instruction of the University.

Discipline-Specific Elective Subjects

The discipline-specific elective subjects under the five surveying disciplines of Building Surveying (BS), General Practice Surveying (GP), Planning and Development (PD), Property and Facility Management (PFM), and Quantity Surveying (QS).

In the final stage of the Major, the BSc (Hons) in Surveying students will choose their professional disciplines from the Disciplines of Building Surveying, General Practice Surveying, Planning & Development, Property and Facility Management, and Quantity Surveying. Each of which comprises eleven discipline-specific elective subjects which are core subjects to the students' choices of surveying disciplines

Projects and Capstone Project

The challenges as well as the opportunities presented to the surveying profession are many and varied. Other than assignments and readings, students will be required to synthesise what they will have learnt by tackling practical problems. As Figure 1 shows, Integrated Professional Workshop, International Study, Analytical Skills & Methods, together with Capstone, form 18.6% of the Discipline-Specific Major curriculum in terms of credit values. They form part and parcel of the surveying education. After preparing the foundation studies on the Discipline Specific Major in Surveying in year 1 and semester 1 of year 2, semester 2 of year 2 will start with a 3-credit Project. Students will be introduced the inter-disciplinary and inter-sectoral nature of the property and construction industry in general, and the surveying profession in particular. That will move into the project of **International Study** in the Year 3. Students will be required to identify and solve problems in a professional context. It will involve the application of knowledge and skills of the five surveying disciplines. In addition, students will be required to either carry out an in-depth comparative study or organize, manage and undertake the international study tour by themselves (whereby they will travel to a city or a few cities overseas/Mainland China) to compare and contrast their property and construction sectors with Hong Kong. All the academic and project studies will culminate in the 6-credit Capstone Project when students will work on problems that are more specialized and more discipline-specific.

Fulfilling the pre-requisite requirement of the Capstone Project, students will study research methodology together with qualitative and quantitative techniques to write up a detailed project proposal. Once their proposals are accepted, students will be required to continue working on their proposals to work on their capstone projects. This subject will present students with an opportunity to demonstrate knowledge of a specific area by taking and reporting a small but in-depth research project. They will take a critical and analytical view of an issue relevant to the surveying profession and of particular concern to the local and its neighbouring environments.

<u>Core Foundation Subjects and Discipline-specific Elective Subjects</u>

The core and elective subjects will provide the basic skills for students to build on their core competencies during the post-graduate training period for any of the four surveying disciplines. The core subjects have been selected based on the subjects currently offered as core subjects the three existing disciplines of the generic surveying programme. They have been further development for this 4-year generic degree.

6.3 ***Programme Structure & Curriculum***

6.3.1 In Stage 1 to 3, together with the English for Construction and Environmental Professionals, Common Fist Year subjects, the core subjects in stage 2 shall focus on the basic skills of the four surveying disciplines.

a. Technology: BRE265 Introductory Construction Technology & Materials, BRE2031 Environmental Science are foundation subjects to BRE349 Building Services I, BRE326 Maintenance Technology & Management.

b. Economics & Real Estate: BRE263 Construction Economics and Finance is the foundation subject for BRE362 Urban Economics & Property Investment, BRE363 Construction Economics and BRE315 Property Valuation.

BRE2171 Planning and Development Theories and Practices introduces the urban planning and land development processes. It provides the contextual study for the land, property and construction professions.

c. Urban Sustainability Policy: BRE2061 Legal Context of Building and Construction Professionals in Society is the foundation subject for all the law Urban Sustainability Policy related subjects offered later.

d. Management: BRE350 Project Management and Procurement and BRE371 Introduction to Property Management. BRE350 Project Management & Procurement further enhance the required foundation knowledge of students so as to prepare and develop their professional discipline-specific elective studies off their chosen surveying disciplines (BS, GP, PD, PFM & QS)

6.3.2 In Stage 3, the core subjects of Technology: BRE3261 Building Maintenance Planning and Technology, Urban Sustainability Policy: BRE336 Development Control Law and Management: Students will choose discipline-specific elective subjects. Table 6 shows the surveying discipline and the professional area that each of the discipline-specific elective subjects.

6.3.3 In stage 4, students are required to take the 6 credits BRE466 Capstone Project spans across 2 Semesters from Semester 1 to Semester 2. It is underpinned by BRE366 Analytical Skills and Methods for both qualitative and quantitative research studies.

Table 6.2 Programme Structure and Curriculum of the Major in Surveying (SUV)# [Discipline-Specific Requirements (DSR)]

Stage 4 (30 Credits)	BRE464 [PD] Urban Planning (3)					
	BRE463 [GP/PD/PFM] Business Valuation and Accounts (3)					
	BRE442[QS] Forecasting and Competition in the Built Environment (3)					
	BRE440 [QS] Cost and Value Management (3)					
	BRE436 [GP/PFM] Applied Property Valuation (3)					
	BRE4291 [GP/PD/PFM] Real Estate Marketing (3)		BRE461 [BS/QS] Environmental Impact and Assessment (3)			
	BRE427 [GP/PD/PFM] Applied Property Investment (3)	BRE439 [QS] Engineering Contract Procedure (3)	BRE453 [BS/QS] Building Service II (3)	BRE465 [GP/PD/PFM] Asset Management (3)	BRE469 Integrated Professional Workshop III (3)	
	BRE418 [GP/PD/PFM] Real Estate Development (3)	BRE415 [BS/QS] Dispute Resolution (3)	BRE435 [BS] Design, Adaptation & Conversion (3)	BRE437 [BS] Facility Management (3)	BRE466 Capstone Project (6)	
Stage 3 (26 Credits)	BRE397 [GP/PD/PFM] Property Management Accounting (3)					
	BRE363 [BS/QS] Construction Economics (3)		BRE472 [BS/QS] Information Technology & Building Information Modelling for Construction Management (3)			
	BRE362[GP/PD/PFM] Construction Economics and Property Investment (3)	BRE364 [BS/QS] Construction Contract Law & Administration (3)	BRE370 [BS/QS] Intermediate Construction Technology & Materials (3)		BRE369 Integrated Professional Workshop II (3)	
	BRE345 [BS/QS] Measurement, Documentation and Estimating (3)	BRE337[GP/PD/PFM] Property Law (3)	BRE3261 Building Maintenance Planning and Technology (2)		BRE366 Analytical Skills and Methods (2)	
	BRE315 [GP/PD/PFM] Property Valuation (3)	BRE336 Development Control Law (3)	BRE204 [BS/QS] Structure I (3)	BRE371[GP/PD/PFM] Introduction to Property Management (3)	BRE365 International Study (1)	
Stage 2 (25 Credits)						ELC3421 English for Construction & Environmental Professionals (3)
	BRE2171 Planning and Development Theories and Practice (2)	BRE2061 Legal Context for Building and Construction Professionals in Society (2)		BRE350 Project Management & Procurement (3)	BRE2691 Introductory Integrated Professional Workshop I (2)	
	BRE263 Construction Economics and Finance (3)		BRE349 Building Services (3) BRE265 Introductory Construction Technology & Materials (3) BRE2031 Technology & Materials (3)			BRE258 Industrial Safety I (1)
Stage 1 (6 Credits)			AP10001 Introduction to Physics (3)			
			AMA1140 Mathematics for Construction and Environment (3)			
Real Estate Economics		Law		Technology	Management	Projects and Capstone Project	Professional Languages, Safety
BS/QS 5 Credits + 6 Credits + QS 6 Credits + GP/PD/PFM 21 Credits + GP/PFM 3 Credits PD 3 credits		BS/QS 5 Credits + 6 Credits + QS 3 Credits + PD/PFM 3 Credits GP		QS 17 Credits + 15 Credits BS 3 Credits	GP/PD/PFM 3 Credits + 6 Credits + BS 3 Credits +	17 Credits	4 Credits

Surveying students are required to opt **ONE** Discipline from the 5 surveying disciplines: Building Surveying (BS), General Practice (GP), Planning & Development (PD), Property and Facility Management (PFM) and Quantity Surveying (QS) offered by the Department.

Table 6 Professional Areas that Discipline-Specific Elective Subjects Specialize

	Professional Areas			
	BUILDING SURVEYING	GENERAL PRACTICE SURVEYING	QUANTITY SURVEYING	PLANNING AND DEVELOPMENT Property &Facility Management
BRE453 Building Services II	• Building Services		• Building Services - Energy Costing Estimation	
BRE435 Design, Adapation and Conversion	• Building Maintenance • Demolition, Structural Survey and Assessment			
BRE437 Facility Management	• Property Management			
BRE415 Dispute Resolution	• Building Economics and Contract Administration		• Contract Services	
BRE442 Forecasting and Competition in the Built Environment			• Cost Advice and Cost Planning	
BRE461 Environmental Impact and Assessment				
BRE439 Engineering Contract Procedure	• Demolition, Structural Survey and Assessment		• Contract Documentation • Tendering and Contractual Arrangements	
BRE427 Applied Property Investment		• Valuation of Land and Building • Sales, Lettings and Purchases of Land and Buildings		• Development Appraisal & Viability Studies • Property Development
BRE4291 Real Estate Marketing		• Sales, Lettings and Purchases of Land and Buildings		
BRE436 Applied Property Valuation		• Valuation of Land and Building		• Development Appraisal & Viability Studies • Property Development
BRE418 Real Estate Development		• Planning and Development		• Planning and Development • Property Development • Town Planning
BRE465 Asset Management		• Estate Management & Landlord & Tenant Including Maintenance & Repair • Housing Management		• Asset Management
BRE463 Business Valuation and Accounting		• Valuation of Land and Building • Sales, Lettings and Purchases of Land and Buildings		• Development Appraisal and Viability Studies • Development and Planning Research
BRE464 Urban Planning				• Planning and Development • Town Planning

6.4 *Curriculum Mapping: BSc (Hons) in Surveying*

This curriculum map gives a holistic view of the degree to which each intended learning outcome will be taught and assessed in your programme.

The following indicators (I, R, A) to show the treatment of the programme outcome in a subject:

I	(Introduced)	That the learning leading to the particular intended outcome is introduced in that subject.
R	(Reinforced)	That the learning leading to the particular intended outcome is reinforced in that subject.
A	(Assessed)	That the performance which demonstrates the particular intended outcome is assessed in that subject

6.4.1 ***Level 1 and 2 Subjects***

		Subject Codes														
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	AMA1140	BRE2031	BRE204 (DSE)	BRE2061	BRE2171	BRE265	BRE2691	BRE263	AP10001						
A1	To comprehend and identify issues and problems concerning land, property and construction at project level		IA	IA	I	I	IA	I								
A2	To comprehend and identify issues and problems concerning land, property and construction at corporate level				R		I	I								
A3	To comprehend and identify issues and problems concerning land, property and construction at industry level		I		I			IA	IA							
A4	To comprehend and identify issues and problems concerning land, property and construction at macro socio-economic and political level		I		A	I		IA	IA							
A5	To advise clients through rendering surveying services		I	I												
A6	To identify, formulate and solve problems related to the surveying profession and real estate industry			IA	I		IA									

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	AMA1110	BRE2031	BRE204 (DSE)	BRE206	BRE217	BRE265	BRE269	BRE263	AP10001						
A7	To analyse and interpret data of the industry		IA				I									
A8	To formulate and implement strategies, policies and solutions for sustainable development and construction		I					I								
	All-rounded Attributes															
B1	To possess skills to identify, analyse and solve problems		IA	IA	A	I		I								
B2	To have an understanding of professional, social and ethical responsibilities				R			IA								
B3	To communicate effectively		IA	IA	A	R	IA	IA	IA							
B4	To reflect on knowledge gap for life time learning				RI			IA								
B5	To contribute as team member and to lead effectively		IA	I			IA	I	IA							
B6	To identify contemporary issues							IA								

(DSE) = Discipline - Specific Elective Subject

6.4.2 ***Level 3 Subjects***

		Subject Codes																		
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE258	BRE315 (DSE)	BRE3261	BRE336	BRE337 (DSE)	BRE345 (DSE)	BRE349	BRE362 (DSE)	BRE363 (DSE)	BRE364 (DSE)	BRE365	BRE366	BRE369	BRE370 (DSE)	BRE371 (DSE)	BRE397 (DSE)	ELC3421	BRE350	
A1	To comprehend and identify issues and problems concerning land, property and construction at project level	IR	IRA	IA	IRA	I	IA	IA	RA	RA	RA	RA	RA	RA	RA		RA		RA	
A2	To comprehend and identify issues and problems concerning land, property and construction at corporate level				I	I			IA	RA		RA	RA	RA	RA	I	R			
A3	To comprehend and identify issues and problems concerning land, property and construction at industry level			IA	IRA	A			IA	RA		IA	RA	IR	RA		R			
A4	To comprehend and identify issues and problems concerning land, property and construction at macro socio-economic and political level			I	I	R			RA	R		IA	RA	IR	I	I				
A5	To advise clients through rendering surveying services	IRA	A	I	I	I	I	I		RA	IA			IR	R		R		RA	
A6	To identify, formulate and solve problems related to the surveying profession and real estate industry		A	IA	IRA	R		IA		RA		RA	A	IR	RA		R			

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE258	BRE315 (DSE)	BRE326	BRE336	BRE337 (DSE)	BRE345 (DSE)	BRE349	BRE362 (DSE)	BRE363 (DSE)	BRE364 (DSE)	BRE365	BRE366	BRE369	BRE370 (DSE)	BRE371 (DSE)	BRE397 (DSE)	ELC3421	BRE350	
A7	To analyse and interpret data of the industry		A				I R	I A	IA	R A		IA	R	I R						
A8	To formulate and implement strategies, policies and solutions for sustainable development and construction	I		I	RA	I			IA	R		RA		I	I					
	All-rounded Attributes																			
B1	To possess skills to identify, analyse and solve problems	IR		I	R	A	IA	R A	RA	RA	RA	RA	A	RA	IR	R	IRA		A	
B2	To have an understanding of professional, social and ethical responsibilities	I	R		RA	R				RA		IA		RA	I		R			
B3	To communicate effectively	IRA	R	I	RA	R	IA	R A	RA	RA	RA	RA	A	RA		I	R	IRA	A	
B4	To reflect on knowledge gap for life time learning				RI	I				I	R	I	IRA	I						
B5	To contribute as team member and to lead effectively			I				R A		R		RA		I			R		A	
B6	To identify contemporary issues	I		I	RA			I	IA	RA	R	R	A	I	IRA		IR			

(DSE) = Discipline - Specific Elective Subject

6.4.3 ***Level 4 Subjects***

		Subject Codes																				
	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE415 (DSE)	BRE418 (DSE)	BRE427 (DSE)	BRE4291 DSE)	BRE435 (DSE)	BRE436 (DSE)	BRE437 (DSE)	BRE439 (DSE)	BRE440 (DSE)	BRE441 (DSE)	BRE442 (DSE)	BRE450 (DSE)	BRE453 (DSE)	BRE461 (DSE)	BRE462	BRE463 (DSE)	BRE464 (DSE)	BRE465 (DSE)	BRE466	BRE469	BRE472
A1	To comprehend and identify issues and problems concerning land, property and construction at project level	A		A		IRA	A		A	RA	RA	RA	R	RA	RA	R	A	RA		RA	RA	RA
A2	To comprehend and identify issues and problems concerning land, property and construction at corporate level					I		A	A	RA	RA	IA			R		A	R	IA	RA	RA	
A3	To comprehend and identify issues and problems concerning land, property and construction at industry level	A		A		RA	A		R			RA	R		R	R	A	RA	IA	RA	RA	
A4	To comprehend and identify issues and problems concerning land, property and construction at macro socio-economic and political level		A		A	R		A				IA	R		R		R	RA		RA	RA	
A5	To advise clients through rendering surveying services			A	A	R			R			RA		RA			A	RA	A	A	RA	IA
A6	To identify, formulate and solve problems related to the surveying profession and real estate industry	R		A	A	R	A				A	I					A	RA	A	A	RA	A

	Programme Outcomes List programme outcomes in this column in the same order as in the outcomes section for easy referencing	BRE415 (DSE)	BRE418 (DSE)	BRE427 (DSE)	BRE4291 (DSE)	BRE435 (DSE)	BRE436 (DSE)	BRE437 (DSE)	BRE439 (DSE)	BRE440 (DSE)	BRE441 (DSE)	BRE442 (DSE)	BRE450 (DSE)	BRE453 (DSE)	BRE461 (DSE)	BRE462 (E)*	BRE463 (DSE)	BRE464 (DSE)	BRE465 (DSE)	BRE466	BRE469	
A7	To analyse and interpret data of the industry	A	A			R A					R	R A	R A		R A		A	R	A		R A	
A8	To formulate and implement strategies, policies and solutions for sustainable development and construction					RA				I	R		RA	RA	RA	RA	R	RA	I		R	
	All-rounded Attributes																					
B1	To possess skills to identify, analyse and solve problems	R			A	R	R	A	A	RA	R	RA	RA	RA	RA	RA	A	RA	A	A	RA	IA
B2	To have an understanding of professional, social and ethical responsibilities	I		R	R	RA	R		R			IA	R	R	RA		A	RA	IR		RA	
B3	To communicate effectively	A	A	R	R	RA	R	R	R	RA	RA	RA	RA			RA	A	RA	RA	A	RA	A
B4	To reflect on knowledge gap for life time learning	I				R						I				R	R	R	R	IR A	R	
B5	To contribute as team member and to lead effectively	A				RA					R	I	R		R	R	A	RA	R		R	A
B6	To identify contemporary issues	R				RA					R		R	R	IR	RA	R	RA	IR	A	R	R

(DSE) = Discipline - Specific Elective Subject
*(E) = Elective

Mapping of the accreditation subject area requirements with the Compulsory Core Foundation Subjects

Table 1

		Building Surveying (Accreditation Subject Areas Specified by Divisions)								
	Compulsory Core Foundation Subjects	Building Construction and Structure	Building Maintenance	Building Services	Structural Survey & Assessment	Project Management	Property Management	Building Ordinance, Administrative Law & related legal aspects	Building Economics & Contract Administration	Research & development
Construction Technology										
BRE2031	Environmental Science	✓				✓	✓			
BRE349	Building Services, I	✓	✓	✓			✓			
BRE261	Construction Technology & Material I	✓	✓		✓	✓	✓			
BRE325	Maintenance Technology & Management	✓	✓		✓		✓			
Management										
BRE350	Project Management and Procurement					✓	✓			
Law										
BRE2061	Legal Context for CRE						✓	✓	✓	
BRE336	Development Control law					✓	✓	✓		
Real Estate & Economics										
BRE2171	Planning and Development					✓		✓		
BRE263	Construction Economics and Finance					✓	✓		✓	
Research & Capstone Project										
BRE366	Analytical Skills and Methods									✓
BRE466	Capstone Project									✓
Integrated Studies/ Professional Workshops										
BRE365	International Study					✓				
BRE299	Work-Integrated Education					✓				
BRE2691	Integrated Professional Workshop I					✓				
BRE369	Integrated Professional Workshop II					✓				
BRE469	Integrated Professional Workshop III					✓				
	Guided studies with seminars & workshops	✓							✓	

Notes:

The above table aims to demonstrate the fulfilment of the accreditation subject area requirements by the compulsory core foundation subjects which are common to all surveying students.

Mapping of the accreditation subject area requirements with the Compulsory Core Foundation Subjects

Table 2

		General Practice Surveying (Accreditation Subject Areas Specified by Divisions)								
	Compulsory Core Foundation Subjects	Buildings	Estate agency & Asset Management**	Law II (Property Law & Landlord & Tenant Law)**	Law I	Property Valuation**	Urban land economics**	Land Administration and Town Planning	Business Valuation, Accountancy, Investment and Finance	Economics
Construction Technology										
BRE2031	Environmental Science	✓								
BRE349	Building Services, I	✓								
BRE261	Construction Technology & Material I	✓	✓							
BRE325	Maintenance Technology & Management	✓								
Management										
BRE350	Project Management and Procurement		✓							
Law										
BRE2061	Legal Context for CRE		✓	✓	✓					
BRE336	Development Control law									
Real Estate & Economics										
BRE2171	Planning and Development					✓	✓	✓	✓	
BRE263	Construction Economics and Finance					✓			✓	✓
Research & Capstone Project										
BRE366	Analytical Skills and Methods									
BRE466	Capstone Project									
Integrated Studies/ Professional Workshops										
BRE365	International Study					✓				
BRE299	Work-Integrated Education					✓				
BRE2691	Integrated Professional Workshop I					✓				
BRE369	Integrated Professional Workshop II					✓				
BRE469	Integrated Professional Workshop III					✓				
	Guided studies with seminars & workshops		✓	✓		✓			✓	

Notes:

The above table aims to demonstrate the fulfilment of the accreditation subject area requirements by the compulsory core foundation subjects which are common to all surveying students.

***Revised new subjects**

****Four minimum common core competence areas as required by the GP Division in the HKIS/HKPU meeting on 11 Jun 2012**

Mapping of the accreditation subject area requirements with the Compulsory Core Foundation Subjects

Table 3

		Planning and Development (Accreditation Subject Areas Specified by Divisions)											
	Compulsory Core Foundation Subjects	Construction Technology	Building Construction and Structure as in Building Surveying	Project Management	Building Ordinance, Administrative Law & related legal aspects	Building Economics & Contract Administration	Town Planning	Property Development Appraisal	Business Valuation, Accountancy, Investment and Finance	Urban land economics	Economics	Environment issues & Transportation planning for development***	
Construction Technology													
BRE2031	Environmental Science	✓	✓	✓								✓	
BRE349	Building Services, I	✓	✓										
BRE261	Construction Technology & Material I	✓	✓	✓									
BRE326	Maintenance Technology & Management	✓	✓										
Management													
BRE350	Project Management and Procurement		✓										
Law													
BRE2061	Legal Context for CRE				✓	✓							
BRE336	Development Control law			✓	✓			✓					
Real Estate & Economics													
BRE2171	Planning and Development			✓	✓		✓	✓	✓	✓		✓	
BRE263	Construction Economics and Finance			✓		✓		✓	✓		✓		
Research & Capstone Project													
BRE366	Analytical Skills and Methods												
BRE466	Capstone Project												
Integrated Studies/ Professional Workshops													
BRE365	International Study						✓						
BRE299	Work-Integrated Education						✓						
BRE2691	Integrated Professional Workshop I						✓						
BRE369	Integrated Professional Workshop II						✓						
BRE469	Integrated Professional Workshop III						✓						
	Guided studies with seminars & workshops							✓	✓			✓	

Notes:

The above table aims to demonstrate the fulfilment of the accreditation subject area requirements by the compulsory core foundation subjects which are common to all surveying students. The complete curriculum design showing both the core subjects and the discipline-specific subjects are included in the original submission document.

**** Enhancement in the areas of environment and transportation as suggested by the PD Division in the HKIS/HKPU meeting on 11 Jun 2012**

Mapping of the accreditation subject area requirements with the Compulsory Core Foundation Subjects

Table 4

		Property & Facilities Management **(Accreditation Subject Areas Specified by Divisions)**											
	Compulsory Core Foundation Subjects	Core Skills	Property Asset Management	Corporate Real Estate	Project Management	Property Management							
Construction Technology													
BRE2031	Environmental Science	✓			✓	✓							
BRE349	Building Services, I					✓							
BRE261	Construction Technology & Material I		✓		✓	✓							
BRE326	Maintenance Technology & Management		✓			✓							
Management													
BRE350	Project Management and Procurement		✓	✓	✓	✓							
Law													
BRE2061	Legal Context for CRE	✓	✓	✓		✓							
BRE336	Development Control law				✓	✓							
Real Estate & Economics													
BRE2171	Planning and Development				✓								
BRE263	Construction Economics and Finance	✓		✓	✓	✓							
Research & Capstone Project													
BRE366	Analytical Skills and Methods												
BRE466	Capstone Project												
Integrated Studies/ Professional Workshops													
BRE365	International Study				✓								
BRE299	Work-Integrated Education				✓								
BRE2691	Integrated Professional Workshop I												
BRE369	Integrated Professional Workshop II				✓								
BRE469	Integrated Professional Workshop III				✓								
	Guided studies with seminars & workshops		✓			✓							

Notes:

The above table aims to demonstrate the fulfilment of the accreditation subject area requirements by the compulsory core foundation subjects which are common to all surveying students. The complete curriculum design showing both the core subjects and the discipline-specific subjects are included in the original submission document.

Mapping of the accreditation subject area requirements with the Compulsory Core Foundation Subjects

Table 5

		Quality Surveying **(Accreditation Subject Areas Specified by Divisions)**											
	Compulsory Core Foundation Subjects	Common Skills	Development Management	Construction Technology and Management	Construction Law and Contracts	Construction Costs							
Construction Technology													
BRE2031	Environmental Science			✓									
BRE349	Building Services, I												
BRE261	Construction Technology & Material I			✓									
BRE326	Maintenance Technology & Management												
Management													
BRE350	Project Management and Procurement	✓	✓	✓	✓								
Law													
BRE2061	Legal Context for CRE				✓								
BRE336	Development Control law		✓										
Real Estate & Economics													
BRE2171	Planning and Development		✓										
BRE263	Construction Economics and Finance	✓											
Research & Capstone Project													
BRE366	Analytical Skills and Methods	✓											
BRE466	Capstone Project	✓											
Integrated Studies/ Professional Workshops													
BRE365	International Study				✓								
BRE299	Work-Integrated Education				✓								
BRE2691	Integrated Professional Workshop I				✓								
BRE369	Integrated Professional Workshop II												
BRE469	Integrated Professional Workshop III				✓								
	Guided studies with seminars & workshops	✓	✓		✓	✓							

Notes:

The above table aims to demonstrate the fulfilment of the accreditation subject area requirements by the compulsory core foundation subjects which are common to all surveying students. The complete curriculum design showing both the core subjects and the discipline-specific subjects are included in the original submission document.

7. Programme Curriculum of Major in Building Engineering & Management*

Subject Descriptions

'Level' codes reflect the intellectual demand on the students. The levels of the subjects are coded according to a common coding system of the Hong Kong Polytechnic University.

Level		Explanation
1	=	Standing comparable to Year 1 of a 4-year degree Major
2	=	Standard comparable to Year 2 of a 4-year degree Major
3	=	Standard comparable to Year 3 of a 4-year degree Major
4	=	Standard comparable to the final year of a 4-year degree Major
5-6	=	Standard at postgraduate level

The University adopts a university-wide standard for subject level weighting for calculating the award GPA, and to use the weighting of 2 for Level 1 and 2 subjects; and a weighting of 3 for Level 3 and 4 subjects.

The Programme Curriculum and Examination Schedule for each academic level are detailed in Figure 7.1 - 7.3.

Subjects are referred by subject codes. The alphabets refer to the responsible departments whilst the three-digit reference numbers, the first digit (i.e. 1, 2, 3 or 4) indicates the level of the subjects.

NOTE

***Programme Curriculum displays the Discipline-specific Requirements (DSR) for the Major in Building Engineering & Management only (Fig. 7.1 to Fig. 7.3).**

Details of the 27-credit General University Requirements (GUR) can be referred to their respective websites provided by the University (Section 3.2).

7.1 Programme Curriculum of Major* in Building Engineering & Management for Stage 1 and 2

Stage 1 and 2		Curriculum								Assessment Methods	
		Timetabled Contact Hours per Week			No. of Teaching Weeks	Total Hours	Teaching Dept.	Subject Weighting for Final Assessment Grade (FAG)			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminar**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
CE1001	Construction and Environment Professionals in Society	7.5	-	-	13	39	FCE	2.0	3	100%	-
AMA1140	Mathematics for Construction and Environment	2.0	1.0	-	13	39	AMA	2.0	3	40%	60%
AP10001	Introduction to Physics	2.0	1.0	-	13	39	AP	2.0	3	40%	60%
AMA290	Engineering Mathematics	2.0	1.0	-	13	39	AMA	2.0	3	40%	60%
BRE262	Project Studio	2.0	1.0	2.0	-	-	BRE	2.0	3	100%	-
BRE350	Project Management & Procurement	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
CSE20290	Introduction to Geotechnology	1.5	1.0	0.5 (field work)	13	39	CSE	2.0	3	30%	70%
ELC3421	English for Construction and Environmental Professionals	-	3.0	-	13	39	ELC	3.0	3	100%	-
LSGI2961	Engineering Surveying	2.0	0.6	0.3	13	39	LSGI	2.0	3	40%	60%

NOTE: Students must complete and pass the 30-credit GUR subjects and all the subjects listed in Level 2 and Level 3 in Stage 2 prior to their graduation.

T/S = Tutorial/Seminar
Lab. (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guided Study
CA = Continuous Assessment

7.2 Programme Curriculum of Major* in Building Engineering & Management for Stage 3

Stage 3		Curriculum								Assessment Methods	
		Timetabled Contact Hours per Week			No. of Teaching Weeks	Total Hours	Teaching Dept.	Subject Weighting for Final Assessment Grade (FAG)			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminar**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
BRE204	Structure I	2.0	0.8	0.2	13	39	BRE	2.0	3	30%	70%
BRE302	Structure II	2.0	0.8	0.2	13	39	BRE	3.0	3	50%	50%
BRE3261				-	13	31	BRE	3.0	2	20%	80%
BRE345	Measurement, Documentation & Estimating	2.0	1.0	-	13	39	BRE	3.0	3	60%	40%
BRE364	Construction Contract Law & Administration	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE365	International Study**	-	0.9	-	13	13	BRE	3.0	1	100%	-
BRE366	Analytical Skills & Methods	1.2	0.8	-	13	26	BRE	3.0	2	100%	-
BRE370	Intermediate Construction Technology & Materials	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE472	Information Technology & Building Information Modelling for Construction Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%

NOTE: Students must complete and pass the 30-credit GUR subjects and all the subjects listed in Level 3 and Level 4 in Stage 3 prior to their graduation.

** International Study Tour is to take place in the Summer Semester. Students need to commence preparation, organization and liaison work of their study tour from Semester 1 of Stage 3.

T/S = Tutorial/Seminar
Lab. (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guided Study
CA = Continuous Assessment

7.3 Programme Curriculum of Major* in Building Engineering & Management for Stage 4

Stage 4		Curriculum								Assessment Methods	
		Timetabled Contact Hours per Week			No. of Teaching Weeks	Total Hours	Teaching Dept.	Subject Weighting for Final Assessment Grade (FAG)			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminar**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
BRE466	Capstone Project[#]	-	0.4	-	13	5	BRE	3.0	6	100%	-
BRE426	Geotechnical & Foundation Engineering	2.0	0.7	0.3	13	39	BRE	3.0	3	30%	70%
BRE4281	Construction Engineering Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE4393	Temporary Work Design	1.0	40 (PW)	-	13	65	BRE	3.0	3	100%	-
BRE453	Building Services II	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE461	Environmental Impact & Assessment	2.0	1.0	-	13	39	BRE	3.0	3	60%	40%
BRE462	Advanced Construction Technology	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%

NOTE: Student must complete and pass all subjects listed in Level 4 and the three electives of their choice prior to their graduation.

[#] BRE466 is a **6-credit** core subject spanning across from Semester 1 to Semester 2 of Stage 4.

[##] BEM students are required to opt three elective subjects. All BRE Level 3 and Level 4 subjects of a particular Major or discipline are offered in the Semester 2 as electives to students in their Stage 3 and 4 of another Major or discipline within the Department (exclusive of the subjects offered by APSS) subject to subject offering, the fulfilment of any pre-requisite or co-requisite requirements and time-table constraints.

T/S = Tutorial/Seminar
Lab. (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guided Study
CA = Continuous Assessment
E = Elective

7. Programme Curriculum of Major in Surveying*

Subject Descriptions

'Level' codes reflect the intellectual demand on the students. The levels of the subjects are coded according to a common coding system of the Hong Kong Polytechnic University.

Level		Explanation
1	=	Standing comparable to year 1 of a 4-year degree Major
2	=	Standard comparable to Year 2 of a 4-year degree Major
3	=	Standard comparable to Year 3of a 4-year degree Major
4	=	Standard comparable to the final year of a 4-year degree Major
5-6	=	Standard at postgraduate level

The University adopts a university-wide standard for subject level weighting for calculating the award GPA, and to use the weighting of 2 for Level 1 and 2 subjects; and a weighting of 3 for Level 3 and 4 subjects.

The Programme Curriculum and Examination Schedule for each academic level are detailed in Figure 7.1-7.4.

Subjects are referred by subject codes. The alphabets refer to the responsible departments whilst the three-digit reference numbers, the first digit (i.e. 1, 2, 3 or 4) indicates the level of the subjects.

NOTE

***Programme Curriculum displays the Discipline-specific Requirements (DSR) for the Major in Surveying only (Fig. 7.1 to Fig. 7.4).**

Details of the 27-credit General University Requirements (GUR) can be referred to their respective websites provided by the University (Section 3.2).

7.1 *Programme Curriculum of Major* in Surveying for Stage 1*

**** Programme Curriculum displays the 97-credit Discipline-Specific Requirements (DSR) for the Major in Surveying only. Details of the 30-details of the 30-credit General University Requirements (GUR) can be referred to their respective websites provided by the University (Section 3.2)***

Stage 1		**Curriculum**								**Assessment Methods**	
		Timetabled Contact Hours per Week			**No. of Teaching Weeks**	**Total Hours**	**Teaching Dept.**	**Subject Weighting for Final Assessment Grade (FAG)**			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminars**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
CE1001	Construction and Environment Professionals in Society	2.5	0.5	-	5	14.5	FCE	2.0	3	100%	-
AP10001	Introduction to physics	2.0	1.0	-	13	39	AP	2.0	3	40%	60%
AMA1140	Mathematics for Construction and Environment	2.0	1.0	-	13	39	AMA	2.0	3	50%	50%

NOTE: 1. Students must complete and pass the 30-credit General University Requirements (GUR) and all the subjects listed in Level 1, Level 2 and Level 3 in Stage 1 before they can graduate.

2. Students must satisfactorily complete the Work-Integrated Education (WIE) before they can graduate.

T/S = Tutorial/Seminars
Lab (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guide Study
CA = Continuous Assessment

7.2 *Programme Curriculum of Major* in Surveying for Stage 2*

Stage 2		**Curriculum**								**Assessment Methods**	
		Timetabled Contact Hours per Week			**No. of Teaching Weeks**	**Total Hours**	**Teaching Dept.**	**Subject Weighting for Final Assessment Grade (FAG)**			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminars**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
ELC3421	English for Construction and Environmental Professionals	-	3.0	-	13	39	ELC	3.0	3	100%	-
BRE2061	Legal Context for Building and Construction Professionals in Society	2.0	1.0	-	9	39	BRE	2.0	2	30%	70%
BRE2171	Planning & Development: Theories and Practices	2.0	1.0	-	6	39	BRE	2.0	2	50%	50%
BRE2691	Introductory Integrated Professional Workshop I	-	-	21	18	39	BRE	2.0	2	100%	-
BRE350	Project Management & Procurement	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE2031	Environmental Science	2.0	0.5	0.5 (Lab.)	13	39	BRE	2.0	3	40%	60%
BRE258	Industrial Safety I	-	0.5	0.5	13	39	IC	3.0	1	100%	-
BRE263	Construction Economics & Finance	2.0	1.0	-	13	39	BRE	2.0	3	40%	60%
BRE299	Work-Integrated Education (WIE)	Minimum 4 weeks continuously (in semester of either stage 1 or stage 2)					BRE/ Employer	2.0	2 training credits	100%	-
BRE349	Building Services I	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%

NOTE: 1. Students must complete and pass the 30-credit General University Requirements (GUR) and all the subjects listed in Level 2 and Level 3 in Stage 2 before they can graduate.

T/S = Tutorial/Seminars
Lab (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guide Study
CA = Continuous Assessment

7.3 *Programme Curriculum of Major* in Surveying for Stage 3*

Stage 3		**Curriculum**								**Assessment Methods**	
		Timetabled Contact hours per week			**No. of Teaching Weeks**	**Total Hours**	**Teaching Dept.**	**Subject Weighting for Final Assessment Grade (FAG)**			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminars**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
BRE3261	Building Maintenance Planning and Technology	3.0	-	0.5 (Lab)		31	BRE	2.0	3	20%	80%
BRE336	Development Control Law	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE365	International Study***	-	0.9	-	13	15	BRE	3.0	1	100%	-
BRE366	Analytical Skills & Methods	1.2	0.8	-	13	26	BRE	3.0	2	100%	-
BRE369	Integrated Professional Workshop II	-	-	-	13	39	BRE	3.0	3	100%	-
BRE472	Information Technology & Building Information Modelling for Construction Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
**BS/QS Discipline-specific Elective subjects											
BRE204	Structure I	2.0	1.0	-	13	39	BRE	2.0	3	30%	70%
BRE345	Measurement, Documentation & Estimating	2.0	1.0	-	13	39	BRE	3.0	3	60%	40%
BRE363	Construction Economics	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE364	Construction Contract Law & Administration	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE370	Intermediate Construction Technology & Materials	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
**GP/PD /FPM Discipline-specific Elective subjects											
BRE315	Property Valuation	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE337	Property Law	2.0	1.0	-	13	39	BRE	3.0	3	30%	70%
BRE362	Urban Economics & Property Investment	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE371	Introduction to Property Management	2.0	1.0	-	13	39	BRE	3.0	3	30%	70%
BRE397	Property Management Accounting	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%

NOTE: ** 1. Students are required to opt **ONE** Discipline from the Surveying disciplines: BS, GP, PD, FPM and QS.
2. Students must complete and pass all the subjects listed in Stage 3 before they can graduate.

*** International Study tour is to take place in the Summer Semester of stage 3. Students need to commence their study tour preparation, organization and liaison work from Semester 1 of stage 3.

T/S = Tutorial/Seminars
Lab (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guide Study
CA = Continuous Assessment

7.4 ***Programme Curriculum of Major* in Surveying for Stage 4***

Stage 4		**Curriculum**								**Assessment Methods**	
		Timetabled Contact Hours per Week			**No. of Teaching Weeks**	**Total Hours**	**Teaching Dept.**	**Subject Weighting for Final Assessment Grade (FAG)**			
Subject Code	**Subject Title**	**Lecture**	**Tutorial/ Seminars**	**Lab. (Pract.)/ Project Work/ Guided Study**				**Subject Weighting**	**Credit Value**	**CW/CA**	**Exam.**
BRE466	Capstone Project#		0.4	1.0	13	5	BRE	3.0	6	100%	-
BRE469	Integrated Professional Workshop III	-	-	-	13	39	BRE	3.0	3	100%	-
BS and QS Discipline-Specific Elective Subjects											
BRE415	Dispute Resolution	2.0	1.0	-	13	39	BRE	3.0	3	100%	-
BRE453	Building Services II	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
BRE461	Environmental Impact & Assessment	2.0	1.0	-	13	39	BRE	3.0	3	60%	40%
BS Discipline-Specific Elective Subjects											
BRE435	Design, Adaptation & Conversion	2.0	1.0	-	13	39	BRE	3.0	3	60%	40%
BRE437	Facility Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
QS Discipline-Specific Elective Subjects											
BRE439	Engineering Contract Procedure	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE440	Cost & Value Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE442	Forecasting & competition in the Built Environment	2.0	1.0	-	13	39	BRE	3.0	3	40%	60%
GP, PD and PFM Discipline-Specific Elective Subjects											
BRE427	Applied Property Investment	2.0	1.0	-	13	39	BRE	3.0	3	30%	70%
BRE4291	Real Estate Marketing	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE463	Business Valuation and Accounts	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE465	Asset Management	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
GP and PFM Discipline-Specific Elective Subjects											
BRE418	Real Estate Development	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE436	Applied Property Valuation	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
PD Discipline-Specific Elective Subjects											
BRE418	Real Estate Development	2.0	1.0	-	13	39	BRE	3.0	3	50%	50%
BRE464	Urban Planning	2.0	1.0	-	13	39	BRE	3.0	3	100%	-

NOTE: 1. Students must complete and pass all the subjects listed in Level 4 and the Discipline-Specific Elective Subjects of their chosen surveying disciplines and one elective of their choice before they can graduate.
2. #BRE466 Capstone Project is a 6-credit core subject spanning across two semesters: Semester 1 and Semester 2 of Stage 4.

T/S = Tutorial/Seminars
Lab (Pract.) = Laboratory (Practical)
PW = Project Work
CW = Coursework
GS = Guide Study
CA = Continuous Assessment
E = Elective

7. Programme Curriculum of Secondary Major *

The option of Secondary Major in Artificial Intelligence and Data Analytics (AIDA) is available of BSc (Hons) Building Engineering and Management and the other option of Secondary Major in Innovation and Entrepreneurship (IE) is also available of BSc (Hons) in Property Management.

Admission to the Secondary Majors are on competitive basis and subject to a different credit requirement for graduation.

Secondary Major in Artificial Intelligence and Data Analytics (AIDA)

	Title of Secondary Major	
	in English:	AI and Data Analytics (AIDA)
	in Chinese:	人工智能及數據分析
	Department/Faulty offering the Secondary Major:	COMP
	Effective year	2022/23 (For students admitted from 2022/23)
	Pre-requisite requirements for enrolment:	Nil
	Secondary Major curriculum	
	(a) Rationale and aim	Artificial intelligence and data analytics (AIDA) are the most prevailing technologies across various disciplines, and have become a de-facto standard approach to enrich business, advance technology and achieve breakthroughs in virtually all fields. Therefore, it is essential for students to possess expertise in AIDA and other underpinning technologies.
	(b) Intended learning outcomes of the Secondary Major	On successful completion of AIDA, students will be able to: 1. Understand the fundamentals of AIDA, and have the ability to apply them. 2. Design AIDA systems, components and processes to meet given specifications and constraints. 3. Identify, formulate and solve problems relevant to AIDA. 4. Use modern IT tools appropriate to AIDA practice. 5. Know the contemporary issues, and understand the impact of AIDA solutions in a global and societal context.

<table>
<tr><td></td><td>(c) Credit requirements

Note: At least 50% of the credits required for satisfying the Secondary Major requirements should be at level 3 or above.</td><td><table>
<tr><td>Core (compulsory subjects)</td><td>30 credits</td></tr>
<tr><td>Electives</td><td>6 credits</td></tr>
<tr><td>Total credits required</td><td>36 credits</td></tr>
</table></td></tr>
<tr><td></td><td>(d) Overlapped subjects</td><td>3 subjects (12 credits in total) are overlapped to fulfil the Secondary Major (AIDA) requirements.
*AMA1110 Basic Mathematics I/AMA1140 Mathematics for Construction and Environment
*BRE472 Information Technology and Building Information Modelling for Construction Management
*BRE4661 Integrated Capstone Project</td></tr>
</table>

Programme Structure

The programme structure of the Secondary Major in Artificial Intelligence and Data Analytics (AIDA) is as follows:

Artificial Intelligence and Data Analytics (AIDA)	
Core	30-36 credits
Mathematics I for AIDA	3 credits
Mathematics II for AIDA	3 credits
Programming I: Programming Fundamentals	3 credits
Programming II: Data Structures and Algorithms	3 credits
Fundamentals of Data Analytics	3 credits
Machine Learning	3 credits
Artificial Intelligence	3 credits
DSR-AIDA Bridging Subject(s)	3-9 credits
Integrated Capstone Project	6 credits
Electives	0-6 credits
Total	**36 credits**

The details of the Secondary Major in Artificial Intelligence and Data Analytics (AIDA) is available at https://www.polyu.edu.hk/comp/study/ug-programmes/aida/

Subject List *

(a) Core (Compulsory)

Subject code	Subject title	Offering Dept	Level	Credits
Mathematics I for AIDA (3 credits)				
*AMA1110/ AMA1140	Basic Mathematics I – Calculus and Probability & Statistics Mathematics for Construction and Environment (for FCE and FENG students only)	AMA	1	3
Mathematics II for AIDA (3 credits)				
AMA1751	Linear Algebra (for students from other Faculties/ Schools)	AMA	1	3
Programming I: Programming Fundamentals (3 credits)				
COMP1012	Programming Fundamentals and Applications (for students from other Faculties/ Schools) (Exclusion: COMP1011 / ENG2002)	COMP	1	3
Programming II: Data Structures and Algorithms (3 credits)				
COMP2013/ DSAI2201	Data Structures and Algorithms (Pre-requisite: COMP1011 / COMP1012 / ENG2002 / LGT3109 & AMA1110 / AMA1501 / AMA2634 & AMA1751 / AMA2111)	COMP	2	3
Fundamentals of Data Analytics (3 credits)				
AMA1611/ DSAI1102	Data Analytics Fundamentals	AMA	1	3
COMP1433/ DSAI1201	Introduction to Data Analytics	COMP	1	3
EIE1003	Foundations of Data Science	EIE	1	3
Machine Learning (3 credits)				
COMP4432/ DSAI4203	Machine Learning (for students from other Faculties/ Schools)	COMP	4	3
ELE3124	Fundamentals of Machine Intelligence	ELE	3	3
Artificial Intelligence (3 credits)				
COMP4431	Artificial Intelligence (Pre-requisite: COMP1012 / COMP2011 / ENG2002)	COMP	4	3
DSR-AIDA Bridging Subject(s) (minimum of 3 credits)				
AF3213	Business Analytics in Accounting and Finance (Pre-requisite: LGT2425 / MM2425 / LGT3425 / MM3425)	AF	3	3
AMA4602	High Dimensional Data Analysis (Pre-requisite: AMA2631 / AMA2631A / AMA2602 / AMA2691)	AMA	4	3
AP30019	Data Analysis Techniques for Scientists	AP	3	3

	(Pre-requisite: AP20018)			
BME34145	AIDA for Health Care and Smart Ageing (Pre-requisite: ENG2002)	BME	3	3
*BRE472	Information Technology and Building Information Modelling for Construction Management	BRE	4	3
BSE3610	Computational Methods in Building Sciences and Engineering	BEEE	3	3
BSE4510	Building Automation and Control [Pre-requisite: BSE2122 & BSE3225 (before 2022/23 cohort) / BSE2124 & BSE3227 (from 2022/23 cohort)]	BEEE	4	3
CBS3947	Programming and Data Analysis for Language Studies	CBS	3	3
CSE30313	Machine Learning Practice in Smart Mobility (Pre-requisite: One basic mathematics subject and one basic computer programming subject Mathematics AMA2007 / AMA2111 / AMA2131 / AMA2308 / AMA2707 / AMA290 Computer Programming AMA2222 / AMA2222A / COMP1011 / COMP1012 / ENG2002)	CEE	3	3
EE4014A	Intelligent Systems Applications in Electrical Engineering	EE	4	3
EIE3127	Artificial Intelligence of Things (Pre-requisite: EIE2112 & EIE2113)	EIE	3	3
ENGL4022	Quantitative Literacy for Language Professionals	ENGL	4	3
ENGL4026	Language and Social Data Analytics	ENGL	4	3
HTM3228	Smart Service Design in Tourism and Hospitality (Pre-requisite: HTM2305)	SHTM	3	3
HTM4362	Artificial Intelligence in Tourism and Hospitality	SHTM	4	3
ISE3018	Logistics Automation	ISE	3	3
ITC329XE	UX Design for Fashion	ITC	3	3
ITC342MC	Digital Marketing and Data Analytics	ITC	3	3
LGT3108	Introduction to Enterprise Resource Planning System	LMS	3	3
LSGI3803	Spatial Data Analytics and Mining	LSGI	3	3
ME46002	Numerical Methods for Engineers (Pre-requisite: AMA2111)	ME	4	3
MM3462	Artificial Intelligence and Big Data for Business (Pre-requisite: MM3425)	MM	3	3
SD3781	Interface Design	SD	3	3
SD4788	User Experience Design	SD	4	3

SO4020X	Application of AI and Data Analytics to Manage Ocular Problems	SO	4	3
Integrated Capstone Project (6 credits)				
*BRE4661	Integrated Capstone Project (Pre-requisite: BRE366) (Exclusion: Any other equivalent capstone project)	BRE	4	6

(b) Electives (6 credits)

Subject code	Subject title	Offering Dept	Level	Credits
AAE4009	Data Science and Data-driven Optimisation in Airline and Airport Operations	AAE	4	3
AAE4011	Artificial Intelligence in Unmanned Autonomous Systems	AAE	4	3
AMA3201	Computational Methods (Pre-requisite : AMA2007 / AMA2008 / AMA2111 / AMA2308 / AMA2380 / AMA2512 / AMA2882 / AMA290 / AMA3001)	AMA	3	3
AMA3602	Applied Linear Models for Finance Analytics (Exclusion: AMA2631 / AMA2631A)	AMA	3	3
AMA3640	Statistical Inference (Pre-requisite: AMA2007 / AMA2111 / AMA2308 / AMA2703 / AMA2703A / AMA273 / AMA2882 & AMA1501 / AMA1502 / AMA2104 / AMA2601 / AMA2601A / AMA2634 / AMA2634A / AMA2691)	AMA	3	3
AMA3820	Operations Research Methods (Pre-requisite: AMA1007 / AMA1008 / AMA1101 / AMA1102 / AMA1120 / AMA1130 / AMA2007 / AMA2111 / AMA2701 / AMA2701A / AMA2703 / AMA2703A / AMA2308 / AMA2380 / AMA2512 / AMA2882 / AMA290)	AMA	3	3
AMA4602	High Dimensional Data Analysis (Pre-requisite: AMA2602 / AMA2631 / AMA2631A / AMA 2691)	AMA	4	3
AMA4650	Forecasting and Applied Time Series Analysis (Pre-requisite: AMA2602 / AMA2631 / AMA2631A / AMA364 / AMA4001)	AMA	4	3
AMA4670	Modelling of Epidemic and Pandemic	AMA	4	3

	(Pre-requisite: AMA2691 / AMA2702)			
AMA4688	Simulation (Pre-requisite: AMA1501 / AMA1502 / AMA2104 / AMA2601 / AMA2634 / AMA2634A / AMA2691)	AMA	4	3
AMA4840	Decision Analysis (Pre-requisite: AMA1501 / AMA1502 / AMA2104 / AMA2601 / AMA2634 / AMA2634A / AMA2691)	AMA	4	3
AMA4850	Optimization Methods (Pre-requisite: AMA2007 / AMA2111 / AMA2112 / AMA2308 / AMA2380 / AMA2882 / AMA3001)	AMA	4	3
AP40012	Machine Learning in Physics (Pre-requisite: AP20005)	AP	4	3
AP40013	Energy Conversion and Storage with Machine Learning (Pre-requisite: AP20002)	AP	4	3
BME44144	AIDA for Biosignal Processing and Medical Imaging (Pre-requisite: BME31116)	BME	4	3
BME34145	AIDA for Health Care and Smart Ageing (Pre-requisite: ENG2002) Programme code changed from BME44145	BME	3	3
*BRE368	AI and Data Analytics for Smart Construction	BRE	3	3
BSE458	Building Performance Diagnosis and Management [Pre-requisite: BSE3514 (before 2022/23 cohort) / BSE3515 (from 2022/23 cohort)]	BEEE	4	3
BSE4610	Building Informatics (Pre-requisite: BSE1610 & BSE2610 & BSE3227)	BEEE	4	3
CBS3410	Python for Language Analytics (Pre-requisite: CBS3947)	CBS	3	3
CBS4702	Advanced Topics in Quantitative Language Studies (Pre-requisite: CBS3947)	CBS	4	3
CBS4703	Social Media and Social Network Analysis	CBS	4	3
CBS4704	Workshop on Language Analytics (Pre-requisite: CBS4958)	CBS	4	3
CBS4844	Machine Aided Translation	CBS	4	3
CBS4954	Statistics for Language Studies	CBS	4	3

CBS4958	Fundamentals of Computational Linguistics (Pre-requisite: CBS3947)	CBS	4	3	
CBS4962	Corpus and Language Technology for Language Studies (Pre-requisite: CBS1902)	CBS	4	3	
COMP4434/ DSAI4434	Big Data Analytics (Pre-requisite: AMA1104 / AMA1110 & COMP1011 / COMP1012 / ENG2002 & COMP2011 / COMP2013/DSAI2201)	COMP	4	3	
COMP4442	Service and Cloud Computing (Pre-requisite: COMP2421 & COMP4232)	COMP	4	3	
COMP4436	Artificial Intelligence of Things (Pre-requisite: COMP1011 / COMP1012 / ENG2002)	COMP	4	3	
CSE30313	Machine Learning Practice in Smart Mobility (Pre-requisite: One basic mathematics subject and one basic computer programming subject Mathematics AMA2007 / AMA2111 / AMA2131 / AMA2308 / AMA2707 / AMA290 Computer Programming AMA2222 / AMA2222A / COMP1011 / COMP1012 / ENG2002)	CEE	3	3	
EE3013B	Transportation Data Analytics (Pre-requisite: EE2029B)	EE	3	3	
EE4014A	Intelligent Systems Applications in Electrical Engineering	EE	4	3	
EIE4121	Machine Learning in Cyber-security	EIE	4	3	
EIE4122	Deep Learning and Deep Neural Networks (Pre-requisite: AMA2104/ EIE3124)	EIE	4	3	
ENGL4022	Quantitative Literacy for Language Professionals	ENGL	4	3	
ENGL4026	Language and Social Data Analytics	ENGL	4	3	
HTI3990	Big Data Analytics for Bioinformatics and Genomic Medicine	HTI	3	3	
HTI4990	AIDA in Clinical Diagnosis and Radiotherapy	HTI	4	3	
HTM4350	Big Data Analytics in Hospitality, Tourism and Events (Pre-requisite: HTM3205)	SHTM	4	3	
HTM4364	Social Media and Digital Marketing Analytics (Pre-requisite: HTM2324)	SHTM	4	3	

ISE3017	Applied AIDA in Operations Research and Management	ISE	3	3
ISE3011	Applied Quality and Reliability with AIDA	ISE	3	3
ITC426ME	Business Intelligence and Analytics for Fashion	ITC	4	3
ITC446XE	Mobile App Design for Fashion (Pre-requisite: ITC212MC / ITC329XE)	ITC	4	3
ITC4202T	Smart Textiles for Wearable Applications	ITC	4	3
LSGI3801	GeoAI	LSGI	3	3
LSGI3802	Spatial Data Science	LSGI	3	3
LSGI3803	Spatial Data Analytics and Mining (Pre-requisite: AMA1751 & COMP1011 / COMP1012)	LSGI	3	3
LSGI3804	Urban Big Data Analytics	LSGI	3	3
LSGI3805	Urban Sensing for Smart City	LSGI	3	3
LSGI3220	Building Information Modelling & 3D GIS	LSGI	3	3
ME41006	Perceptual Robotics (Pre-requisite: ME31002)	ME	4	3
ME42001	Artificial Intelligence in Products (Pre-requisite: ME31002 / ME41004)	ME	4	3
ME42011	Fundamentals of Robotics (Pre-requisite: ME31002 / ME41004)	ME	4	3
SD4772	Interactive Media and Marketing	SD	4	3

*The Subject Offering Departments reserve the rights to review/revise the subjects to be offered and the time of offer

The Progression pattern of AI and Data Analytics

36 academic credits – 12 double counted

Stage 1 (Semester 1) (Total Credits = 3)		**Stage 1 (Semester 2) (Total Credits = 0)**		**Stage 1 (Summer Semester)**
Mathematics I for AIDA				
AMA1140***	Mathematics for Construction and Environment (AMA)			
Stage 2 (Semester 1) (Total Credits = 0)		**Stage 2 (Semester 2) (Total Credits = 0)**		**Stage 2 (Summer Semester)**
Stage 3 (Semester 1) (Total Credits = 9)		**Stage 3 (Semester 2) (Total Credits = 9)**		**Stage 3 (Summer Semester)**
Mathematics II for AIDA		**Programme II: Data Structures and Algorithms**		
AMA1751	Linear Algebra	COMP2013/DSAI2001	Data Structures and Algorithms	
Programme I: Programme Fundamentals		**Fundamentals of Data Analytics (select one subject below)**		
COMP1012	Programme Fundamentals and Applications	AMA1161/DSAI1102 or ELE1003 or COMP1433/ DSAI1120	Data Analytics Fundamentals Foundations of Data Science Introduction to Data Analytics	
DSR-AIDA Bridging Subject * (Select one subject from the subject pool)**		**Electives (Subject one elective subject from the subject pool)**		
Stage 4 (Semester 1) (Total Credits = 9)		**Stage 4 (Semester 2) (Total Credits = 6)**		**Stage 4 (Summer Semester)**
Artificial Intelligence		**Machine Learning (select one subject below)**		
COMP 4431	Artificial Intelligence	COMP4432 /DSAI 4203 Machine Learning or ELE3124 Fundamentals of Machine Intelligence		
BRE4661***	Integrated Capstone Project #			
Electives (Subject one elective subject from the subject pool)		BRE4661***	Integrated Capstone Project #	

Remarks

*** 12 credits (AMA1140 (C) /BRE472 (C) and BRE4661 Integrated Capstone Project (C) - double counted for both BEM discipline-specific requirement and Secondary Major (AIDA) requirements. AMA1140 Mathematics for Construction and Environment (AMA) – Faculty Compulsory subject; BRE472 Information Technology & BIM for Construction Management- DSR-AIDA Bridging Subject; BRE4661 Integrated Capstone Project – Compulsory subject. Students can refer to the list of elective subjects available on the website.

BRE4661 Integrated Capstone Project is a 6-credit core subject spanning across 2 semesters from Semester 1 to Semester 2 of Stage 4. The Secondary Major (AIDA) students pursuing the Secondary Major in AIDA who take the BRE4661 Integrated Capstone Project are not required to complete the BRE466 Capstone Project

The subject offering departments reserve the rights to review/revise the subjects to be offered and the time of offer. Subjects are offered as electives to students, subject to the fulfilment of any pre-requisite or co-requisite requirements and time-table constraints.

Programme Structure and Curriculum of Minor in Real Estate Investment

Title of Minor Programme & Programme Code:	Minor in Real Estate Investment (32405-YRI)
Offering Department(s) in Full & in Abbreviation:	Department of Building and Real Estate
Requirement for Claiming the Minor Award:	For students admitted form 2012-13 inwards (4-year Undergraduate Degrees) Attained 18 credits from the subjects listed under section 7, of which at least 9 credits are at level 3 or above.
Exclusive Programme(s) & Programme Code(s):	BSc (Hons) in Surveying (32405-SUV)
Effective Year:	For students admitted from 2012-13 onwards
Professional Recognition:	Not applicable

Subject Code	**Subject Title**	**Subject Offering**	**Level**	**Credit Value**	**Subject Nature (Compulsory Elective)**
BRE363	Construction Economics	BRE	3	3	Compulsory
BRE265*	Introductory Construction Technology & Materials	BRE	2	3	Compulsory
BRE263*	Construction Economics & Finance	BRE	2	3	Compulsory
BRE315	Property Valuation (*Instead of BRE265 and BRE263, student with a Major study in BSc(Hons) in Building Engineering and Management (BEM) are to take BRE397 Property Management Accounting; and BRE427 Applied Property Investment.)	BRE	3	3	Compulsory
BRE3261	Urban Economics and Property Investment Building Maintenance Planning and Technology	BRE	3	2	Elective
BRE371	Introduction to Property Management	BRE	3	3	Elective
BRE397	Property Management Accounting	BRE	3	3	Elective
BRE427	Applied Property Investment	BRE	4	3	Elective
BRE431	Housing Studies	BRE	4	3	Elective
BRE418	Real Estate Development	BRE	4	3	Elective

8. Work Integrated Education (WIE)

8.1 *Introduction*

The Department of Building and Real Estate has put a strong emphasis on the WIE element in the design of curriculum of all its UGC funded full-time programmes of the BRE Scheme to (i) affirm our position in offering academic programmes in a professional context; (ii) strengthen the competitive edge of our professional oriented programmes with quality learning and enhancement of employability of our students; and (iii) enhance all-round development of students.

8.2 *Rationale and Philosophy*

As a major provider of professional education in real estate and construction, the Department understands the importance and responsibilities of enhancing the intellectual as well as the holistic development of our students. Both the attributes for all-round (i.e. generic skills) and professional competencies are complementary. At present, the labour market is placing increasing demand on people to possess an appropriate combination of professional skills and generic skills so as to cope with a rapidly changing work environment. We hope to provide students with an education not only in the acquisition of their own area of professional specialization, but also skills that are transferable in their professional education. This will increase our students' competitiveness in diversification and employability for multi-disciplinary work opportunities and environment in this rapidly changing socio-economic climate. WIE is a way to educate our students in learning and experiencing the multi-facets of workplace environment. We recognize however that WIE arrangements will be subject to the constraints of an industry that is both project based and comprises predominantly small and medium sized enterprises.

8.3 *Intended Learning Outcomes of the WIE Components*

1. To identify, formulate and solve problems related to the surveying profession & property industry.
2. To communicate effectively.
3. To contribute as a team member and lead effectively.

8.4 *Structure of the WIE Components*

The WIE element in BRE will last for a minimum duration of FOUR weeks, which will take place in the summer after Stage-1 and before Stage-2 study. The WIE element will be mandatory for all full-time undergraduate programmes and will bear TWO training credits.

The Department is aware of the University's guideline that the learning outcomes of WIE can be geared either towards "professional knowledge and skills" or "attributes for all-roundedness and generic skills". It is the view of the Department that, where possible, we will aim to gear our WIE activities to improve students' professional knowledge and skills.

Other forms of placements such as relevant summer jobs secured by students may also be considered as WIE element. However, these activities must be endorsed by the Department and must meet the requirements of being "structured", "measurable", and in an organisational context.

8.5 *Strategies for Supporting Learning in the Workplace*

The Department will fully utilise the mentors in our mentor scheme to facilitate our students to find profession-based placements. The Department will be involved in the assessment of the students to make sure they have achieved the intended learning outcomes of the WIE element.

A departmental WIE coordinator will be appointed to liaise with the SAO and industry, to arrange work placements for students and to coordinate WIE activities such as assessment with programme coordinators. The Department will also explore the possibilities of finding placements through other channels, including (1) working with CFSO as student helpers to conduct works in the area of surveying and property management; (2) working in Mainland China by utilising our links with universities and institutions there, and our graduates/alumni in China.

8.6 *Assessment of the WIE Components*

The Department will adopt universal assessment methods for the WIE elements in all full-time undergraduate programmes. The assessment methods will include two components: (1) a reflective journal by the student, and (2) a report by the employer. For sandwich students, a log book is also required, which is essential for them to fulfil the requirement of the professional institutions.

Students will be required to document their workplace learning experience in reflective journals, which will be assessed in conjunction with an assessment report by the employer to see whether the WIE learning outcomes have been achieved. The Department may form an interview panel when necessary to assess whether students have achieved the intended learning outcomes.

9. Teaching and Learning Methods

The teaching and learning methods are adopted to align with the intended learning outcomes of the subjects/programme.

The first two years of study will provide students with a broad-based education to fulfil university and faculty requirements, and then a foundation study which explains the characteristics and multi-disciplinary nature of building and real estate industries and analyses various components of the industries.

The third year of study offers to develop students' abilities to consider and analyse the constraints and solutions/options and decision making skill to the building and real estate proposals, development, production and available resources. A sound academic and professional knowledge at with all-rounded attributes and communication skills are thus developed.

The final year of study further develops students' abilities of problems solving skills, critical thinking and synthesis for new insights or views through dissertation and professional studies in projects. Students of all programmes will be able to develop their areas of specialism or interest through studies of both core subjects and elective subjects. Both professional and all-rounded attributes are further enhanced through different studies.

Emphasis will be placed on student's participation in the learning process under the close supervision and direction of academic staff to the student's studies.

Student participation will be encouraged through:

Tutorials
Student presentations in structured seminars
Guided reading in all subjects
Application of computer packages
Student involvement in professional studies, case studies, site visits, integrated and subject projects, guest lecturers, international study tour etc.
Final year individual dissertation and team projects for integrative and professional studies.

The following major T&L methods are implemented in the programme under the Scheme/Programmes:

1. Interactive Lecture
2. Tutorial/Seminar
3. Project-based Learning
4. Guided Study/Self-directed Learning
5. E-learning
6. Problem-based Learning
7. International Study

The primary objectives of the implementation of these T&L method are to ensure students' achievement in acquisition of knowledge and critical thinking and all-roundedness with professional competence defined by the programme outcomes.

Such alignment of the T&L methods with the programme outcomes is illustrated with examples of subjects which may adopt one or two particular type(s) of T&L methods.

9.1 *Interactive Lecture (subject example: BRE437 Facility Management)*

The interactive type of lecturing mode is encouraged and implemented in the programmes. The sequence of such lectures is as follows:

(i) Briefing concepts, principles and fundamentals are introduced and explained with the requirement of necessary knowledge retention from students: e.g. quality and performance assessment to facilities, bench marking process, etc.

(ii) Application and case studies: Real-life building projects and cases are presented for drawing students' focuses and analysis on issues and solutions with the applications of principles and fundamentals learned e.g. comparison between Cyberport and the HK Science Park.

(iii) De-briefing: Providing opportunities during the lecture to solicit students' views and perceptions. Students are encouraged to participate by raising questions and discussion.

(iv) Reinforcement: Reiterating the learning objectives of the topical unit through conclusive remarks, observations and contemporary issues. Students are encouraged to interpret issues and solutions holistically with knowledge-transfer to real-life situations and occasions e.g. quality and performance assessment to facilities with considerations of sustainability and management.

9.2 *Tutorial/Seminar (T/S)*

Tutorial/Seminars supplement T&L activities and implement lectures. T/S are used to amplify what are introduced and learned from the lectures. Students are encouraged to think critically, question and make inquiries, discuss problems/issues and make suggestions and proposals. In the case, where there are student's presentations, peer discussion and criticism/review are encouraged. Usually students form groups of 2 to 5 and each group is given a question for discussion either in the beginning of the tutorials/seminars or given in advance. A leader is chosen to record and report important ideas to the T/S group. Students 'buzz' for about 10 minutes on the former case. Leaders take turns to report important points of their groups to the whole class. During reporting, teacher prompts students for explanations and suggestions. Students post up ideas and inquiry, if any. Lastly, the teacher gives feedback and invites the whole class in participation.

The intended learning outcomes are an ability to communicate effectively through presentations and discussions/explanation of contemporary issues, comparing and contrasting ideas in view of different stakeholders of the industry with reference to knowledge gained during lectures. In doing so, students learn and gain the abilities delineated in the Programme Outcomes of professional/academic knowledge and competence (section 3.5). Moreover, all-rounded education especially in the areas of communication knowledge transfer and awareness of contemporary issues are attributed (section 3.5.2).

Tutorials/Seminars are included in nearly all subjects. The typical group size is around 28.

9.3 ***Project-based Learning (subject example: BRE262 Project Studio, BRE4393 Temporary Work Design, BRE435 Design, Adaptation and Conversion, BRE466 Capstone Project)***

Projects are usually open-ended embedded with a real-life 'investigation' for information, re-visit of issues and proposal of solution(s). Students are given project brief whereby they are asked to find/identify and analyse problems/issues and propose method(s) to solve the problems. Such project briefs involve investigation and study of problem originated from a contemporary issue (e.g. current maintenance issues of the building stock) or real-estate related situation (e.g. land price and property market) or a realistic workplace problem (e.g. measurement and estimating, strategies of bidding construction works, etc.). Students are required to actively carry out their own studies, produce reports and present findings/solutions in teams or individually.

Quite a few number of all-rounded attributes are exhibited in project-based learning.

The learning process and outcomes include:

(i) The ability to identify, analyse and solve problems in their related professional studies (outcomes of professional/academic knowledge and competences and attributes for all roundedness).

(ii) The ability to function as team members or as leader – it is among the group to determine and distribute responsibilities and tasks of works to make decisions and agreement both internally and externally and to ensure work done (Attributes for all roundedness).

(iii) An ability to manage/control time and plan works accordingly and effectively and work within reasonable time frame.

(iv) The ability to work in partnership with the skills of negotiation: "give and take", and resolution of conflicts and disputes within a group selling.

(v) The ability to self-evaluate performance to ensure work quality.

(vi) The ability to seek advice and expert knowledge and be aware of own's limitations and hence be able to identify knowledge gap for further learning (Attributes for all roundedness).

(vii) An ability to differentiate performance, work and achievement priorities within given time frame and resources.

(viii) The ability to communicate effectively through aural, graphical, numerical and text presentation.

Project-based learning method is a comprehensive approach to instruction and learning whereby students need to actively participate with self-motivation and practise with an array of multi-disciplinary knowledge and skills.

Students learn through both internalization (mental process) and externalities (peer affects, constraints, information, etc.), where these intrinsic knowledge is learned through project work in teams (groups) or individually.

Small-scale project based learning assignments are adopted by many other subjects (e.g. BRE435 Design, Adaptation and Conversion).

9.4 ***Guided Study/Self-directed learning (BRE466 Capstone Project)***

This component of guided study and self-directed learning creates a facilitation for and a favourable attitude towards independent learning for students. This will be one of the most important skills a student acquires from degree level education. Both student and lecturer play an active role in such learning.

Guided study/Self-directed learning is specially designed for particular subjects underpinned with strong research and investigation studies whereby an atypical pace of study and minimal intervention by supervisors or facilitators are required. In this case is the subject Dissertation. In general, self-directed learning is individualized instruction designed from the point of view of the learner who studies individually at his/her own pace, place and time. However, self-discipline is required by the students for progress monitoring with specified pre-arranged regular meeting. Study programme is scheduled in the 'table of works' and students have to formulate problem statement, research objectives, research design and methodology; carry out literature review and investigations in a pre-determined period of time. Hence, at times, students need to adjust their learning pace or content with the exercise of self-initiative and time management. The intended learning outcome is to develop life time learning abilities e.g. action plan decision making strategies, information funding abilities and achievement of targeted goals. (Outcomes of professional/academic knowledge and competencies and attributes of all roundedness are culminated).

9.5 ***E-learning (subject example: BRE217 Planning and Development, BRE4291 Real Estate Marketing)***

Electronic learning (e-learning) provides a virtual learning environment allowing students to experience and learn topics similar to what they would experience in reality. In this environment, the support of computer, information technology and on-line teaching/learning platform is vital.

A web-site for a particular subject is designed to include the presentations of learning materials (e.g. journal papers, book chapters, etc.), downloadable notes or PowerPoint notes, practising exercises quizzes and assignments for the topical units of the subject. Usually teaching/learning plan of the subject with information regarding grading and weighting of examination, test and assignments/coursework are also included. Hyperlinks to both local and overseas websites of related subject topics facilitate and guide students to seek most updated information and hence gain a wider perspective and in-depth understanding of the related topics. (e.g. sustainable development and construction, assessment of building performance, etc.).

Animation and film strips are also used to explain and simulate the actual construction process. Moreover, students can communicate among peers or with the subject lecturer through e-mails and chatroom. There are a number of e-learning subjects currently in use in the Department.

The Department actively supports web-based learning/teaching, and communication through WebCT and SMILE learning platforms. In particularly, SMILE is in fact designed and promoted by this Department (BRE). Subject management including examination and grading system can be performed effectively through the SMILE platform.

9.6 ***Problem-based learning (BRE435 Design, Adaptation & Conversion)***

Problem-based learning is introduced in many other subjects.

It is characterized by the use of actual cases with practical issues/problems e.g. part of the building under adaptation and conversion (e.g. the Landmark in Hong Kong): how disturbance can be minimized to the existing tenants in particular noise problem; how that part of building can be adapted and converted without disturbing the existing building services, etc. The inquiry and exploration leads to a series of learning task e.g. technical issues (environmental issues and engineering issues), communication (with tenants and sub-contractors), legal requirements, logistic of works, etc. Students, thus, gain concepts, knowledge and application within the learning process. Thus, both the programme outcomes, subject outcomes and the attributes of all-roundedness are fulfilled.

9.7 *International Study (BRE365 International Study)*

An overseas study tour is organized during the summer semester of stage 3 during their course of study (under the guidance of a tutor,) students are responsible for the organization and contact from the choice of destination to the arrangement of study visits to overseas academic institutions and professional/industrial establishments, transport and boarding arrangements budget controls, logistics, division of works, etc. Usually two members of staff will accompany the students for the study tour. The duration of the study tour is about a week. On return, a study report is produced together with an open oral presentation of the studies to other student faculty, teaching faculty, mentors and sponsors. The attributes for all roundedness in this programme are learned through this organization of study tour from initiative to production.

9.8 *Learning to Learn (L2L)*

Scheme/programme outcome for learning to learn (L2L)

The programmes of BSc(Hons) Scheme in Building and Real Estate are committed to nurture students with the continual learning and self-improvement mindset in the context of students' respective programmes, and able to plan, manage and evaluate their own learning in pursuit of self-determined goals.

In Year 1, the L2L focus is on fostering students to develop the attitudes of becoming lifelong learners. Students will be introduced to the concepts of L2L through the General University Requirements (GUR) subject, APSS1L01 (Tomorrow's Leaders). The importance of their identity as learner and belief and confidence in leading their own development will be recognised. The subject lays down a solid foundation for students to prepare their personal self-development plan. In addition, students will meet with academic advisors to explore the curricular and co-curricular opportunities for fostering their aspirations and developmental learning needs in the first year of study. The academic advisors will continue to play an advisory role in facilitating L2L throughout students' course of study.

In Year 2 and Year 3, students' understanding of L2L concept will be reinforced through two core Discipline-Specific Requirements (DSR) subjects. BRE299 [The Work-Integrated Education (WIE)] will take the form of an industrial attachment after the completion of stage 2 study. The expected programme L2L outcomes will be achieved through better understanding of the work environment. Students will be engaged in the reflection on personal growth, future career planning into their respective professionals and enhancement in the future learning process. In Year 3, the L2L focus will emphasize on learning the 'methods to learn' through research, critical analysis and self-learning. BRE366 (Analytical Skills and Methods) is a major component leading to the completion of BRE466 (Capstone Project). It contributes towards awareness of the importance of developing the ability to engage in a rigorous self-determined learning process.

In Year 4, students will be able to apply and evaluate their L2L ability in planning and managing a comprehensive learning project through the subject, BRE466 (Capstone Project). Students' achievement of the programme L2L outcomes will be assessed through a final reflection demonstrating their experience and development of L2L outcomes throughout the previous academic years of study and continuing their passion for lifelong learning after graduation.

In order to assess the learning to lean element and students' continued development of learning, a reflection journal is incorporated into the assessment methods of the above subjects at different stages of the study.

L2L Elements in the Curriculum

Programme	Year/Level 1	Year/Level 2	Year/Level 3	Year/Level 4
JS3100	APSS1L01 (Tomorrow's Leaders)	BRE299 [Work-Integrated Education (WIE)]	BRE366 (Analytical Skills and Methods)	BRE466 (Capstone Project)

APSS1L01 (Tomorrow's Leaders)

L2L outcomes	Recognise the importance of learning to learn and make initial plans for their development as learners based on self-reflection on aspirations and developmental needs.
Teaching and learning methods	Students will be introduced to the idea of L2L and a model for reviewing and planning their development as learners. They will explore the connection between their aspirations and university study and engage in guided reflections to review their developmental needs. This provides the basis on which students will formulate an initial personal development plan.
Assessment methods	Personal development plan + reflection (5% of whole subject grade)

BRE299 [Work-Integrated Education (WIE)]

L2L outcomes	• Recognize the importance of learning new skills and practical knowledge in the workplace. • Demonstrate the gaining of learning experience and practical knowledge through industrial placement. • Reflect on and develop their capacity for learning in their professional practice in the workplace.
Teaching and learning methods	• Apply their knowledge and skills acquired from the programme in carrying out tasks in the workplace during their WIE period. • Reflect on their growth as a learner through a personal reflection journal on their learning process and experience in understanding the process of developing problem-solving skills, communication skills, leadership and teamwork skills and possible improvements actions.
Assessment method	Personal Reflection Journal on their learning experience through industrial placement (600 - 1,000 words) (Pass/Fail grade only)

BRE366 (Analytical Skills and Methods)

L2L outcomes	Develop and evaluate the ability to engage in a rigorous self-determined learning process through research. Reflect on their readiness for learning through engaging in the research process.
Teaching and learning methods	Students will be engaged in identifying a research topic, asking research questions, learning about research methodology, and writing a research proposal, to develop the mindset and skills for planning and managing research projects. They will be guided through a series of tutorial discussions to demonstrate their understanding of the whole research process from a learner's perspective and reflect on how well they equip themselves for engaging in a rigorous self-determined study.
Assessment method	Personal Reflection Journal on their learning experience in how to develop a research topic and a research proposal (800 - 1,000 words) (10% of whole subject grade; students must pass all the assessment components of coursework)

BRE466 (Capstone Project)

L2L outcomes	Recognise the need for continual learning and self-improvement in the context of their respective professional disciplines, and be able to plan, manage and evaluate their own learning in pursuit of self-determined goals.
Teaching and learning methods	Students are expected to: • carry out self-study and research work • plan and manage their own research project • reflect on: (1) how well they have applied their L2L capability in completing the capstone project, (2) how far they have developed as a learner over the course of their university study, and (3) their readiness for learning in the workplace in future.
Assessment method	Personal Reflection Journal on students' learning process and their L2L development over the project period. (minimum of 500 words) (10% of whole subject grade; students must pass all the assessment components of coursework)

Co-curricular Elements

Academic Advising

All students are assigned to an academic advisor and are able to meet them at least once a year to discuss their academic plans and aspirations. The Academic Advisors will introduce the ideas of L2L to students in Year 1 and encourage them to explore both curricular and co-curricular opportunities for development (e.g. the Mentorship Programme), reflect on their experience, and adjust their learning and development goals, plans and approaches throughout the whole course of study. The plans and reflections generated in the designated L2L subjects will be used as materials for discussion in academic advising meetings.

10. Assessment

Assessment plays an important role in enhancing students' learning. Assessment is the process of finding out and putting a value on a student's achievements in studying a programme. It is a means to measure the learning outcomes/goals of a subject/programme. With the movement from a norm-referenced to a criterion-referenced model of measurement in this University, students are assessed and measured of their performance against an explicit set of standards. Therefore, the prime objective of assessment is to enable students to demonstrate their abilities in attaining the intended learning outcomes and fulfilling the intended learning outcomes and requirements of a subject/programme. Assessment is also served as feedback both to students of their performance and learning in progress and attainment of the subject/programme and to the teaching faculty of their teaching.

Different assessment methods including formative and summative assessments are adopted as deemed appropriate to the subjects depending on the natures of the subject disciplines and the alignment of the intend learning outcomes of the courses. The assessment methods are contained therein in the subject specifications which are distributed to all students in the beginning of the academic year. It is also reinforced by the subject lecturers by informing the students at the learning commencement on the assessment modes, standards and criteria.

With the move to criterion-referenced assessment, rubrics are developed to assess student performance with a scoring scale along a task-specific continuousness of criteria for some subjects. Students work is evaluated against scoring standards/criteria. Rubrics must be specified for all major assessment items at the subject level, made available to students before the assessment, and used for grading the assessment. As a rule of thumb:

(i) For subjects without examinations, rubrics should be required for single assessment items with a weighting of 30% or above of the subject's overall assessment.
(ii) For subjects with examinations, rubrics should be required for single assessment items with a weighting of 20% or above of the subject's overall assessment.

In general, the student performance in each subject is assessed by coursework and examination respectively. Weightings are allocated to coursework and examination of a subject, e.g. 30% and 70%, 40% and 60% or 50% and 50% respectively. Coursework includes assignments, case studies, seminar/tutorial presentation, role playing, field work, tests and other forms of learning activities. Grades will be assigned to reflect both individual contribution and group effort in the case it is not an individual piece of work. Examination is an end of unit/subject assessment. Grades are usually awarded to the written examinations. Marking schemes are provided to ensure assessment and grading on student performance are based on criteria and standards. The quality of examination papers and marking schemes is scrutinized by the external examiners and departmental academic advisor.

Other than projects and dissertation, where appropriate, some subjects can employ 100% continuous assessment. Usually students are assessed in their performance attainment of technical skills over an extended period of time, for example, measurement, estimating & documentation, and engineering surveying.

In the case of group projects, both aggregating grades and assigning grades are given to group effort and individual contribution in a group. This is to ensure that there will be no 'non performer'. Moreover, peer interactive learning in project proposal/solutions, and different components of the project, presentations, reports and communication are included in the grading for the group effort.

10.1 ***Assessment Methods***

Students' performance in a subject is assessed by either of the following methods:

(a) Coursework only: To pass a subject by this method of assessment, a student must attain a minimum Grade 'D' in coursework (tests, assignments, projects, laboratory work, field exercises, presentations and other forms of classroom participation).

(b) Examination and Coursework (the weighting of each component is stated in the Subject Portfolio): To pass a subject by adopting this method of assessment a student must attain a minimum Grade 'D' in coursework and a minimum Grade 'D' in the examination.

(c) Continuous Assessment: Both Project and Capstone Project are of this type of assessment where students are assessed through a period of time with stages of work and progress together with the final products of works.

Assessment methods and parameters are determined by the Subject Leader who will inform the students of the details at the beginning of each semester.

10.2 ***Grading*** (in accordance with C1-10 General Assessment Regulations of AR Handbook on Academic Regulations and Procedures)

At the end of each semester students will be informed of the grade achieved for each subject normally.

Assessment grades shall be awarded on a criterion-reference basis. A student's overall performance in a subject shall be graded as follows:

Subject Grade	***Short Description***	***Elaboration on subject grading description***
A+ A A-	Excellent	Demonstrates excellent achievement of intended subject learning outcomes by being able to skilfully use concepts and solve complex problems. Shows evidence of innovative and critical thinking in unfamiliar situations, and is able to express the synthesis or application of ideas in a logical and comprehensive manner.
B+ B B-	Good	Demonstrates good achievement of intended subject learning outcomes by being able to use appropriate concepts, and solve problems. Shows the ability to analyse issues critically and make well-grounded judgements in familiar or standard situations, and is able to express the synthesis or application of ideas in a logical and comprehensive manner.
C+ C C-	Satisfactory	Demonstrates satisfactory achievement of intended subject learning outcomes by being able to solve relatively simple problems. Shows some capacity for analysis and making judgements in a variety of familiar and standard situations, and is able to express the synthesis or application of ideas in a manner that is generally logical but fragmented.
D+ D	Pass	Demonstrates marginal achievement of intended subject learning outcomes by being able to solve relatively simple problems. Can make basic comparisons, connections and judgements and express the ideas learnt in the subject, though there are frequent breakdowns in logic and clarity.
F	Fail	Demonstrates inadequate achievement of intended subject learning outcomes through a lack of knowledge and/or understanding of the subject matter. Evidence of analysis is often irrelevant or incomplete.

'F' is a subject failure grade, whilst all others (from 'D' to 'A+') are subject passing grades. No credit will be earned if a subject is failed.

Note:

- Marking rubrics aligned with these Grade Descriptors need not include all aspects of the grade descriptor.
- Marking rubrics aligned with these Grade Descriptors may include other aspects aligned with particular subject matter or field of study requirements but are not included in the grade descriptor.

The grade points assigned to subject grades attained by students are as follows:

Grade	New Grade Point	Short Description
A+	4.3	Excellent
A	4.0	
A-	3.7	
B+	3.3	Good
B	3.0	
B-	2.7	
C+	2.3	Satisfactory
C	2.0	
C-	1.7	
D+	1.3	Pass
D	1.0	
F	0.0	Failure

At the end of each semester/term, a Grade Point Average (GPA) will be computed based on the grade point of the subject overall grade as follows:

$$\text{GPA} = \frac{\sum_{n=1}^{N} \text{Subject Grade Point}_n \times \text{Subject Credit Value}_n}{\sum_{n=1}^{N} \text{Subject Credit Value}_n}$$

where N = number of all subjects (inclusive of failed subjects) taken by the student up to and including the latest semester/term. For subjects which have been retaken, only the grade point obtained in the final attempt will be included in the GPA calculation

In addition, the following subjects will be excluded from the GPA calculation:

(i) Exempted subjects
(ii) Ungraded subjects
(iii) Incomplete subjects
(iv) Subjects for which credit transfer has been approved, but without any grade assigned[1]
(v) Subjects from which a student has been allowed to withdraw (i.e. those with the code 'W')

Subject which has been given an "S" code, i.e. absent from all assessment components, will be included in the GPA calculation and will be counted as "zero" grade point. GPA is thus the unweighted cumulative average calculated for a student, for all relevant subjects taken from the start of the programme to a particular reference point of time. GPA is an indicator of overall performance, and ranges from 0.00 to 4.30 from 2020/21.

[1] Subjects taken in PolyU or elsewhere and with grades assigned, and for which credit transfer has been approved, will be included in the GPA calculation.

10.3 ***Retaking of subjects***

Students may only retake a subject which they have failed (i.e. Grade F or S or U). Retaking of subjects is with the condition that the maximum study load of 21 credits per semester is not exceeded. In cases where a student takes another subject to replace a failed elective subject, the fail grade will be taken into account in the calculation of the GPA, despite the passing of the replacement subjects.

The number of retakes of a subject should be restricted to two, i.e. a maximum of three attempts for each subject is allowed. Students need to submit a request to the Faculty/School Board for the second retake of a failed subject. Students who have failed a compulsory subject after two retakes and have been de-registered can submit an appeal to the Academic Appeals Committee (AAC) for a third chance of retaking the subject. In case AAC does not approve further retakes of a failed compulsory subject or the taking of an equivalent subject with special approval from the Faculty, the student concerned would be de-registered and the decision of the AAC shall be final within the University.

(Remark: The rules are currently being reviewed by the University and may be subject to change.)

[1] The retake count of students admitted in or before 2019/20 will be reset to "0" in 2020/21 when the revised regulations come into effect.

10.4 *Appeals*

Appeals against the decision of the Subject Assessment Review Panel must be made within one calendar week days after the public announcement of the overall results. A student should make the appeal to the Head of the BRE Department. The Department will inform the student of the appeal result and, if the appeal is successful, the Department will inform the Faculty. (Details are referred to C7 Student Appeals of AR Handbook on Academic Regulations and Procedures.)

10.5 *Progression/Academic Probation*

When a student has a Grade Point Average (GPA) lower than 1.70, he will be put on academic probation in the following semester. If a student is able to pull his GPA up to 1.70 or above at the end of the semester, the status of "academic probation" will be lifted. The status of "academic probation" will be reflected in the assessment result notification but not in the transcript of students.

11. Progression and Award

11.1 *Progression*

A student will have 'progressing' status unless he falls within any one of the following categories which shall be regarded as grounds for de-registration from the programme:

(i) the student has reached the final year of the normal period of registration for that programme, as specified in the Programme Requirement Document, unless approval has been given for extension; or

(ii) the student has reached the maximum number of retakes allowed for a failed compulsory subject; or

(iii) the student's GPA is lower than 1.70 for two consecutive semesters and his/her Semester GPA in the second semester is also lower than 1.70; or

(iv) the student's GPA is lower than 1.70 for three consecutive semesters.

11.2 *Graduation Requirements*

A student will be eligible for award if all the following conditions are satisfied:

(i) Accumulation of the requisite number of credits for the particular award, as defined in the programme requirement document; and

(ii) Satisfying the residential requirement for at least one third of the credits required for the award to be completed under the current enrolment at PolyU; and

(iii) Satisfying the National Education (NE) Requirement (applicable to students admitted in or after 2022/23)

(iv) Satisfying the Academic Integrity and Ethics (AIE) requirement (applicable to students admitted in or after 2024-25); and

(v) Satisfying all requirements as defined in the programme requirement document and as specified by the University; and

(vi) Having a Grade Point Average (GPA) of 1.70 or above at the end of the programme.

A student is required to graduate as soon as all the conditions for award are satisfied.

11.3 ***Guidelines for Award Classification***

The following are guidelines for the Boards of Examiners when determining award classifications. The BoE will exercise its judgement as to the award for each student and may use other relevant information.

Hons Degree	**Guidelines**
1st	The student's performance/attainment is outstanding, and identifies him/her as exceptionally able in the field covered by the programme in question.
2:i	The student has reached a standard of performance/attainment which is more than satisfactory but less than outstanding.
2:ii	The student has reached a standard of performance/attainment judged to be satisfactory, and clearly higher than the "essential minimum" required for graduation.
3rd	The student has attained the "essential minimum" required for graduation at a standard ranging from just adequate to just satisfactory.

The following table indicates the ranges of award GPA for determining award classifications:

Honours Classification	**All Other Programmes**	**Award GPA**
1st	Distinction	3.60 – 4.30
2:i	Credit	3.00 – 3.59
2:ii	Pass	2.40 – 2.99
3rd		1.70 – 2.39

11.4 A Pass-without-Honours degree award will be recommended only under exceptional circumstances, when the student has demonstrated a level of final attainment which is below the 'essential minimum' required for graduation with Honours from the programme in question, but when he has nonetheless covered the prescribed work of the programme in an adequate fashion, while failing to show sufficient evidence of the intellectual calibre expected of Honours degree graduates.

Weighted GPA will be computed as follows:

$$\text{Weighted GPA} = \frac{\sum_{n=1}^{N} \text{Subject Grade Point}_n \times \text{Subject Credit Value}_n \times W_n}{\sum_{n=1}^{N} \text{Subject Credit Value}_n \times W_n}$$

where W_n = weighting to be assigned according to the level of the subject

N = number of all subjects counted in GPA calculation as set out in Section 8.3 of C1 above, except those exclusions specified in Section 10.3 of C1 below.

For calculating the Weighted GPA (and award GPA) to determine the Honours classification of students who satisfy the graduation requirements of Bachelor's degree awards, a University-wide standard weighting[1] will be applied to all subjects of the same level, with a weighting of 2 for Level 1 and 2 subjects, a weighting of 3 for Level 3 and 4 subjects. Same as for GPA, Weighted GPA ranges from 0.00 to 4.30 commencing from 2020/21.

[1] Requests for deviation from this University-wide standard require specific approval by the APRC.

For students taking the Major/Minor study route, a separate GPA will be calculated for their Major and Minor programmes. The Major GPA will be used to determine his/her award classification, which will be so reflected on the award parchment. The Minor GPA can be used as a reference for the Board of Examiners to moderate the award classification for the Major.

For students taking the Major/Secondary Major study route, there is no separate 'Secondary Major GPA". The Major GPA is the weighted GPA of all subjects contributing to the Major and Secondary Major.

11.5 *Students Taking the Major/ Minor Option*

Students taking the Major/Minor option will be considered for an award when they have satisfied the requirements for both the Major and Minor studies (i.e. having a GPA of 1.70 or above) and have also submitted a graduation application. If the 18 credits taken for the Minor study can meet the requirements for a specific Minor, the Major students may apply to graduate with a specific Minor, in addition to their Major. If the 18 credits taken are a free collection of electives in any combination of disciplines in conjunction with a Major programme, these students will graduate with a Major only.

Subject to approval by the Minor-offering Department, students may count up to 6 credits from their Major/GUR [including Language Communication Requirements (LCR) subjects at proficiency level] towards their chosen Minor. Nevertheless, students must take at least 6 credits from their chosen Minor programme to satisfy the residential requirement of their chosen Minor. In addition, to be eligible for the Major and Minor awards, the total number of credits taken by the students for their Major-Minor studies must not be lower than the credit requirement of the single discipline Major programme.

11.6 *Students taking the Major/Secondary Major Option*

Students may count up to 12 credits of their Major/GUR subjects towards the Secondary Major. Nevertheless, students must take at least 12 credits from their chosen Secondary Major in order to satisfy the residential requirement of the chosen Secondary Major. Students who have completed more than 12 credits of subjects that are eligible for double counting will need to apply for graduation and indicate the subjects intended for double counting. Notwithstanding the above, students must meet the minimum credit requirements of the "X + Secondary Major" concerned, i.e. 132 credits.

11.7 ***Students taking the Major (including the Major/Secondary Major option) Minor studies***

For students who have completed a Major (including the Major/Secondary Major option)/Minor programme, a single classification will be awarded and their award classification will mainly be based on the "Major GPA", but it can be moderated by the Board of Examiners with reference to the "Minor GPA".

"Major GPA" is derived based on all subjects of the Major programme, as well as the Secondary Major programme, if any, including those meeting the mandatory General University Requirements (GUR) and programme-specific language requirement, but not necessarily including the training credits.

"Minor GPA" is derived based on the 18 credits of specific Minor programme. "Minor GPA" is unweighted.

The "Major GPA" and the "Minor GPA" will be presented separately to the Board of Examiners for consideration. The guidelines for determining award classification as stipulated in Section 10.7 of C1 below are applicable to programmes with Major (including the Major/Secondary Major option)/Minor studies.

Where a student has a high GPA for his/her Major (including the Major/Secondary Major option) but a lower GPA for his/her Minor, he/she will not be 'penalised' in respect of his/her award classification, which is attached to the Major. On the other hand, if a student has a lower GPA for his/her Major (including the Major/Secondary Major option) than his/her GPA for the Minor, the Board of Examiners may consider giving the student recommending a higher award classification than with reference to his/her Major GPA for the student for ratification by the APRC via the Faculty/School Board.

Part III

Programme Management

12. Programme Operation and Management

12.1 *Board of Examiners (BOE)*

A Board of Examiners shall be appointed for each programme leading to an award of the University. The composition/membership of the Board of Examiners (BoE) will be proposed by the Head of Department and for the Dean's approval. Its composition will be as follows:

Chairperson

(i) Head of the Department in which the Scheme is based

Members

(ii) Associate Head (Teaching)
(iii) Undergraduate Scheme Chair
(iv) Programme Leader (Award Co-ordinator) of the Programme within the Scheme
(v) Examination Officer(s) of the Department
(vi) External Examiner(s) where appointed, if available

Co-opt Members

(vii) 4-5 subject leaders/lecturers

Secretary: Departmental Senior Executive Officer

The Scheme BoE meets at the end of each semester, within one week after the subject results have been finalised. - The BoE is responsible to the Senate for making decisions concerning:

(i) decisions on straight forward progression and de-registration cases;
(ii) decisions on the classification of awards to be granted to each student on completion of the programme, and
(iii) decisions on cases with extenuating circumstance

The BoE will not attempt to change the grades for any student in any subject nor condone failures. The decisions of the BoE, except those on straight forward progression and de-registration cases, shall be ratified by the Faculty Board. The Faculty Board may refer the decisions back to the BoE for further consideration and explanation.

Any decisions by the BoE outside the General Assessment Regulations of the University, supported by the Faculty Board, should be referred to the Academic Planning and Regulations Committee (APRC) for ratification. All approved cases shall be reported to the Senate. Decisions by BoE outside the programme regulations but within the General Assessment Regulations of the University fall within the authority of the Faculty Board.

12.2 ***Subject Assessment Review Panel (SARP)***

A Subject Assessment Review Panel (SARP) will be formed by the Department to review the grades of the subjects it offers before finalising them, e.g. by observing if there are irregularities or discrepancies in the distribution of grades in the subject results reports and statistics, considering comments and observations made by Subject Teachers, etc. After finalisation by SARP, the subject grades shall be formally released to students and submitted to the Board of Examiners which will not attempt to change any grades.

Composition of the **SARP** is as follows:

Chairman:	(i) Head, Department of Building and Real Estate
Members:	(ii) Associate Head (Teaching)
	(iii) Undergraduate Scheme Chair
	(iv) Examination Officer (Quality)
Secretary:	Departmental Senior Executive Officer

12.3 ***Departmental Programme Committee (Undergraduate Scheme Committee)***

<u>Composition</u>

The Composition of the Departmental Programme Committee (DPC) will be as follows:

Chairperson

(i) Appointed by the Head of Department in which the Scheme is based

Members

(ii) Head of host Department
(iii) Associate Head (Teaching)
(iv) All Programme Leaders (Award Co-ordinators) within the Scheme
(v) A representative of each department which does not host an award but is making a significant contribution to the subjects within the Scheme
(vi) One student representative from each year of the programmes offered within the Scheme

Secretary: Departmental Executive Officer

Terms of Reference

The Departmental Proramme Committee (Undergraduate Scheme Committee) will exercise the overall academic and operational responsibility for the Scheme and its development within defined policies, procedures and regulations including the following:

(i) the effective operation, organisation, and development of the programme(s), including the co-ordination of teaching and other inputs and the implementation of University, Faculty and Departmental policies and guidelines for monitoring student progress, student counselling, placements, etc.;
(ii) implementation of University learning and teaching policies and strategies in the context of academic programmes and identification of areas for enhancement, in collaboration with the Departmental Learning and Teaching Committee (DLTC);
(iii) review of academic regulations, admission policy, assessment, and examination methods;
(iv) submissions of proposals to appropriate professional bodies and external validating bodies, normally via the Head of the programme offering Department and in accordance with the University's established procedures;
(v) the continuing critical review of the rationale, aims, intended learning outcomes (ILOs) and the alignment of teaching, learning, and assessment with the ILOs, programme learning outcomes assessment and its results, and the improvement and development of the programme(s), including the approval of minor changes to the curricula of the programmes;
(vi) the definition and maintenance of the academic standard of the programme(s);
(vii) ensuring that the views of students, as reflected by the Student/Staff Consultative Group(s) or additional means as decided by DPC, and other key stakeholders in the programme(s) are known and taken into account;
(viii) co-ordination of the programme review procedures and the submission of the Annual Programme Review reports, including the Departmental Overview report.

12.4 ***The Chairperson of the Departmental Programme Committee (Undergradate Scheme Committee)***

The Chairperson of the Departmental Prorgamme Committee (Undergraduate Scheme Committee is responsible for the day-to-day management as well as overall management of the prorgamme within the scheme, in particular

(i) co-ordination of the management team;
(ii) administering the admissions procedure with the assistance of the Programme Leaders;
(iii) liaison with FB, Heads of Department contributing to theprorgamme(s), and relevant the Programme Leaders;
(iv) external liaison on behalf of the Scheme, for example with the validating bodies and external bodies concerned with credit transfer via the Head of Department; and
(v) forward planning and the development of the Scheme within the policies of the University at the advice of the Head of the Department.

12.5 *Programme Leader (Award Co-ordinator)*

The Programme Leader (Award Co-ordinator) will provide the programme's academic and organisational leadership with full support and co-operation of the Head of Department. In particular, a Programme Leader's responsibilities are:

(i) to ensure the effective conduct and organization of the programme within agreed policies and regulations;
(ii) to negotiate with the Head(s) of Department(s) the allocation of appropriate staff for teaching and other duties required by the programme;
(iii) to develop good working relationships with the Heads and relevant senior staff of Departments involved in the programme and with staff teaching in the programme;
(iv) to work with subject teachers to ensure that the university policies and guidelines and quality standards pertaining to academic quality (e.g. policy on Active Learning, Quality Standards for Online Teaching) are observed;
(v) to keep in close touch with the academic welfare and progress of students in the programme, and to be aware of students' views on the programme;
(vi) to report to the Heads of Departments concerned on the ongoing requirements of staff and resources for the programme, as part of the preparation of departmental estimates;
(vii) to co-ordinate any necessary interaction with professional bodies through the appropriate internal mechanisms;
(viii) to lead the development of the programme and the implementation of the Programme Learning Outcomes Assessment Plan;
(ix) to co-ordinate the inputs to and the debate of the Departmental Programme Committee leading to the annual programme review reports (including the programme learning outcomes assessment results) which form part of the Annual Programme Review (APR), and other periodic programme reviews; and
(x) to take executive action as agreed by the Departmental Programme Committee.

12.6 *Programme Management Committee (Programme Executive Group)*

A Programme Management Committee is responsible to monitor and control day-to-day running within the agreed scheme. The committee comprises Programme Leader (Award Co-ordinator), Deputy Programme Leader (Deputy Award Co-ordinator) and Capstone Research / Capstone Project Co-ordinator. The committee meets at least twice per academic year to consider progress of the students as well as receiving comments from the various subject lecturers or proposed changes to the programme.

12.7 *Head/Student Consultative Group*

A Head/Student Liaison Group, made up of the Head of Department and two student representatives from each year of individual programme, meets twice a year to discuss issues of concern.

12.8 *Staff/Student Consultative Group*

It is important that there are adequate and effective opportunities for discussion of the programme between students and staff, in a context that allows broad student participation. The nature and extent of student interaction and feedback is one of the issues covered in the annual programme report and the programme review report, to be considered in a Departmental Review exercise.

The Student/Staff Consultative Group (SSCG) is set up to provide a formal channel through which student views can be obtained. Student membership should include, as far as possible, two student representatives from each year of the programme under the normal progression pattern and an appropriate mix of major student groupings. Staff membership should cover the Programme Leader, Deputy Programme Leader and Capstone Research / Capstone Project Co-ordinators. SSCG must meet at least once per semester.

SSCG's terms of reference are:

(i) to discuss any matters directly related to the programme; and
(ii) to report or make recommendations, as felt necessary, to the Departmental Programme Committee (Undergraduate Scheme Committee).

The SSCG report will be one of the data sources for the Annual Programme Review and an agenda item of the first meeting of the next academic year; progress on any unresolved issues should also be reported in this meeting.

12.9 *Academic Advisors Systems for Undergraduate Studies*

In order to ensure that students receive proper academic advice throughout their studies and are provided with accurate information about programmes, academic regulations and procedures, Department should designate an academic staff to serve as the Academic Advisor for a student.

The Academic Advisor, as front-line advisors to students, are responsible for providing students with relevant and current information about curriculum and programme requirements, advising students of the suitable combination of subjects before subject registration in each semester, providing academic advice to students related to their studies and career development, assisting students in solving problems encountered in their studies and formulating study plans, and referring students to other units for relevant information or support.

13. Subject Management

13.1 *Discipline Leader*

A Discipline Leader is responsible for the development of subjects within a particular discipline area across the credit-based honours degree programmes/awards in which they appear. In particular the discipline leaders assist the Scheme Chairperson and the Award Co-ordinators in Scheme/programmes development and they are responsible for monitoring and co-ordination of development and examination standards of subjects in that discipline area. They ensure that the needs of the various awards are met, avoiding duplication and omission of material.

13.2 *Subject Leader*

The BRE Department adopts a team approach to teaching. Subjects are normally delivered by more than one lecturer with one of the team designated as the Subject Leader responsible for the development of the subject and for teaching activities of the lecturers involved.

13.3 *Subject Lecturer*

A Subject Lecturer is responsible for the teaching and delivery of the subject and assessing the student performance.

13.4 *Subject Syllabus and Standard Subject Size*

Syllabus details are provided in the attached SUBJECT PORTFOLIO at Section 11. Each subject has an allocated credit value (the standard is 3 credits) and, in terms of effort, a student is expected to do 40 hours of study to earn a credit.

13.5 *Subject Levels*

The credit-based subjects are classified according to the University Credit-based System. Each subject is given a unique code that identifies the department offering the subject, the intellectual level and the discipline. For example, subject code BRE201 consists of the letter prefix “BRE” identifying the department as a subject offered by the Department of Building & Real Estate, “2” indicating that it is a level 2 subject, and “01” as the coding of that particular subject. The level codes are as follows:

Level code		Explanation
1	=	Standard comparable to Stage 1 of a 4-year honours degree programme
2	=	Standard comparable to Stage 2 of a 4-year honours degree programme
3	=	Standard comparable to Stage 3 of a 4-year honours degree programme
4	=	Standard comparable to Stage 4 of a 4-year honours degree programme
5	=	Master's level
6	=	Doctoral level

Although the level codes 2 to 4 are for undergraduate degrees, other awards may also use subjects with level codes 2 to 4 if the level of the subject is considered to be appropriate for the level of award. Therefore, level 2 subjects, level 3 subjects and level 4 subjects may be included in different years of the programme.

13.6 ***Requisites, Co-requisites and Exclusions***

Each subject may have pre-requisites, co-requisites and exclusions. The pre-requisite of a subject must have been obtained before a student registers for that subject. However, the Department has the discretion to waive the pre-requisite requirements of a subject, if deemed appropriate. If a subject X has a subject Y as a co-requisite, both X and Y must be taken in the same semester. And, if subject X has subject Y as exclusion, a student having completed subject Y cannot have subject X count towards the award.

13.7 ***Credit Transfer and Exemption***

13.7.1 **Credit Transfer** will be given credits for recognized previous study, which will count towards the award requirement. University policy stipulates that not more than 50% of the required number of credits for the academic programme may be transferable from approved institutions outside the University, and not more than 67% of the required credits for the programme can be transferred from programmes within the University.

13.7.2 **Exemption** from taking subjects means that the credits associated with the exempted subjects will not count towards the award requirement. If a student is exempted from taking a specified subject because they have previously successfully completed similar subjects in another programme, another subject will have to be taken in order to satisfy the credit requirement.

(Remarks: The rules are currently being reviewed by the University and may be subject to change.)

13.8 ***Subject Registration***

A student must register for a subject 2 weeks prior to the start of the semester in which it is offered. The schedule for subject registration includes an "add-drop" period of 2 weeks at the beginning of each semester.

14. Programme Review and Quality Control

In addition to the information set out below further details are provided in the Hong Kong Polytechnic University document Programme Planning, Validation and Management (July, 2004) Section C2 - Programme Review and Generic QA Exercise and C3 - Changes to Programmes.

14.1 *Programme Evaluation and Review*

Each programme is to be reviewed on an annual basis and the review report will form part of the Annual QA Report and Business Plan to be submitted to the Faculty Dean. The process makes provision for the Scheme/Award Committee to analysze on a systematic basis, the evidence available on the operation and progress of the programme and amends the programme in the light of that evidence. It also serves to ensure that, and provides a mechanism whereby, the department/Faculty Board (FB) can carry out its responsibility to ascertain the satisfactory operation of the programme on a year-to-year basis.

The annual programme report will be subsumed in the Annual QA Report which also covers other academic and administrative functions. Based on the Annual QA Report submitted by departments, Faculty Dean will prepare a consolidated Faculty QA Report for submission to the Quality Assurance Committee (Academic Departments).

14.2 *Annual Review*

A meeting (or series of meetings) of the programme team under the leadership of the Scheme/Programme Leaders will take place in each academic year (normally late October or November) for the purpose of critically reviewing and assessing the operation of the programme during the preceding year. In respect of the programme this process should include:

(a) identification of strengths and weaknesses;

(b) consideration of strategies to build on strengths, solve problems and remedy weaknesses;

(c) a review of action taken on issues identified in the previous year's review; and

(d) a critical examination of programme statistics with analyses of student admissions and performance, an assessment of the continued need for and relevance of the programme, the quality of its output and employment prospects, students' views and reports from Departmental Academic Advisors/External Examiners where appropriate.

The outcome of this process of annual review should be a written report, to be submitted by the Award Co-ordinator, via the Scheme Chairman to the Head of Department for the compilation of the Annual QA Report to the Faculty Dean.

The annual programme report draws on:
(a) statistical data on admissions and examination results;
(b) the views of the students;
(c) the views of the staff teaching on the programme;
(d) the report of the DAA;
(e) any views expressed by the Advisory Committee or employers;
(f) relevant comments made by validating panels; and

The annual programme report contains:
(a) The Programme Committee's (Scheme Committee) report.
(b) Admissions and examinations' statistics.
(c) A summary of proposed changes.
(d) The external examiners' report (if there is external examiner) in full.

Department may take the opportunity of submitting her Annual QA Reports to propose changes to the study programmes or introduce remedial measures for implementation before the commencement of the following academic year. In order not to cause any delay to such initiatives, Faculty Dean should ensure that any items in the Action Plans which require urgent attention be dealt with and decided upon immediately, without waiting for clearance of the entire Report by the Quality Assurance Committee (Academic Departments).

14.3 *Departmental Academic Advisor*

In addition to the information set out below further details are provided in The Hong Kong Polytechnic University document Academic Regulations and Procedures for Credit-Based Programmes (July, 2004), Section C - Departmental Academic Advisor.

The appointment of Departmental Academic Advisor (DAA) is approved by the Vice President (Academic Development) via the submission from the Head of the Department to the Faculty Dean for endorsement.

Duties of DAA

A Departmental Academic Advisor is expected to give advice to the Department on all aspects of the Department's work, including the following:

(i) the identification of strengths and weaknesses, as evidenced by different data sources,
e.g. student feedback, external reviews, programme statistics, and, in particular, learning outcomes assessment results;
(ii) the consideration of strategies to build on strengths, remedy weaknesses, and address issues;
(iii) a review of action taken on strengths/weaknesses/issues identified in the previous review; and

(iv) a critical examination of programme statistics, with analyses of student admissions and performance, an assessment of the continued need for and relevance of the programme, the quality of its output and employment prospects, student.

14.4 ***Programme Validation***

The general objectives of programme validation are to confirm that the standards of the programme are equivalent to those of comparable programmes; and to help the Department and the teaching staff concerned to improve all aspects of the programme.

Programme validation forms an integral part of the University's QA processes, and is intended to ensure that all new study programmes offered will meet the appropriate requirements for an award of the University. Over the years, the framework for programme validation has been evolving, and has been refined/updated according to changing internal and external circumstances.

Under the current framework for programme validation, Faculty Deans/School/College Board Chairmen, who have ultimate responsibility over the academic quality of study programmes in the Faculty/School/College, will decide on the most appropriate validation mechanism for each new study programme, after the APRC has given initial approval to the proposed new programme, and before the programme proposal is submitted to the Senate for formal and final approval for implementation. The procedures have been simplified, so that the previous requirements of setting up a validation panel and having the panel meet with the Programme Planning Committee concerned, are no longer mandatory. Nevertheless, the validation would still involve a formal and open process with review by a combination of internal peers and advice to be sought, as far as practicable, from external experts, including the Departmental Academic Advisor.

Each programme is expected to be reviewed on an annual basis and the review report (including the programme learning outcomes assessment results) will form part of a Department's Annual QA Report to be submitted to the Faculty Dean/School Board Chairman concerned. The process makes provision for the Department, on a systematic basis, to analyse the evidence available on the operation, progress and learning outcomes of the programme, and to amend and refine the programme in the light of that evidence. It also provides a mechanism whereby the Department and Faculty/School board can carry out their respective responsibilities to ascertain the satisfactory operation of the programme on a year-to-year basis.

The annual programme review report will be subsumed in the Annual QA Report which also covers other academic and administrative functions of the academic department concerned. The Annual QA Report should cover the preceding academic year. Based on the Annual QA Report submitted by Departments, Faculty Deans/School Board Chairmen will prepare a Summary QA Report for submission to the Quality Assurance Committee (Academic Department).

Part IV

Subject Portfolio

Level 1 Subjects:

AMA1140	Maintenance for Construction and Environment
AP10001	Introduction to Physics
APSS1L01	Leadership and Intra-Personal Development – Tomorrow's Leaders
CE1001	Construction and Environment Professionals in Society
CE1002	Introduction to AI and Data Analysis for Construction and Environment
MM1031	Introduction to Innovation and Entrepreneurship

Subject Description Form

Subject Code	AMA1140
Subject Title	Mathematics for Construction and Environment
Credit Value	3
Level	1
Pre-requisite	Nil
Exclusion	Calculus and Linear Algebra (AMA1007) Basic Mathematics I – Calculus and Probability & Statistics (AMA1110) Calculus for Engineers (AMA1130) Calculus (AMA1131) Foundation Mathematics for Accounting and Finance (AMA1500) Calculus (AMA1702)
Objectives	This subject aims to introduce students to the basic concepts and applications of elementary calculus and statistics. Emphasis will be on the understanding of fundamental concepts and the use of mathematical techniques in handling practical problems in science and engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) apply analytical reasoning to solve problems in engineering; (b) master the basics of calculus and its applications in engineering; (c) make use of the knowledge of mathematical/statistical techniques and adapt known solutions to various situations; (d) demonstrate abilities of logical and analytical thinking.
Subject Synopsis/ Indicative Syllabus	Elementary calculus: Limit and continuity, derivatives and their geometric meaning, rules of differentiation, the derivatives of functions involving algebraic functions, trigonometric functions, inverse trigonometric functions, exponential functions and logarithmic functions, applications. - Concepts of definite and indefinite integrals, fundamental theorem of calculus, integration by parts, integration of rational functions using partial fractions, applications. Elementary Probability and Statistics: Descriptive statistics, random variables, probability and probability distributions, binomial and normal distributions, applications.

Subject Description Form

Subject Code	AP10001
Subject Title	Introduction to Physics
Credit Value	3
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Exclusion: AP1D03 “How Things Work: the Physics of Everyday Life"
Objectives	This is a subject designed for students with no background in physics studies. Fundamental concepts in major topics of physics (mechanics, heat, wave and electromagnetism) will be discussed. The aim of this subject is to equip students with some basic physics knowledge, and to appreciate its applications in various branches of science and technology.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) solve simple problems in kinematics Newton’s law and Energy; (b) solve problems in heat capacity and latent heat; (c) explain phenomena related to the wave character of light; (d) apply the superposition of waves; (e) understand electrostatic field and potential; (f) solve problems on interaction between current and magnetic field; and (g) describe and demonstrate the phenomenon of electromagnetism.
Subject Synopsis/ Indicative Syllabus	**Mechanics**: scalars and vectors; kinematics and dynamics; Newton’s laws; momentum, impulse, work and energy; conservation of momentum and conservation of energy. **Thermal physics**: heat and internal energy; heat capacity; conduction, convection and radiation; latent heat. **Waves**: nature of waves; wave motion; reflection and refraction; image formation by mirrors and lenses; superposition of waves; standing waves; diffraction and interference; electromagnetic spectrum; sound waves. **Electromagnetism**: charges; Coulomb’s law; electric field and potential; current and resistance; Ohm’s law; magnetic field; magnetic force on moving charges and current-carrying conductors; Faraday’s law and Lenz’s law.
Teaching/Learning Methodology	**Lecture**: Fundamentals in mechanics, waves and electromagnetism will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. Students are free to request help. Homework problem sets will be given. **Student-centered Tutorial**: Students will work on a set of problems in tutorials. Students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. These problem sets provide them opportunities to apply their knowledge gained from the lecture. They also help the students to consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to daily life phenomena or experience.

e-learning: In order to enhance the effectiveness of teaching and learning processes, electronic means and multimedia technologies would be adopted for presentations of lectures; communication between students and lecturer; delivery of handouts, homework and notices etc.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
		a	b	c	d	e	f	g
(1) Continuous assessment	40	✓	✓	✓	✓	✓	✓	✓
(2) Examination	60	✓	✓	✓	✓	✓	✓	✓
Total	100							

Continuous assessment:
The continuous assessment includes assignments, quizzes and test(s) which aim at checking the progress of students' study throughout the course, assisting them in fulfilling the learning outcomes.
Assignments in general include end-of-chapter problems, which are used to reinforce and assess the concepts and skills acquired by the students; and to let them know the level of understanding that they are expected to reach.
At least one test would be administered during the course of the subject as a means of timely checking of learning progress by referring to the intended outcomes, and as means of checking how effective the students digest and consolidate the materials taught in the class.

Examination: This is a major assessment component of the subject. It would be a closed-book examination. Complicated formulas would be given to avoid rote memory, such that the emphasis of assessment would be put on testing the understanding, analysis and problem solving ability of the students.

Student Study Effort Expected

Class contact:	
• Lecture	33 h
• Tutorial	6 h
Other student study effort:	
• Self-study	81 h
Total student study effort	120 h

Reading List and References

John D. Cutnell & Kenneth W. Johnson, **Introduction to Physics**, 9th edition, 2013, John Wiley & Sons.

Hewitt, **Conceptual Physics**, 11th edition, 2010, Benjamin Cummings.

Radi, Hafez A., and John O. Rasmussen. **Principles of Physics for Scientists and Engineers**. Berlin ; New York: Springer, 2013. Undergraduate Lecture Notes in Physics. Web.

<table>
<tr><td></td><td>- Population and random samples. Sampling distributions related to sample mean. Concepts of a point estimator and a confidence interval. Point and interval estimates of a mean.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Emphasis is placed on a pro-active learning approach. Fundamental knowledge will be introduced in the lectures, with interspersed questions, exercises and quizzes for class discussion and after class self study. Formal tutorial classes will be conducted (1 hour per week), with additional worked examples and tutorial sheets being discussed. Students will be expected to read up, do exercises and reflect critically on the material covered in class.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Coursework</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>
The coursework (continuous assessment) components include homework assignments, quizzes and midterm test. Students are assigned with certain problem sets and are required to explain and elaborate the answers in written format. This will allow the instructors to observe and assess individual student’s achievement of a particular learning outcome based on the coverage of the assigned problem set questions.
Final examination is used to gauge how much students have understood the overall subject contents and to assess students’ achievement of all learning outcomes.
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject focuses on understanding of basic concepts and application of techniques elementary calculus and elementary statistics. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students’ progress in the course.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td></td><td>▪ Lecture</td><td>26 Hrs.</td></tr>
</table>

	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Homework and self-study	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	Chung, K.C. *A Short Course in Calculus and Matrices*, McGraw Hill 2013. Hung, K.F., Kwan, Wilson, Pong, T.Y. *Foundation Mathematics & Statistics*, McGraw Hill 2013. Thomas, GB, Weir, MD, & Hass, JR. Thomas' Calculus Early Transcendentals 14th ed. Pearson Education 2017. James Stewart, Calculus. 8th ed, Cengage Learning 2016 . Walpole, R.E., Myers, R.H., Myers, S.L. Ye, K. *Probability and Statistics for Engineers and Scientists*, Prentice Hall, 2012.	

The Hong Kong Polytechnic University

Subject Description Form

<table>
<tr><td>Subject Code</td><td>APSS1L01</td></tr>
<tr><td>Subject Title</td><td>Tomorrow’s Leaders</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>1</td></tr>
<tr><td>GUR Requirements Intended to Fulfill</td><td>This subject intends to fulfill the following requirement(s):

☐ Healthy Lifestyle
☐ AI and Data Analytics (AIDA)
☐ Innovation and Entrepreneurship (IE)
☐ Languages and Communication Requirement (LCR)
☒ Leadership Education and Development (LEAD)
☐ Service-Learning
☐ Cluster-Area Requirement (CAR)
☐ Human Nature, Relations and Development [CAR A]
☐ Science, Technology and Environment [CAR D]
☐ Chinese History and Culture [CAR M]
☐ Cultures, Organizations, Societies and Globalization [CAR N]
☐ China-Study Requirement
☐ Yes or ☐ No
☐ Writing and Reading Requirements
☐ English or ☐ Chinese</td></tr>
<tr><td>Pre-requisite / Co-requisite/ Exclusion</td><td>Nil</td></tr>
<tr><td>Assessment Methods</td><td>
<table>
<tr><th>100% Continuous Assessment</th><th>Individual Assessment</th><th>Group Assessment</th></tr>
<tr><td>1. Class Participation (including 5% “Learning to learn” self-reflection)</td><td>20%</td><td>--</td></tr>
<tr><td>2. Group Project</td><td>--</td><td>30%</td></tr>
<tr><td>3. Term Paper</td><td>50%</td><td>--</td></tr>
<tr><td>4. Online Academic Integrity Tutorial Test</td><td>Compulsory Pass Requirement</td><td></td></tr>
</table>
</td></tr>
</table>

	<table><tr><td>5. Law Abiding-Leadership Test</td><td>Compulsory Pass Requirement</td><td></td></tr></table> • The grade is calculated according to the percentage assigned; • The completion and submission of all component assignments are required for passing the subject; and • Student must pass all component(s) if he/she is to pass the subject.
Objectives	The course is designed to enable students to learn and integrate theories, research and concepts of the basic personal qualities (particularly intrapersonal and interpersonal qualities) of effective leaders. This subject also intends to help students develop and reflect on their intrapersonal qualities, interpersonal qualities and connection of learning to oneself. Finally, the subject cultivates students' appreciation of the importance of intrapersonal and interpersonal qualities in effective leadership.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: a. understand and integrate theories, research and concepts on the basic qualities (particularly intrapersonal and interpersonal qualities) of effective leaders; b. develop self-awareness and self-understanding; c. demonstrate self-leadership in pursuit of continual self-improvement; d. apply intrapersonal and interpersonal skills in daily lives; e. appreciate the importance of intrapersonal and interpersonal qualities in effective leadership, particularly the connection of learning in the subject to one's professional development and personal growth; f. recognize and accept their responsibility as professionals and citizens to the society and the world.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. An overview of the personal attributes of effective leaders: roles of intrapersonal and interpersonal qualities in effective leadership and university graduates' employability in the service economy; **compulsory requirements of the subject**: "Learning to learn" assessment; Online Tutorial on Academic Integrity; law abiding-leadership assessment; group presentation; individual assignment; class participation. 2. Self-leadership in effective leaders: the importance of self-understanding and self-management; "Learning to learn" ability; life-long learning and leadership. 3. Cognitive competence (critical thinking): misinformation, disinformation, and propaganda; different types of thinking styles; critical thinking model; roles of cognitive competence, critical thinking and problem solving in effective leadership; learning to learn. 4. Social emotional competence: social awareness; relationship

	management; the application of social emotional competence in daily lives and in effective leadership. 5. Resilience and stress-coping: concepts and theories of resilience and stress-coping; relationship between resilience, stress and stress-coping; role of resilience in effective leadership; application of resilience and stress-coping on daily basis. 6. Morality and integrity: moral competence; role of morality in effective leadership; ethical leadership; importance of moral competence in different professions, academic integrity in university students (online tutorial on academic integrity). 7. Spirituality: connectedness to others, personal beliefs and values, meaning of life, spirituality and professional development, role of spirituality in effective leadership; spiritual practices in daily lives. 8. Law-abidance as a quality of leadership: basic concepts and theories related to law-abiding leadership and socially responsible leadership; importance of law-abiding leadership and socially responsible leadership to professionals and the general public; basic knowledge on national security and the Hong Kong; Hong Kong National Security Law and the Article 23 legislation and details of the Safeguarding National Security Ordinance; a brief overview of modern Chinese history, the Constitution, and the Basic Law. 9. Cultural competence and global citizenship: cultual competence in a globalized world; global citizenship and effective leadership; responsibilites of university students as both professionals and citizens of the society. 10. Effective communication: basic communication skills; importance of effective communication to daily life and leadership; care and compassion in effective leadership. 11. Team building: theories, concepts, skills and blocks of team building; role of team building in effective leadership; application of team building in different professions and daily lives. **Note:** For the topic on law abidance and the Hong Kong National Security Law, students are required to pass an online assessment with multiple-choice questions. Students can take the assessment with multiple attempts. The assessment does not carry any mark.
Teaching/Learning Methodology *(Note 3)*	Students taking this course are expected to be sensitive to their own behavior in intrapersonal and interpersonal contexts. Intellectual thinking, reflective learning, experiential learning and collaborative learning are emphasized in the course. Case studies on successful and fallen leaders will also be covered in the course. The teaching/learning methodology includes: 1. Lectures (including e-learning modules); 2. Experiential classroom activities; 3. Group project presentation; 4. Written assignment.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Class Participation (including 5% "Learning to learn" self-reflection) ^	20%	✓	✓	✓	✓	✓	✓
2. Group Project*	30%	✓	✓	✓	✓	✓	✓
3. Term Paper^	50%	✓	✓	✓		✓	
4. Academic integrity online module and assessment^	0%	✓			✓	✓	
5. Quiz on law abidance and Hong Kong National Security Law^	0%	✓	✓	✓	✓	✓	✓
Total	100 %						

*assessment is based on group effort
^assessment is based on individual effort

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

1. Assessment of Class Participation (20%): It is expected that both online and classroom activities, and preparation for lectures can help students understand the subject matter and oneself, develop social skills, connect learning to oneself and promote an appreciation of the importance of intrapersonal and interpersonal leadership qualities. Hence, marks for class participation (including the participation in e-learning modules) and preparation for lectures will be given. Students will be assessed by: a) preparation for class (e.g., complete e-learning modules, online assignment, and dig up materials before class), b) participation in class and online learning activities (e.g., completion of worksheets and sharing in class, participation in online discussion forum) and c) volunteering to answer questions and join discussions. Also, students will be invited to rate the performance and learning of other group members in an honest and authentic manner. The marks will reflect the mastery of knowledge, self-reflection and quality of interpersonal skills (such as collaboration with other members and contribution to the group) of the group members.

	Peer assessment will contribute to marks in class participation. As the university strategic priority, "Learning to learn" has the aim to support the development of students' ability to engage in the learning process, manage their own learning, and take their learning to a higher level. "Learning to learn" concept will be covered in the lectures and students are required to develop a personal development plan at the beginning of the course. To encourage students to reflect on their experience in achieving their learning goals set in the development plan, students are required to reflect on their learning to learn ability and related learning experience in a reflective journal (5%). 2. Assessment of Group Project (30%): Group project presentation can give an indication of the students' understanding and integration of theories and concepts on the personal qualities in effective leadership, personal and group reflections, interpersonal skills and degree of recognition of the importance of active pursuit of knowledge covered in the course. 3. Assessment of Term Paper (50%): Individual paper can give an indication of the students' understanding and integration of theories and concepts on the personal qualities in effective leadership, self-assessment, self-reflection, connection of the subject matter to oneself and degree of recognition of the importance of active pursuit of knowledge covered in the course. 4. Quiz on Law Abidance and Hong Kong National Security Law (0%): As universities have the obligation to conduct education on the Constitution, Basic Law and Hong Kong National Security Law, students are required to take a 3-hour face-to-face lecture on law abiding leadership and 7 hours of self-study. Based on the related materials on modern Chinese history, the Constitution, the Basic Law, restoration of Hong Kong to mainland China, national security and the Hong Kong National Security Law, students have to take an assessment with 20 multiple choice questions. Students can pass the assessment if he/she has correct answers on at least 16 questions (multiple attempts allowed). A student will fail in this subject if he/she cannot pass this assessment component. 5. Academic Integrity Online Module and Assessment (0%): As academic integrity is very important for university students, students are required to take an online Academic Integrity program lasting for two hours. First, students are required to take a multiple-choice test with 10 questions in the pre-test without a passing mark (multiple attempts allowed). After that, students need to study four online modules to understand the concepts of academic integrity and ways to avoid academic dishonesty. Finally, students are required to take another multiple-choice test with 20 questions in the post-test with a passing benchmark of 15 questions (multiple attempts allowed). A student will fail in this

	subject if he/she cannot pass this assessment component. They must complete this component by the 5th week of the semester. Based on the implementation of this subject in the past ten academic years (2012-2022), evaluation findings consistently showed that this subject was able to achieve the intended learning outcomes in the students. The positive evaluation findings are documented as follows: Leung, H. (2016). Levels of reflection on teaching a leadership and positive youth development subject. *International Journal on Disability and* Human *Development, 15*(2)*,* 211-220. Leung, H., Shek, D. T. L., & Mok, B. P. W. (2016). Post-lecture subjective outcome evaluation of a university subject on leadership and intrapersonal development. *International Journal of Child and Adolescence Health, 9*(2)*,* 223-234. Li, X., & Shek, D. T. L. (2020). Objective outcome evaluation of a leadership course utilising the positive youth development approach in Hong Kong. *Assessment & Evaluation in Higher Education, 45*(5), 741-757. Ma, C. M. S., Shek, D. T. L., & Li, P. P. K. (2017). Evaluation of a leadership and intrapersonal development subject for university students: Experience in Hong Kong. *International Journal of Child and Adolescent Health, 10*(3), 337-346. Ma, C. M. S., Shek, D. T. L., Li, P. P. K., Mok, B. P. W. & Leung, E. Y. K. (2016). Qualitative evaluation of a leadership and intrapersonal development subject for university students in Hong Kong. *International Journal of Child and Adolescent Health, 9*(2), 217-224. Shek, D. T. L. (2012). Development of a positive youth development subject in a university context in Hong Kong. *International Journal on Disability and Human Development, 11*(3), 173-179. Shek, D. T. L. (2013). Promotion of holistic development in university students: A credit-bearing subject on leadership and intrapersonal development. *Best Practices in Mental Health, 9*(1), 47-61. Shek, D. T. L., Fok, H. K., Leung, C. T. L., & Li, P. P. K. (2016). Qualitative evaluation of a credit-bearing leadership subject in Hong Kong. *International Journal of Child and Adolescent Health, 9*(2), 173-183. Shek, D. T. L., & Leung, J. T. Y. (2014) Perceived benefits of a university subject on leadership and intrapersonal development. *International Journal on Disability and Human Development. 13*(4), 481-488. Shek, D. T. L., & Ma, C. M. S. (2014). Do university students change after taking a subject on leadership and intrapersonal

<table>
<tr><td></td><td colspan="2">development? International Journal on Disability and Human Development, 13(4), 451-456.

Shek, D. T. L., Sun, R. C. F., Tsien-Wong, T. B. K., Cheng, C. T., & Yim H. Y. (2013). Objective outcome evaluation of a leadership and intrapersonal development subject for university students. International Journal on Disability and Human Development, 12(2), 221-227.

Shek, D. T. L., & Wu, F. K. Y. (2014). The role of teachers in youth development: Reflections of students. International Journal on Disability and Human Development, 13(4), 473-480.

Shek, D. T. L., Wu, F. K. Y., Leung, C. T. L., Fok, H. K., & Li, P. P. K. (2016). Focus group evaluation of a subject on leadership and intrapersonal development in Hong Kong. International Journal of Child and Adolescent Health, 9(2), 185-194.

Shek, D. T. L., & Yu, L. (2014). Post-course subjective outcome evaluation of a subject on leadership and intrapersonal development for university students in Hong Kong. International Journal on Disability and Human Development, 13(4), 457-464.

Shek, D. T. L., & Yu, L. (2016). Student feedback on a subject on leadership and intrapersonal development for university students in Hong Kong. International Journal on Disability and Human Development, 15(3), 339-345

Shek, D. T. L., & Yu, L. (2017). An evaluation study on a university general education subject in Hong Kong. International Journal of Adolescent Medicine and Health, 29(1),103-109.

Shek, D. T. L., Yu, L., Lin, L., Li, X., Zhu, X., Dou, D., Chai, W., Chak, Y., Ho, W., Leung, E., Li, P., Mok, B., Shek, V., Shek, E., & Jin, T. (2021). Nurturing leadership qualities under COVID-19: Student perceptions of the qualities and effectiveness of online teaching and learning on leadership development. International Journal of Child and Adolescent Health, 14(1), 89-100.

Shek, D. T. L., Zhu, X., Li, X., & Dou, D. (2022). Satisfaction with HyFlex teaching and law-abiding leadership education in Hong Kong university students under COVID-19. Applied Research in Quality of Life, 1-26.

Yu. L., Shek, D. T. L., & Leung, E. Y. K. (2016). Post-lecture evaluation of a university subject on leadership and intrapersonal development. International Journal of Child and Adolescent Health, 9(2), 155-164.</td></tr>
<tr><td rowspan="2">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures and experiential/online learning activities</td><td>39 Hrs.</td></tr>
</table>

	Other student study effort:	
	▪ Group project preparation	20 Hrs.
	▪ Reading and writing term paper	61 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Basic References** Catalano, R. F., Berglund, M. L., Ryan, J. A. M., Lonczak, H. S., & Hawkins, J. D. (2002). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *Prevention and Treatment, 5*(15), 1-106. Dalton, J., & Crosby, P. (2007). Being and having: Shouldn't excellence in higher education (and people) be a measure of what one does rather than what one has? *Journal of College and Character, 9*(1), 1-5. Davies, L. (2006). Global citizenship: abstraction or framework for action? Educational Review, *58*(1), 5-25. Dugan, J. P. (2006). Involvement and leadership: A descriptive analysis of socially responsible leadership. *Journal of College Student Development*, *47*(3), 335-343. Dugan, J. P. (2015). The measurement of socially responsible leadership: Considerations in establishing psychometric rigor. Journal of Educational, Cultural and Psychological Studies, *12*, 23-42. Hong Kong Government. (2020, July 7). The Law of the People's Republic of China on Safeguarding National Security in the Hong Kong Special Administrative Region. Available at https://www.isd.gov.hk/nationalsecurity/eng/pdf/NSL_QnA_Book.pdf. Gilley, A., Gilley, J. W., McConnell, C. W., & Veliquette. A. (2010). The competencies used by effective managers to build teams: An empirical study. *Advances in Developing Human Resources, 12*(1), 29-45. Goleman, D. (1995). *Emotional Intelligence: Why it can matter more than IQ.* New York: Bantam Books. Houghton, J. D., & Yoho, S. K. (2005). Toward a contingency model of leadership and psychological empowerment: When should self-leadership be encouraged? *Journal of Leadership and Organizational Studies, 11*(4), 65-84. Kim, Y. H., Chiu, C. Y., & Zou, Z. M. (2010). Know thyself: Misperceptions of actual performance undermine achievement motivation, future performance, and subjective well-being. *Journal of Personality and Social Psychology*, *99*(3), 395-409. Kohlberg, L. (1964). Development of moral character and moral ideology. In M. L. Hoffman, & L. W. Hoffman (Eds.), *Review of Child Development Research* (pp. 381-431). New York: Russell Sage Foundation. Lau, P. S. Y., & Wu, F. K. Y. (2012). Emotional competence as a positive youth development construct: A conceptual review. *The Scientific World Journal, 2012*, 8 pages. doi:10.1100/2012/975189	

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Note 1: Intended Learning Outcomes

Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	CE1001
Subject Title	Construction and Environmental Professionals in Society
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is entitled "Construction and Environmental Professionals in Society", specially devised for all first-year students enrolled in the Faculty of Construction and Environment. It focuses on integrating students into the professional and ethical dimensions of the construction and environmental fields. The objectives of the subject include: - Introducing students to the construction and environmental industries, familiarising them with key concepts, practices, and the current landscape in their freshman year - Instilling a strong ethical mindset that emphasises environmental sustainability and societal well-being in decision-making processes - Actively engaging students with contemporary challenges and debates such as climate change, urban development, and changes in regulations affecting their fields - Preparing students for their future roles by exposing them to industry norms, expectations, and various career opportunities - Offering networking sessions and providing insights from experienced professionals through guest lectures, helping students connect with the industry
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: (a) Describe the role and impact of the construction and environmental industries and their professional fields in addressing contemporary societal needs at local, national and global levels (b) Identify the qualities and competencies required to become a successful professional in the construction and environmental industries and explain why they are important for professional work (c) Reflect on their professional aspirations and develop a personal development plan for pursuing their career goals (d) Discuss how professionalism and professional ethics are manifested in the professional settings and practices of the construction and environmental industries

	(e) Explain how professionals in the construction and environmental industries approach and solve problems
Subject Synopsis/ Indicative Syllabus *(Note 2)*	**<u>Subject Synopsis</u>** The Faculty of Construction and Environment (FCE) at PolyU is a cornerstone institution renowned for advancing sustainable urban development and improving the built environment. Emphasising the integration of sustainability principles across all facets of construction and environmental practices, FCE has been instrumental in developing skilled professionals who now contribute across diverse sectors within the construction and environmental industries. In this subject, faculty members from various departments within FCE will impart their expertise to freshmen by detailing the historical context, evolution, current practices, and ethical norms of key construction and environmental professions, with a specific focus on architecture, surveying, building services engineering, and civil engineering. Leveraging their extensive knowledge of current industry practices, FCE instructors will further explain how environmental parameters related to these disciplines impact sustainable development. Additionally, they will explain how cutting-edge technologies are employed to promote sustainable construction and environmental development, ultimately contributing to societal well-being. Reputable industrial practitioners or FCE alumni will be invited to give seminars to students to share their experiences in handling construction projects and solving problems on technical, financial and other issues in the industry. **<u>Indicative Syllabus</u>** The teaching content is divided into three parts as follows: ***Part 1 – Fundamental discipline introduction and practicum-based elaboration*** A subject coordinator from each of the four departments within FCE will coordinate and deliver two focused lectures: A series of **foundational lectures** will be delivered to outline the historical development and core principles of their respective disciplines in each department. Four lectures (each department will deliver one foundational lecture) will serve as a fundamental introduction to environmental parameters, regulatory standards, and current technologies influencing the construction and environmental sectors. A series of **guest lectures** led by an industry expert, highlighting real-world considerations of environmental and construction parameters within that discipline will be delivered after the foundational lectures. Each department will organise one guest lecture, tailored to ethical considerations and field-specific applications in their area of expertise. ***Part 2 – Professional ethics*** An online learning module will be provided to introduce the principles and practices of professional ethics in the construction and engineering industry. The module will cover key ethical standards, industry codes of conduct, and common dilemmas faced by professionals. ***Part 3 – "Flipped the classroom"*** Four "flipped classroom" will be organised with students accessing the online

<table>
<tr><td></td><td>materials before the class and participating in group discussion to reflect and elaborate on the contents in the classroom. Each department will be responsible for organising one “flipped classroom”.</td></tr>
<tr><td>Teaching/Learning Methodology

(Note 3)</td><td>The teaching and learning methodology of this course is distinguished by its dynamic and blended approach, utilising a variety of educational tools to enhance the student experience. It features inspirational lectures to establish a strong knowledge base, complemented by flexible, self-paced online micro-modules and practical online assignments. Additionally, seminars led by experienced practitioners provide real-world insights into the industry, bridging the gap between theoretical knowledge and practical application. An online companion site further supports the educational delivery, ensuring easy access to materials and fostering robust interactions both within and outside the classroom.

This subject is specifically designed to engage freshman students at FCE, fostering development in creative thinking, problem-solving, global awareness, and entrepreneurship through both theoretical learning and practical application. The integration of seminars by industry practitioners emphasises the practical relevance of the curriculum, highlights the real-world challenges in the construction industry, and reinforces the programme’s core competencies. This comprehensive and cohesive approach not only ensures a deep understanding of theoretical concepts but also hones students’ ability to apply these concepts in real-world settings, effectively preparing them for professional success.

Furthermore, this course is notable for its innovative approach, which seamlessly combines traditional lectures with modern digital learning tools and emphasises sustainability and ethical practices. This strategy prepares students not just for immediate academic success but also equips them to make meaningful contributions to society and meet the demands of the global market, ensuring their readiness for future careers in the construction and environmental sectors.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)</td><td>
<table>
<tr><td colspan="2" rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr>
<tr><td rowspan="3">1. “Pathfinder” virtual module and flipped classroom activities</td><td>1a. Completion of “Pathfinder”</td><td>10%</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>1b. Online exercise associated with the “Pathfinder”</td><td>10%</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>1c. Group video presentation</td><td>30%</td><td>✓</td><td></td><td>✓</td><td></td><td>✓</td></tr>
<tr><td colspan="2">2. Professional ethics online module</td><td>10%</td><td></td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="2">3. In-class quizzes (four quizzes to be held in Weeks 2, 4, 6, and 8)</td><td>40%</td><td>✓</td><td>✓</td><td></td><td></td><td>✓</td></tr>
</table>
</td></tr>
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Total	100 %	

The assessment task 1 plays a part in addressing the intended learning outcomes (a), (c) and (e) covered by the "flipped classroom" arrangement. Students are required to complete four virtual modules from Weeks 10-13 and submit their presentation videos after the in-class discussion.

The assessment task 2 assesses students' comprehension of key ethical standards and industry codes of conduct in the construction and engineering industry to address the intended learning outcome (d). The online module will be delivered in Week 4.

The assessment task 3 serves as an assessed task (i.e., 40% of the overall assessment grade) for students to demonstrate their overall attainment of intended learning outcomes (a), (b) and (e) at the end of the curriculum.

Professional ethics
An online learning module will be provided to introduce the principles and practices of professional ethics in the construction and engineering industry. Students are required to complete an online module and complete a series of exercises. The exercises will be in the form of MC questions, aiming to test students' comprehension of the knowledge.

"Pathfinder" virtual module and flipped classroom activities

Students will participate in four "Pathfinder" virtual module activities, each developed and delivered by one of the four departments within FCE. Each virtual module will provide career scope of specific construction/engineering discipline (e.g. land surveyor, building surveyor, quantity surveyor, architect, building service engineer, civil engineer), career path planning, and real-life examples of engineering/construction professional practitioners. Following each module, students are required to complete an associated online exercise to reinforce their understanding.

Each module will culminate in a flipped classroom session, resulting in a total of four sessions -- one per department. Given the large class size, students will engage in group-based, in-class discussions facilitated by the respective departments. The in-class discussions will further assist students in reflecting on their own career interests and assist them to map their development plan.

These discussions will serve as the foundation for a group presentation, for which students are required to prepare and submit a video recording that demonstrates their collective analysis and insights on industry trend and future outlook. They are encouraged to discuss the group presentation topic with the instructor during the in-class discussion.

In-class online quizzes

Four in-class online quizzes are scheduled for Weeks 2, 4, 6, and 8, each taking place at the end of the lecture and lasting 30 minutes. The four quizzes are intentionally designed to align with the modular structure of the course, which is jointly delivered by four separate departments. Each department is responsible for one specific module, and the content of each module is distinct and self-contained. These four departments represent key professional disciplines within the construction and engineering industry. Each contributes its unique perspective by delivering two lectures: the first introduces the fundamental principles of the discipline, and the second is a guest lecture focused on professional practices and real-world applications. To reinforce

	students' understanding, each in-class quiz is held at the end of the second session (i.e., the guest lecture) and is designed to assess knowledge specific to that module's content. The subject examiner coordinates with all departments to collect the relevant topics and ensures that the quizzes are aligned with the intended learning outcomes of the course. Each quiz comprises 15-20 multiple-choice (MC) questions, which are distributed randomly to ensure that each student receives a unique set of questions. Students are required to access these quizzes using their smartphones or laptops, integrating technology into the learning environment and allowing for immediate feedback on their performance.	
Student Study Effort Expected	Class contact:	
	▪ Inspirational Lectures/ Guest Lectures/ In-class discussions	39 Hrs.
	Other student study effort:	
	▪ Reading, studying and on-line exercise	40 Hrs.
	▪ "Pathfinder" virtual modules	4 Hrs.
	▪ Preparation for quizzes	26 Hrs.
	Total student study effort	109 Hrs.
Reading List and References	Migliaccio, G. C., Holm, L. (2018). Introduction to Construction Project Engineering. United Kingdom: CRC Press. Digital Transformation of the Design, Construction and Management Processes of the Built Environment. (2019). Germany: Springer International Publishing. Foxell, S. (2018). Professionalism for the Built Environment. United Kingdom: CRC Press LLC. Mirsky, R., Schaufelberger, J. (2022). Professional Ethics for the Construction Industry. United Kingdom: CRC Press. Yates, J. K., Castro-Lacouture, D. (2015). Sustainability in Engineering Design and Construction. United Kingdom: CRC Press.	

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description Form

Subject Code	CE1002
Subject Title	Introduction to AI and Data Analytics for Construction and Environment
Credit Value	2
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject aims to help students to learn the basic concepts in artificial intelligence (AI), machine learning, and data analytics, especially their applications in the field of construction and environment (e.g., building environment and energy engineering, architecture and real estate, civil and environmental engineering, spatial data science and smart cities). The objective is to raise the interest in AI and data analytics for first-year students and prepare them with a background to design AI and data analytics methods to benefit varying applications in the diversified fields of construction and environment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Demonstrate an understanding of the foundational concepts of Artificial Intelligence and Data Analytics (AIDA). b) Acquire basic skills in using AIDA technologies and applications. c) Articulate examples of the current applications and how the adoption AIDA could enhance different aspects in the field of construction and environment d) Demonstrate an awareness of global contemporary ethical issues and the impact of AIDA applications in daily life.
Subject Synopsis/ Indicative Syllabus	**Topics:** 1. Introduction to Artificial Intelligence and Data Analytics Overall introduction to the field of AI and DA, historical developments. (2 weeks) 2. The machine learning and data analytics basics, including the concept of learning (e.g., learnability, Occam's razor), basic data analytics (e.g., EDA, visualization), supervised learning (e.g., perceptron, decision tree, linear regression, logistic regression)

<table>
<tr><td></td><td>and unsupervised learning (e.g., k-means, hierarchical clustering). (5 weeks)

3. Introduction of the advanced topics in AI and data analytics, such as reinforcement learning, deep learning, multi-source data collection, data fusion, privacy issues, and other emerging topics related to the recent development and real-world application of AIDA, such as generative AI, agentic tools, etc. (2 weeks)

4. The applications of AI and data analytics in the field of construction and environment (e.g., building environment and energy engineering, architecture and real estate, civil and environmental engineering, spatial data science and smart cities). (4 weeks)</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The subject is delivered in weekly interactive lectures, and the corresponding e-Learning materials will be provided.

The lectures in Topics 1 to 3 are to cover the basic concepts and methods about AI, DA, and mainly machine learning. Students will practice these basic concepts and methods and receive timely feedback through simple assignments and in-class exercises. The accuracy of knowledge acquired in Topics 1 to 3 will be assessed by in-class exercises, assignments, and a test.

The lectures in Topic 4 aim to expose students to the wide range of applications of AIDA in various fields in construction and environment, and to discuss the ethical issues and practical impacts of these latest developments. Students' understanding of these aspects will be assessed by in-class exercises.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Assignments</td><td>25%</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Individual Project</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>3. Test</td><td>50%</td><td>✓</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</td></tr>
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<table>
<tr><td></td><td colspan="2">Students will be assessed with continuous assessment. The continuous assessment consists of a set of assignments (25%), individual project (25%), and one test (50%).

Each assignment is designed to cover a particular aspect of quantitative and qualitative skills as well as machine learning methods. The forms of assignment include questions, mini-project, and labs. Assignments mainly assess students' practical skills in understanding and solving actual problems.

The test will be conducted at the end of Topic 3, and it covers all the contents in Topics 1, 2, and 3 to test the students' understanding of technical methodologies.

Students must attain at least grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.</td></tr>
<tr><td rowspan="6">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Reading and studying, e-Learning</td><td>24 Hrs.</td></tr>
<tr><td>▪ Assignments</td><td>20 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>70 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">(1) Mitchell, T. (1997) Machine Learning. McGraw Hill.
http://www.cs.cmu.edu/~tom/mlbook.html

(2) Bishop, B. (2006). Pattern Recognition and Machine Learning. Springer.

(3) Foster, D. (2022). Generative deep learning. O'Reilly Media, Inc.

(4) Hong Kong Smart City Blueprint: https://www.smartcity.gov.hk/

(5) Kaggle: https://www.kaggle.com/

(6) Sidewalk Labs Toronto
https://www.sidewalktoronto.ca/documents/

(7) Handbook of geospatial artificial intelligence</td></tr>
</table>

	https://doi.org/10.1201/9781003308423

Subject Description Form

Subject Code	MM1031
Subject Title	Introduction to Innovation and Entrepreneurship
Credit Value	1
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject introduces students to the essential aspects of innovation and entrepreneurship in a digital world. The objective is to prepare the first-year students with an entrepreneurial mindset and apply innovative strategies to find creative solutions that benefit both organizations and society in the age of digital transformation, while also bolstering Hong Kong's position as a global hub for innovation and technology.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate an elementary understanding of innovation and entrepreneurship; b. appreciate the importance of innovation and entrepreneurship in the local and global community; c. appreciate the applications and implications of the latest technologies on entrepreneurship and innovation; and d. identify ethical issues in entrepreneurship and innovation.
Subject Synopsis/ Indicative Syllabus	This subject is built upon three pillars – **Nature and importance of innovation and entrepreneurship** Defining innovation and entrepreneurship; differences between innovation and entrepreneurship; the importance of innovation and entrepreneurship in Hong Kong and beyond; entrepreneurship as a career path; ethical issues **Innovation** Technology and innovation; technology life cycle; diffusion of innovation; technology leadership and followership; assessing technology needs; making technology decisions; sourcing and acquiring new technologies; organizing for innovation **Entrepreneurship** Technology and entrepreneurship; design thinking; value proposition canvas; business model canvas; lean start-up

	Indicative Outline: *(A) Introduction* Videos (~10 minutes in total), plus discussion/activities/self-study in between the following topics • Defining innovation and entrepreneurship • Differences between innovation and entrepreneurship • The importance of innovation and entrepreneurship in Hong Kong and beyond • Entrepreneurship as a career path *(B) Innovation and entrepreneurship toolkit* Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics • Design Thinking • Value Proposition Canvas • Business Model Canvas • Lean Start-up (including MVP) *(C) Applications and implications of artificial intelligence on entrepreneurship and innovation* Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics • Hand-written digit recognition • Face detection • Stock price prediction • ROC Concept • Chatbot applications, e.g. customer service, enquiry handling in the customer journey • Latest A.I. development *(D) Applications and implications of blockchain technology on entrepreneurship and innovation* Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics • Defining blockchain technology • Background • Applications (e.g., verifying educational or employment credentials, intellectual property, smart contract, billing and revenue allocation, rights and royalties, history of ownership – critical minerals, diamond, fine art, garment, wine and spirits, supply chains, etc.) • Advantages and Disadvantages • Ethical implications (e.g., cryptojacking, co-ownership of illegal data, etc.) *(E) Applications and implications of Internet of Things technology on entrepreneurship and innovation* Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics • Defining Internet of Things technology • Background (from 1G to 5G) • Applications (e.g., daily life, manufacturing, retail, smart cities, etc.) • Advantages and Disadvantages

<table>
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- Ethical implications (e.g., privacy, security, etc.)

(F) Other Applications:
Bio-technology and medical service
Guest Lecture or video recording will be arranged (Both online and off-time students are eligible to attend)

(G) Managing technology for competitive advantage in a digital world

Videos (~10 minutes in total), plus discussion/activities/self-study in between the following topics

- Technology life cycle
- Diffusion of innovation
- Technology leadership and followership
- Assessing technology needs
- Making technology decisions
- Sourcing and acquiring new technologies
- Organizing for innovation

</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>This subject is designed to be interactive, with short videos, cases, in-class discussions and activities interspersed throughout an introductory session and thirteen 1-hour seminars. Students are encouraged to go beyond the understanding of concepts, and to reflect on their learning process. Learning from the responses and feedback from their peers is also critical.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Quizzes</td><td>10%</td><td>✓</td><td></td><td></td><td>✓</td></tr>
<tr><td>2. Participation in discussion forum / journal</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>3. Personal Reflection</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Requiring students to answer multiple-choice questions at the end of each module is appropriate for helping the first-year students confirm their understanding of the concepts. The requirement of writing some textual responses is to assess the schema established by the students toward innovation and entrepreneurship.

</td></tr>
<tr><td>Student Study Effort Expected</td><td>

<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ One online introductory session, plus four online video modules, combined with in-class discussions and activities, interspersed throughout</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
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	▪ Self-study and preparation	20 Hrs.
	▪ Assignment	10 Hrs.
	Total student study effort	43 Hrs.
Reading List and References	Aulet, B. (2024). *Disciplined entrepreneurship: 24 steps to a successful startup, expanded & updated* (2nd ed.). Wiley. Bateman, T. S., & Konopaske, R. (2025). *Management: Leading & collaborating in a competitive world.* NY: McGraw-Hill LLC. Bamford, C., & Bruton, G. (2024). *Entrepreneurship: The art, science, and process for success.* McGraw-Hill.Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Hoboken, NJ: John Wiley & Sons. Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2014). *Value proposition design: How to create products and services customers want.* Hoboken, NJ: John Wiley & Sons. Ries, E. (2011). *The lean start-up*. NY: Crown Business.	

Level 2 Subjects:

AMA290	Engineering Mathematics
BRE2031	Environmental Science
BRE204	Structure I
BRE2061	Legal Context for Building Construction Professional in Society
BRE2171	Planning and Development : Theories and Practices
BRE258	Industrial Safety I
BRE262	Project Studio
BRE263	Construction Economics and Finance
BRE265	Introductory Construction Technology and Materials
BRE2691	Introductory Integrated Professional Workshop I
BRE299	Work-Integrated Education (WIE)
CSE20290	Introduction to Geotechnology
LSGI2961	Engineering Surveying

Subject Description Form

Subject Code	AMA290
Subject Title	Engineering Mathematics
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The subject aims to introduce students with some fundamental mathematical concepts. The emphasis will be on application of mathematical methods to solving practical problems in the construction industry.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. apply knowledge of Vector Calculus to solve problems in Engineering Mathematics; 2. apply knowledge of Linear Algebra to solve problems in Engineering Mathematics; 3. apply algorithms to solve for simple Linear Programming problems; 4. apply the idea of partial derivatives and Lagrange Multiplier to solve for constrained optimization problems.
Subject Synopsis/ Indicative Syllabus	*Linear Algebra:* Matrices and determinants; Vectors; Systems of linear equations; General properties of solutions; Elimination methods; Ill-conditioned systems; Eigenvalues and eigenvectors; Applications. *Functions of several variables:* Partial derivatives; Maxima, minima and saddle points; Lagrange multiplier; Application to error estimates. *Linear Programming:* Formulation; Graphical solution; Simplex method; Parametric modelling.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures, tutorials and presentation. The lectures aim to provide the students with an integrated knowledge required

<table>
<tr><td></td><td>for the understanding and application of mathematical concepts and techniques. To develop students' ability for logical thinking and effective communication, tutorial and presentation sessions will be held.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>a. Assignment and a Mid-term Test</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>b. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>
Continuous Assessment comprises of assignments and a Mid-term Test. A written examination is held at the end of the semester.
Questions used in assignments, tests and examinations are set to test students' ability with regard to any one of the intended learning outcomes.
To pass this subject, students are required to obtain Grade D or above in <u>both</u> the Continuous Assessment and the Examination components.
</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorial and Student Presentation</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Assignment</td><td>20 Hrs.</td></tr>
<tr><td>▪ Self-study</td><td>58 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>117 Hrs.</td></tr>
</table>
</td></tr>
</table>

Reading List and References	Textbook:		
	Chan, C.K., Chan, C.W. & Hung, K.F.	Basic Engineering Mathematics	McGraw Hill 2013
	References:		
	Taha, H.A.	Operations Research - An Introduction 9th edition	Prentice Hall 2011

Subject Description Form

Subject Code	BRE2031
Subject Title	Environmental Science
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to: Equip students with a holistic understanding of the factors that contribute to the quality and performance of the built environment with respect to the technical knowledge learned in construction technology.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the means of controlling the internal environment and provide standards of utility and comfort whilst utilizing principles of passive design to minimize the consumption of energy b. Review the causes of indoor air pollution and the means to provide a healthy environment. c. Consider the effect of building construction and operation on the environment and appraise the role of sustainable development in minimizing impact on the external environment – use of resources, waste generation, and pollution.
Subject Synopsis/ Indicative Syllabus	**Brief Syllabus Content:** Man and heat, heat transfer mechanisms, conduction, convection, radiation, thermal comfort. Climate and shelter, classification, global mechanisms, climatic data, micro-climatic building design. Design variables for energy efficient design and thermal performance of a building. Passive and active thermal controls, heating, refrigerators, ventilation and air conditioning. Principles of light, electromagnetic radiation, vision, luminance, glare, natural lighting and artificial lighting. Principles of sound, noise, noise transfer, insulation, acoustic design. Use of resources, energy efficiency, waste reduction, land use, damage to the environment, sustainable development. Environment assessment.

Indoor air quality.

Experimental work:

Environmental Science: 2 experiments each of 1 hour duration from the following list:-

1. Lamps – measurement of efficiency.
2. Visual environment - assessment of quality.
3. Light fittings - determination of intensity distribution.
4. Daylight – measurement of daylight factor.
5. Absorption - determination of sound absorption coefficient.
6. Oral environment - use of sound level meter to investigate.
7. Reverberation - measurement or reverberation time.
8. Thermal comfort - investigation using thermal comfort meter.
9. 'U' values - determination of 'U' value of a building element.
10. Thermal radiation - measurement of radiant temperature.

Teaching/Learning Methodology

Teaching periods will adopt a range of methods which could include lectures by staff, small group discussions, student presentations, project based and problem-solving tasks, laboratory and case study work. Where appropriate, the use of computer assisted learning techniques will be employed.

The intention is to create an environment that encourages active learning. Students will be encouraged to reflect on their learning activities to review what they have learned and to plan further action and activity.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Coursework	40	√	√	√			
2. Examination	60	√	√	√			
Total	100						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and coursework will constitute the 60% and 40% of the overall work of the subject respectively. The coursework mark will be based on the assessments of assignments projects, presentations, peer-group critiques and in-class tests. Assessment methods are intended to ensure the students achieve the learning objectives set, and assist learning through constructive feedback.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials including experiments	13 Hrs.
	Other student study effort:	
	▪ Independent Study including assignments and project works	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Reading List:** Burberry P. (1997) *Environment and Services*, Addision Wesley Longman. Langston, C. (Ed.) (1997) *Sustainable Practices: ESD and the Construction Industry*. Envirobook, Sydney Aus. Thomas, R. (Ed) (1996) *Environmental Design*, E & F N Spon, London & N.Y. Hyde, R. and Woods, P. (2000) *Climate Responsive Design*, E & F N Spon, London & N.Y. McMullan R. (1992) *Environmental Services in Building*. The Macmillan Press Ltd. Wathern P. (1990) *Environmental Impact Assessment, Theory and Practice*. Routledge **Supplementary:** BRE (various) *Digests and Current Papers*. Building Research Establishment, Garston, Watford, U.K. BSIRIA (1987) *Building Services Materials Handbook*, E & F N Spon, London & N.Y.	

Subject Description Form

Subject Code	BRE204
Subject Title	Structure I
Credit Value	3
Level	2
Pre-requisite	AMA1110
Objectives	a) Encourage an appreciation of the structure of buildings. b) Develop concepts of structural action, leading to an ability to model, analyse and design common elements and structural frames, by understanding simple structural framing.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Use mathematical modelling to explain the behaviour of building materials and structures. b) Apply the concepts of structural mechanics to solve structural problems involving beams, columns and statically determinate frames. c) Quantify and analyse the internal and external forces (i.e. internal moments/stresses and external loads) acting within and upon a structural component under various anticipated loading conditions. d) Design simple structural elements to withstand these forces in their respective loading conditions.
Subject Synopsis/ Indicative Syllabus	*Identification of forces and their effects on structures*: Point and distributed static loading, (quasi-static) wind loading, load transfer in common building structures of various forms. Reaction of structural materials to imposed loads (with induced stresses and deformation). *Statically determinate truss*: Computation of internal forces using the Method of Joints and Method of Section. *Stresses*: The induced stresses as a combination of tension, compression, flexural bending moment and shear. *Beams*: Simple flexural theory, computation of bending stresses, shearing force and bending moment distribution, deformation and deflection of beams, sizing of simple steel beams to current codes. *Columns and walls*: Simple buckling theory of columns, effective length and slenderness ratio in relation to fixity conditions, combined stresses as subjected to eccentric axial load, sizing of steel columns to current Hong Kong Standard.
Teaching/Learning Methodology	Interactive Lectures will enable students to: 1. analyse the internal forces of truss members, beams and columns; 2. analyse the strength of the materials for axial, bending and shear loadings. 3. apply the structural concept to design simple beams, columns and connections.

	Tutorial will enable students to: 1. consolidate the structural mechanics and analysis concepts through problem-solving assignments and discussions. Laboratory will enable students to: 1. identify the structural behaviour of simple truss, beams, and columns.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
1. Problem-solving assignment	10.5	√	√	√	√
2. Laboratory report	4.5		√	√	
3. Mid-term test	15	√	√		
4. Final examination	70	√	√	√	√
Total	100 %				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The problem –solving assignments are used to assess students' ability to solve structural engineering problems with good numerical accuracy based on the theories and concepts studied in the lectures.

The laboratory report is used to assess students' ability to observe and verify the structural behaviour of model beams, truss and columns and to present the experimental results in a logical and clear format.

The mid-term test and the final examination are used to assess students' i) understanding of the structural engineering theories and concepts learned in the lectures and ii) ability to solve structural engineering problems with good numerical accuracy.

Student Study Effort Expected		
	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial and Laboratory	13 Hrs.
	Other student study effort:	
	▪	96 Hrs.
	▪	Hrs.
	Total student study effort	135 Hrs.
Reading List and	1. Alexander Chajes "Structural Analysis", Prentice Hall 1990.	

References	2. Aslam Kassimali “Structural Analysis”, PWS publishing 2010. 3. Hibbeler, R.C. “Mechanics of Materials”, Prentice Hall 2011. 4. James M. Gere and Barry J Goodno “Mechanics of Materials” 8th edition, Cengage Learning, 2009. 5. T.J. MacGinley “Structural Steelwork Design to Limit State Theory” 6. Code of practice for Structural Use of Steel 2011, Buildings Department, the Government of HKSAR 7. F. P. Beer and R. Johnson, “Mechanics of Materials”, 4nd edition, McGraw Hill, 2006.

Subject Description Form

Subject Code	BRE2061
Subject Title	Legal Context for Building and Construction Professionals in Society
Credit Value	2
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	Enable students to understand the social responsibility of construction professionals in the context of important legal concepts within the framework of the Hong Kong legal system and apply the same in the context of building construction and real estate. Develop an appreciation of professional ethics in the construction and real estate industry. Develop intellectual skills, with particular reference to analysis, reasoning and communication skills.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the social responsibility as a construction or a real estate professional in the context of the basic concepts and principles of Hong Kong law. b. Evaluate the basic concepts and principle of Hong Kong law in particular related to the construction and real estate industry. c. Apply the basic concepts, principles and remedies in the law of contract, law of property, and law of tort to the context of construction and real estate. d. Use the above knowledge and reasoning skills to solve legal problems out of factual situations. e. Understand professional ethics of building construction professionals. f. Reflect and review their legal knowledge in the societal context. g. Communicate effectively.
Subject Synopsis/ Indicative Syllabus	Hong Kong legal system, including: court system; case law; Basic Law. Legal reasoning, including: application of legal principles, analysis, problem-solving, and communication skills. Contract Law, including: general principles of contract, types of contracts; remedies. Tort Law, including: principles of tortuous liability, negligence, nuisance, trespass, occupier's liability, breach of statutory duties and remedies. Roles and responsibility, professional liabilities, codes of ethics and conduct of building construction professionals in society.

Teaching/Learning Methodology

The sequence of learning in this module is organized around topics with a pattern of active and interactive tasks which occur before, during and after class contact sessions. Each topic is structured as follows: preparation activity, learning activity, feedback, reflection and evaluation, action planning, and review activity, which serves as the next preparation activity.

The teaching strategy involves phases through which students learn intellectual and academic skills necessary for legal study, in parallel with learning key concepts for later study:

Phase 1: Learning to identify legal issues – Topic focus: understanding legal system, concepts and rules.

Phase 2: Learning how to apply legal knowledge – Topic focus: understanding and applying legal principles.

Phase 3: Critical Judgment Analysis – Topic focus: justifying conclusions.

Phase 4: Problem-solving – Topic focus: integrating learning.

The programme is developed though learning support groups, specially designed heuristics, reflection and self-assessment tasks.

The learning support groups facilitate small group activities, promote effective learning, develop higher order intellectual abilities, give peer group support for learning, and promote active involvement of students in their own learning.

Reflection exercises are designed to turn experience into learning. They help students assess strengths and weaknesses, and identify remedial action.

Self-assessment tasks are one type of reflection exercise through which students may test out knowledge and understanding of legal concepts and rules, and the development of reasoning skills. Guidance on self – assessment will be distributed to each student. The primary objectives of formative self-assessment are self-learning; measurement of attainment of the learning outcome; and efficient and effective preparation for summative assessments.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Coursework	30%	√	√	√	√	√	√
2. Examination	70%	√	√	√	√	√	√
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The Coursework project is to assess students' ability:

1. to organize themselves.
2. to organize fellow group members.
3. to coordinate selection of topics with others outside of your group.
4. to solve a problem or task that is given.

	5. to be creative in discovering solutions to the problem or task [*i.e.*, "thinking outside the box"]. 6. to use effectively the resources available to you in the library and on-line. The presentations are expected to be substantial, in-depth and thorough review, integration and application of the legal materials taught over the course of the semester. The presentations are expected to be professional, well rehearsed, and completed within time, rather than haphazardly organized at the last minute. Furthermore, consideration will be given to the following criteria in assessing performance: content, creativity, enthusiasm/team spirit, interaction [between the group members as well as the audience] and presentation. The examination is intended to assess students' analytical and reasoning skills, *i.e.*, application of the learned legal material; simple memorization will not result in a passing grade. In sum, the examination will assess the students' understanding of the subject as demonstrated by application rather than the student's ability to regurgitate notes. Students will be required to solve problems; to recognize potential problems in the development stage; to integrate, apply and justify the particular use of definitions and legal principles in evaluating a legal scenario/problem.	
Student Study Effort Expected	Class contact:	
	▪ Lecture	18 Hrs.
	▪ Tutorial	8 Hrs.
	Other student study effort:	
	▪ Preparation for lectures and tutorials sessions	18 Hrs.
	▪ Independent study and learning	36 Hrs.
	Total student study effort	80 Hrs.
Reading List and References	Albert Chen, *AN INTRODUCTION TO THE LEGAL SYSTEM OF THE PEOPLE'S REPUBLIC OF CHINA* (LexisNexis 2011). Allan Leung & Douglas Clark, *CIVIL LITIGATION IN HONG KONG* (Sweet & Maxwell 2012). *BUTTERWORTHS HONG KONG CONTRACT LAW HANDBOOK* (LexisNexis 2013). *ARB Code of Professional Conduct* Chee, Simon (2016), *Construction Dispute Prevention and Resolution in Hong Kong*, Sweet & Maxwell and Hong Kong Construction Arbitration Centre, Limited Chee, Simon (2013), (Thesis) *From right to Interest – Specialised Facilitative Mediation (Construction)*, City University of Hong Kong. Clement Shum, *GENERAL PRINCIPLES OF HONG KONG LAW* (3rd Ed. Longman 1998). Geoffrey Ma, et al, eds. *ARBITRATION IN HONG KONG: A PRACTICAL GUIDE* (3rd Ed. Sweet & Maxwell 2014). *Hong Kong Arbitration Ordinance Cap. 609* *Hong Kong Mediation Ordinance Cap 620*	

	HKIA / HKIS / HKICM Standard Forms of Building Contracts (2005, 2006 Editions) *HKIA Code of Professional Conduct* *HKIS Rules of Conduct* *HKIE Rules of Conduct* Ian Robinson & Derek Roebuck, *INTRODUCTION TO LAW IN THE HONG KONG SAR* (2nd Ed. Sweet & Maxwell 2001). R. Jackson, J. Powell and R. Steward, Jackson & Powell on Professional Liability, Chapter 9 and 10, Sweet & Maxwell, 8th Edition, 2017. J.A. Mclnnis, *HONG KONG CONSTRUCTION LAW* (Butterworths Asia 1997). Jill Cottrell, *Legal research: A GUIDE FOR HONG KONG STUDENTS* (Hong Kong University Press 1999). Krishnan Arjunan & Abdul Nabi Baksh, *BUSINESS LAW IN HONG KONG* (2nd Ed. LexisNexis 2009). Legal database in PolyU's library. Martyn Hills, *BUILDING CONTRACT PROCEDURES IN HONG KONG* (Longman Hong Kong Education 2001). Michael Fisher & Desmond Greenwood, *CONTRACT LAW IN HONG KONG* (2nd Ed. Hong Kong University Press 2011). Michael Moser & Teresa Cheng, *HONG KONG ARBITRATION: A USER'S GUIDE* (3rd Ed. Wolters Kluwer Hong Kong Limited 2014). Peter Corne & Susan Finder, *A GUIDE TO THE LEGAL SYSTEM OF THE PRC* (Asia Law & Practice 1997). Rick Glofcheski, *TORT LAW IN HONG KONG* (3rd Ed. Sweet & Maxwell 2012). Roger Nissim, *LAND ADMINISTRATION AND PRACTICE IN HONG KONG* (4th Ed. Hong Kong University Press, 2016). Sarah Nield, *HONG KONG LAND LAW* (2nd Ed. Addison Wesley Longman 1997). Stephen D. Mau, *HONG KONG LEGAL PRINCIPLES: IMPORTANT TOPICS FOR STUDENTS AND PROFESSIONALS* (2nd Ed. Hong Kong University Press 2013). Stephen D. Mau, *CONTRACT LAW IN HONG KONG* – AN INTRODUCTORY GUIDE (2nd Ed. Hong Kong University Press 2016). Stephen D. Mau, *TORT LAW IN HONG KONG* – AN INTRODUCTORY GUIDE (2nd Ed. Hong Kong University Press 2015). Stephen D. Mau, *PROPERTY LAW IN HONG KONG* – AN INTRODUCTORY GUIDE (2nd Ed. Hong Kong University Press 2014). Vanessa Stott, *AN INTRODUCTION TO HONG KONG BUSINESS LAW* (4th Ed. Pearson Education South Asia 2010).

Subject Description Form

Subject Code	BRE2171
Subject Title	Planning and Development: Theories and Practices
Credit Value	2
Level	2
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	1. Examine the forces and underlying mechanisms of urbanization and development of cities. 2. Review the planning and development practices in Hong Kong. 3. Critically evaluate development policies and strategies relating to territorial development and urban planning.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Tackle core urban theories and analyze socio-economic and institutional factors affecting land use patterns, urban built-forms, and growth and decline of cities. b. Comprehend the regulations and practices related to urban planning and development context. c. Understand the development in the process of conservation and development. d. Communicate and work effectively with various professionals involved in different stages of urban planning.
Subject Synopsis/ Indicative Syllabus	A review of planning system and land use problems in Hong Kong; Discussions on land development strategy, urban redevelopment and rural land issues ; an overview of the land conversion and development process in Hong Kong; an evaluation on the tactics adopted by professional to tackle the problems arising from the urban development process; a critical review of government policy affecting planning and development.
Teaching/Learning Methodology	Relevant theories, concepts and regulations related to urban planning will be introduced in lectures, supplemented with applications and discussions during seminars. Outside planning professionals will be invited to give guest lectures on current planning and development issues. Students are required to conduct case studies on real-life planning issues and present their findings in tutorial classes. Students are expected to actively participate in in-class activities and demonstrate improved knowledge of urban planning development.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Student projects	**40%**		√		√		
2. Examination	**50%**	√	√	√	√		
3. In-class activities	**10%**	√	√	√			
Total	**100%**						

Student Study Effort Expected

Class contact:	
▪ Lectures (including a fieldtrip)	12 Hrs.
▪ Studios	14 Hrs.
Other student study effort:	
▪ Readings	24 Hrs.
▪ Group discussion, site visits, and data collection	30 Hrs.
Total student study effort	80 Hrs.

Reading List and References

Brenner, N., Marcuse, P., & Mayer, M. (2012). *Cities for People, Not for Profit: Critical Urban Theory and the Right to the City*. London: Routledge.

Cervero, R., & Murakami, J. (2009). Rail and Property Development in Hong Kong: Experiences and Extensions. *Urban Studies*, *46*(10), 2019–2043.

Fainstein, S. S., & DeFilippis, J. (2016). *Readings in Planning Theory* (Fourth ed.). GB: Wiley-Blackwell.

Fainstein, S. S., & Campbell, S. (2002). *Readings in urban theory* (2nd ed.). Oxford: Blackwell.

HKSARG (2007). Hong Kong 2030+ Topical Papers and Reports. Retrieved from https://www.hk2030plus.hk/explore_a.htm

HKSAR (2019). *Hong Kong Planning Standards and Guidelines*. Retrieved from https://www.pland.gov.hk/pland_en/tech_doc/hkpsg/index.html

Lai, W.H., Ho, C.W., Leung, H.F. (2017) *Change in Use of Land: A Practical Guide to Development in Hong Kong (Third Edition)*, Hong Kong: Hong Kong University Press.

Levy, J. M. (2016). *Contemporary Urban Planning,* New York: Taylor & Francis.

Nissim, R. (2016) *Land Administration and Practice in Hong Kong, Fourth Edition*, Hong Kong University Press.

Ng, M. K. (2020). Transformative urbanism and reproblematising land scarcity in Hong Kong. *Urban Studies*, *57*(7), 1452–1468.

Scott, A. J. (2001). *Global city-regions: trends, theory, policy*. Cambridge, UK; New

York: Oxford University Press.

Sun, Y., Phillips, D. R., & Wong, M. (2018). A study of housing typology and perceived age-friendliness in an established Hong Kong new town: A person-environment perspective. *Geoforum, 88*, 17-27.

Sun, Y., Fang, Y., Yung, E. H. K., Chao, T.-Y. S., & Chan, E. H. W. (2020). Investigating the links between environment and older people's place attachment in densely populated urban areas. *Landscape and Urban Planning, 203*, 103897.

UN-HABITAT. (2017). *New Urban Agenda*. Retrieved from http://habitat3.org/wp-content/uploads/NUA-English.pdf

United Nations (2015). *Sustainable Development Goals*. Retrieved from https://www.un.org/sustainabledevelopment/sustainable-development-goals/

WHO. (2007). *Global Age-Friendly Cities: A Guide*. Switzerland: WHO Press.

Yung, E. H. K., & Sun, Y. (2020). Power relationships and coalitions in urban renewal and heritage conservation: The Nga Tsin Wai Village in Hong Kong. *Land Use Policy, 99*, 104811.

Subject Description Form

Subject Code	BRE258
Subject Title	Industrial Safety I
Credit Value	1 Academic Credit
Level	2
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	To provide health and safety training to BRE students, with emphasis being placed upon safety awareness, accident prevention and the safety issues associated with construction industry.
Intended Learning Outcomes	Upon completion of this subject, students will be able to: a. Describe the legal requirements/codes of practice relating to construction safety *(Syllabus Item 1)*. b. Describe the common types of work-related accidents and identify potential Occupational Safety and Health hazards at construction sites, and recommend associated preventive measures including the use of personal protective equipment *(Syllabus Items 2 and 3)*. c. Describe the importance of, and procedures for, reporting accidents and dangerous occurrences *(Syllabus Item 3)*; and d. Outline the safety management principles applicable to the construction industry *(Syllabus Item 4)*.
Subject Synopsis/ Indicative Syllabus	1. **Overview**: Introduction to construction safety; Government's policy in industrial safety; safety & health legislation in Hong Kong. 2. **Construction Safety**: Construction Sites (Safety) Regulations; codes of practice; potential hazards/risks associated with construction sites and high risk activities such as working in confined space. 3. **Safety Technology**: Machinery safety and guarding; workplace ergonomics including display screen equipment and manual handling; personal protective equipment; first aid and emergency preparedness; reporting accidents and dangerous occurrences; fire safety, electrical hazards. 4. **Safety Management**: Safety training; safety policy; safety committees; safety inspection; safety audit.

<table>
<tr><td>Learning Methodology</td><td>Lectures, supported by illustration, demonstration and student-teacher interaction.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% Weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Coursework</td><td>70%</td><td>√</td><td>√</td><td>√</td><td></td></tr>
<tr><td>2. Test</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="4"></td></tr>
</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject is to be assessed by 100% continuous assessments with coursework disseminated along the course of study and a test. Coursework aims to assess student learning on specific topics while the test is targeted to assess the overall learning attainment of students for the whole subject. The result of the Test has been aligned with the "green card" training (Mandatary basic safety training course (construction work)) for construction site access administered by the Labour Department.
</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td colspan="2">Class contact:</td></tr>
<tr><td>▪ Lecture and Test</td><td>8 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>14 Hrs.</td></tr>
<tr><td colspan="2">Other student study effort:</td></tr>
<tr><td>▪ Self-learning and preparation of coursework</td><td>14 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>36 Hrs.</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>HKSAR Government, Factories and Industrial Undertakings Ordinance (CAP.59) and associated Regulations.

HKSAR Government, Buildings Ordinance (CAP.123) and associated Regulations.

Buildings Department, HKSAR Government (2021), Code of Practice for Site Supervision 2019 (2021 ed.).

Buildings Department, HKSAR Government (2021), Code of Practice on Access for External Maintenance (2021).

Buildings Department, HKSAR Government (2004), Code of Practice for Demolition 2004 (with amendments in 2023).</td></tr>
</table>

Subject Description Form

Subject Code	BRE262
Subject Title	Project Studio
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	1. Provide a platform for students to integrate knowledge and to develop critical thinking and problem solving skill in the context of controversial issues and practical problems in the building and real estate industry. 2. Nurture a sense of social responsibility through the application of professional knowledge. 3. Encourage student-centred learning and develop their generic and professional competence. 4. Provide basic and practical training in construction drawing skills.
Intended Learning Outcomes	Upon completion of the subject, students should be able to: <u>Academic Outcomes</u> a. Understand construction and real estate industry in Hong Kong and identify key issues and problems the industry faces. b. Evaluate current issues and policies in a systematic and analytical manner. c. Synthesize various sources of information to search for creative solution to contemporary issues and practical problems. d. Reflect on the roles of professionals in the relevant fields of professional practice in the construction and real estate industry. e. Propose course of action for problems emerging from a rapidly changing urban environment of Hong Kong. f. Demonstrate skills in construction drawing and master AutoCAD in project work. <u>Generic Outcomes</u> 1. Gather and analyze relevant information using appropriate technology. 2. Communicate the arguments in a clear and articulated manner. 3. Develop critical and creative minds. 4. Work independently and identify needs for self-learning and self-improvement. 5. Co-operate with others in a professional team working environment to excel for the common goal.
Subject Synopsis/ Indicative Syllabus	This course examines important issues and policies in construction and real estate industry of Hong Kong, allowing for the city's unique socioeconomic milieu and development trajectories. It starts with a review of urban development pathway of Hong Kong and its implications for land, housing and real estate development. It is followed by an in-depth appreciation of current issues in the field of construction and property development, with particular reference to Hong Kong as a high-density city with an executive-led government. The latest development trends (for instance, public consultation on Hong Kong 2030+, building up age-friendly city and the central government initiated belt and road initiatives, etc.) will be reflected to shed light on the development prospect of the city and industry. Besides, students are expected to undertake Industrial Centre training and master construction drawing skills.

	Examples of contemporary issues/ policies in building and real estate industry: Urban development and sustainability • Housing and land use policy • Population ageing and ageing in place • Urban renewal • Spatial justice and "right to the city" • Building control and safety • Sustainability, urban development and the society Technology and management • Smart city and big data • Professional practice, industrial organization and innovations • The structure of the industry and the competitive environment • Assets and property management Construction and real estate industry in prospect • The "belt and road initiatives" • Infrastructure development
Teaching/Learning Methodology	This subject comprises two components: (a) BRE Professional Studies & Evaluation (2 credits); and (b) Industrial Centre (IC) training (1 credit). **I. BRE Professional Studies & Evaluation** This component consists of lectures and tutorials. Lectures will revisit the contemporary issues and latest policies on town planning, building and property industry. The students are expected appreciate the issues using proper theories and models, as well as to reflect on their personal/professional development through synthesizing the subject matters. After finishing the lectures, students are required to submit an essay. Students are encouraged to explore and identify issues in relation to construction and real estate development of Hong Kong through group project and thus enhance their problem-solving skills. Each group should give an in-class presentation during the tutorial sessions. Floor students are required to ask questions and/or make comments after the presentation. **II. Industrial Centre (IC) Training** This component is delivered by the Industrial Centre and involves training workshops and practical project works in construction drawing. It involves technical demonstrations, followed by self-assessments to ensure students' acquisition of the skills. Student attendance to the demonstrations is compulsory.
Assessment Methods in Alignment with Intended Learning Outcomes	**I. Assessment overview**

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Academic Outcomes)					
		a	b	c	d	e	f
1. Group project	25%	√	√	√	√	√	
2. Essay	45%	√	√	√	√	√	
3. IC Training	30%						√

Total	100%	

Students must complete all the assessment tasks. Failure to complete any one of the 3 tasks will be awarded an "F" grade for the subject.

II. Assessment procedures

The emphasis of the course will be on active participation: students are encouraged and expected to read widely, assess critically the relevant literature and contribute to lecture and class discussions.

Essay

A term paper of 1,000 words (excluding reference) on identified issues of Hong Kong. The paper should demonstrate active engagement in lecture contents and reading materials, as well as add values to the understanding of current practices and policies in at least one of the following areas:

- urban planning
- building and construction
- real estate development

Hardcopy should be submitted to Assignment Box on 7/F, ZS Block, date is available at Learn@PolyU. Softcopy should be submitted via *Turnitin* on or before 6:00pm. Late submission will not be assessed and will be awarded an "F" grade.

Group project

Students are expected to work in group and to accomplish one study based on the topic they choose. It is encouraged to conduct on site investigation and consult the relevant reading materials and websites for data collection. Each group should give one presentation during tutorial sessions and critically comment on their peer's work. Students should maintain regular discussions with tutors and/or course instructors regarding the progress of the project.

Weighting: 20% for the group presentation plus 5% via peer assessment (by fellow group members)

III. Assessment criteria

The following evaluation criteria are adopted:

Essay:

- ***Addressing the task:*** identify and address clearly the main question(s).
- ***Knowledge***: demonstrate comprehensive understanding of relevant concepts and theories; the analysis, synthesis and application of knowledge is consistently clear and effective.
- ***Argumentation***: examine the question/issue/ problem from important perspectives. Overall logic is clear. Premises or evidence should support conclusions.
- ***Structure***: introduction states clearly writer's thesis or position, and conclusion clearly summarizes main arguments. Paragraphing is logical and appropriate.
- ***Mechanics***: grammar and vocabulary are properly used. Conventions of academic writing (e.g. citation, references, footnotes, etc.) are followed.

Presentation:

- ***Knowledge:*** ability to contribute new and relevant information using a variety of learning resources.
- ***Concepts:*** a capacity to use different concepts to attain a thorough understanding of the development processes.
- ***Logical thinking & reasoning:*** ability to critically assess data and information and draw justifiable conclusions.
- ***Communication skills:*** ability to communicate and articulate ideas or ask

	Research integrity: Softcopy will be submitted to *Turnitin* for plagiarism check. (User Guide: http://edc.polyu.edu.hk/PSP/SG_Turnitin.pdf). Any assignment that is reported as plagiarism will be marked Zero. Please refer to University's explanation on plagiarism and advices to avoid it: https://www.polyu.edu.hk/ogur/academic_integrity/Plagiarism_Booklet.pdf	
Student Study Effort Required	Class contact:	
	▪ Lectures (2-hour lecture per week, week 1-6)	12 Hrs.
	▪ Tutorials (including presentation)	12 Hrs.
	▪ Industrial Centre Training Workshop	26 Hrs.
	Other student study effort:	
	▪ Reading/ self-study	30 Hrs.
	▪ Assessment: group project	30 Hrs.
	▪ Assessment: essay	30 Hrs.
	Total student study effort	140 Hrs.
Reading List and References	**Indicative Reading List:** Brenner, N., Marcuse, P., & Mayer, M. (2012). *Cities for People, Not for Profit: Critical Urban Theory and the Right to the City*. London: Routledge. Huang, H., & Chan, E. H. W. (2000). *Building Hong Kong: Environmental considerations*. Hong Kong: Hong Kong University Press. Chiang, Y. H., Anson, M., & Raftery, J. (2003). *The construction sector in the Asian economies*. London: Spon Press. Ganesan, S., Hall, G., & Chiang, Y. H. (1996). *Construction in Hong Kong: Issues in labour supply and technology transfer*. Aldershot, Hants, England: Avebury. Gurran, N., Gallent, N., & Chiu, R. L.-H. (2016). *Politics, planning and housing supply in Australia, England and Hong Kong*. New York: Routledge. Deakin, M. (2004). *Property management: Corporate strategies, financial instruments, and the urban environment.* Aldershot: Ashgate. HKSARG (Hong Kong. Special Administrative Region Government). Environment Bureau. (2015). *Hong Kong climate change report 2015*. http://www.enb.gov.hk/sites/default/files/pdf/ClimateChangeEng.pdf. Kyle, R. C., Spodek, M. S., & Baird, F. M. (2016). *Property Management*. Dearborn Real Estate Education. Lai, L. W., & Ho, C. D. (2002). *Planning buildings for a high-rise environment in Hong Kong: A review of building appeal decisions*. Hong Kong: Hong Kong University Press. Lai, L. W., Ho, D. C., & Leung, H. (2010). *Change in use of land: A practical guide to development in Hong Kong*. Hong Kong: Hong Kong University Press. Leung, A. Y. T., & Yiu, C. Y. (2004). *Building dilapidation and rejuvenation in Hong Kong*. Hong Kong: Hong Kong Institute of Surveyors.	

Logan, J. R., & Molotch, H. L. (2007). *Urban fortunes: The political economy of place*. Berkeley, CA: University of California Press.

National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce of the People's Republic of China. *Vision and actions on jointly building silk road economic belt and 21st-century maritime silk road*. Available at https://eng.yidaiyilu.gov.cn/qwyw/qwfb/1084.htm

Ng, M. K. (2006). World-city formation under an executive-led government: The politics of harbour reclamation in Hong Kong. *Town Planning Review, 77*(3), 311-337.

Ng, M. K. (2016). The right to healthy place-making and well-being. *Planning Theory & Practice, 17*(1), 3-6.

Nissim, R. (2012). *Land administration and practice in Hong Kong*. Hong Kong: Hong Kong University Press.

Poon, T. N. T. & Chan, E. H. W. (1998). *Real estate development in Hong Kong*. Hong Kong: PACE Pub.

Reed, R., & Sims, S. (2015). *Property development*. London: Routledge.

Sullivan, W. M., & Carnegie Foundation for the Advancement of Teaching. (2005). *Work and integrity: The crisis and promise of professionalism in America*. San Francisco, CA: Jossey-Bass.

UN-HABITAT (The United Nations Human Settlements Programme). (2016). *New urban agenda: Quito declaration on sustainable cities and human settlements for all*. Available at http://habitat3.org/wp-content/uploads/N1639668-English.pdf.

Wong, Y. C. R. (2015). *Hong Kong land for Hong Kong people: Fixing the failures of our housing policy*. Hong Kong: Hong Kong University Press.

Yung, B. R. (2008). *Hong Kong's housing policy: A case study in social justice*. Hong Kong: Hong Kong University Press.

Websites:

Topical papers and reports in relation to Hong Kong 2030+. Available at http://www.hk2030plus.hk/explore_a.htm

IC Student Handbook. Available at https://www.polyu.edu.hk/ic/lt/pdf/UI/ACT20160118%20IC%20Training%20-%20IC%20Student%20Handbook%20(2016%20Edition).pdf

IC Training Material. Available at https://www.polyu.edu.hk/ic/lt/hkpu.htm

Subject Description Form

Please read the notes at the end of the table carefully before completing the form.

Subject Code	BRE263
Subject Title	Construction Economics and Finance
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to: 1. Provide students with an economics perspective of the real estate and construction sectors, and an understanding of their roles on the general economy. 2. Introduce to students the financial markets, institutions and instruments in the context of the construction and real estate industry. 3. Enable students to identify and analyze industry-wide problems based on an understanding of the market structure, performance and behaviour of the industry.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: 1. Describe the size and market structure of the property and construction industries, and consequently articulate why construction and real estate has played an important role on economic development, particularly in the case of Hong Kong. In particular, students would be able to: a) describe the contribution of the property and construction industries to economic growth, b) describe how much the construction output has been in countries around the globe, c) describe some salient features of the property and construction sectors, including new-build and retrofitting works. 2. Apply macroeconomics theories, in particular those concerning business fluctuations, aggregate demand, and the Keynesian multiplier model to understand and describe the economic and social role of the property and construction industries. With such competence, students would be able to: a) evaluate whether fiscal plans adopted by governments around the globe would work as intended to stimulate the general economy, b) give their own ideas of how such fiscal policies should be formulated and implemented in view of constraints and limitations. c) articulate the inter-relationship between the property and construction industries, the banking industry and the macro-economy. d) identify problems related to the market structure and the behaviours of the stakeholders. 3. Estimate the profitability of projects and firms with an understanding of how project and corporate finance can be raised from the money and capital markets. In particular, students would be able to: a) understand the time value of money, and calculate net present value and internal rate of return (IRR) of projects. b) estimate the weighted average cost of capital (WACC) of a firm or a project. c) evaluate the profitability of a project based on WACC. d) describe the various financial instruments and understand how their costs

could be estimated.

4. Be able to articulate the roles and interdependence of participants in the construction and real estate industry, including developers, consultants, contractors, property managers and the government.

5. Be able to effectively communicate their ideas, to make contributions to teamwork and to demonstrate their leadership potential. Students are required to present their works and findings in groups and lead the discussions afterwards, learning to communicate their ideas and advance their arguments in an effective and convincing manner. The group work setting will also facilitate their understanding of group dynamics, cultivating their leadership skills and nurturing their sense of responsibility being part of a team. They are assessed both individually and as a group.

Subject Synopsis/ Indicative Syllabus

(Note 2)

An overview of macro-economic theories. Roles of property and construction on the economy, with comparisons between some economies around the globe and the particular case of Hong Kong. The relationship between the property/construction industry, the financial institutions, markets and the participants. Pricing of financial instruments including debts, equities and REITs. Economic viability and financial feasibility of projects including their externalities such as carbon emissions. An overview of market structure, performance and behaviour of the real estate and construction industry in Hong Kong. Economic problems associated with the Asian Financial Crisis, the Sub-prime Crisis and globalisation.

Teaching/Learning Methodology

(Note 3)

Students spend half of their total contact hours in mass lectures, and another half in seminars. Tutorials are interactive and students are encouraged to participate in discussions. Topics are introduced in the lectures and the key issues highlighted as well, supplemented with further learning and reference materials downloaded from the web. Subsequent seminars provide the opportunity for more in-depth discussion of the main issues delivered in the lectures. Themes of the seminars will follow closely that of the lectures, so that the framework introduced in the lectures can be further illustrated, exemplified and elaborated. Learning materials will also be assessible from the web.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	1	2	3	4	5
1. Seminar/Group Report 1	20%	√	√	√		√
2. Seminar/Group Report 2	20%		√		√	√
3. Examination	60%	√	√	√	√	√
Total	100 %					

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Learning outcomes	***Assessed principally through***			
	Oral	Written	Attendance	Examination

	Seminar Presentation	Seminar Report	and Performance in Class	
All-rounded attributes:				
1. to possess skills to identify, analyze and solve problems		√		√
2. to have an understanding of professional, social and ethical responsibilities				√
3. to communicate effectively	√	√	√	√
5. to contribute as team member and to lead effectively	√	√		
7. to identify contemporary issues			√	√
Intended learning outcomes of course:				
1. An ability to describe the size and market structure of the property and construction industries are and consequently an understanding of why construction and real estate has played an important role on economic development, particularly in the case of Hong Kong.	√	√		√
2. Be capable of applying macroeocnomics theories, in particular those concerning business fluctuations, aggregate demand, and the Keynesian multiplier model on the economic and social role of the property and construction industries: identifying problems related to the market structure and the behaviours of the stakeholders	√ √	√ √		√
3. Be able to evaluate economic viability and financial feasibility of projects including their life-cycle costing, costs of externalities, alternative sources of finance and explain the basis of the pricing of the basic financial instruments.	√	√		√

4. Be able to articulate the roles and interdependence of participants in the construction and real estate industry, including developers, consultants, contractors, property managers and the government.	√	√		√
5. Be able to effectively communicate ideas and to make contributions to teamwork			√	

The assessment criteria adopted in tutorial seminars

Nature of Coursework: Individual Presentation and Group Report

Assessment criteria:

1. Seminar (oral presentation) – individual assessment (40%)
2. Seminar (Group report) – overall (group) assessment (40%)
3. Attendance and active participation in Q and A (20%)

1. Seminar (oral presentation) – individual assessment (40%)

Individual assessment is based on:

a. Clarity of presentation
b. Oral presentation skills
c. Facilitation of Q & A session

2. Seminar (Group report) – overall (group) assessment (40%)

Assessment of the group is based on:

a. Understanding of the central theme and identification of relevant issues
b. Collection of data / information
c. Data interpretation and analyses
d. Written communication skills.
e. Conclusion

3. Attendance and active participation in Q and A (20%)

Each student is encouraged to participate actively in the Q & A session. Each student will be asked to raise at least one question.

Evidences students are expected to give to get the various grades under the criteria:

Grade	Report	on
A+	1. Excellent understan ng of the central theme and id ntification of relevant issues 2. Insightful and stimu ating 3. Very good collectio of data / information (with some extra reading) 4. Very good data inter retation and analyses (good illust ation by examples, case studi s, figures and	y of presentation lating presentation ent oral presentation skills ent Facilitation of Q & A n

		other evidences) 5. Display excellent written communication skills. 6. Excellent conclusion	
	A	1. Very good understanding of the central theme and identification of relevant issues 2. Good collection of data / information 3. Good data interpretation and analyses (Good illustration of the answer by examples, case studies, figures and other evidences). 4. Display very good written communication skills. 5. Very good conclusion	1. Clarity of presentation 2. Good oral presentation skills 3. Facilitation of Q & A session
	B+	1. Good understanding of the central theme and identification of relevant issues 2. Good collection of data / information 3. Good data interpretation and analyses 4. Display good written communication skills 5. Good conclusion	1. Clarity of presentation 2. Good oral presentation skills 3. Good facilitation of Q & A session
	B	1. Good understanding of the central theme and identification of relevant issues 2. Sufficient data collection, interpretation and analyses 3. Display good written communication skills 4. Good conclusion	1. Clarity of presentation 2. Good oral presentation skills 3. Facilitation of Q & A session
	C+	1. Understanding of the central theme and display adequate knowledge of the subject 2. Sufficient data collection and analyses 3. Display reasonably good written communication skills 4. Reasonably good conclusion	1. Familiarity with the topic 2. Reasonably good oral presentation skills 3. Some facilitation and participation of Q & A session
	C	1. Reasonable understanding of the central theme and display adequate knowledge of the subject 2. Provide sufficient data and information 3. Display some written communication skills 4. May have a reasonably good conclusion	1. Familiarity with the topic 2. Reasonably good oral presentation skills 3. Poor participation of Q & A session
	D+	1. Display inadequate knowledge of the subject 2. Provide poor and insufficient data / information 3. Display poor written communication skills 4. May not have a conclusion	1. Poor knowledge of the topic 2. Poor oral presentation skills 3. Poor participation of Q & A session
	D	1. Display poor knowledge of the subject 2. Provide poor and insufficient data / information 3. Display poor written	1. Very poor knowledge of the topic 2. Poor oral presentation skills 3. Poor participation of Q & A session

		communication skills 4. May not have a conclusion	
	F	1. Display no knowledge of the subject 2. Provide poor and insufficient data / information 3. Display poor written communication skills	1. No knowledge of the topic 2. Poor oral presentation skills 3. Poor participation of Q & A session

Student Study Effort Required	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Seminars/Tutorials	13 Hrs.
	Other student study effort:	
	▪ Independent Study	96 Hrs.
	Total student study effort	135 Hrs.

Reading List and References

Recommended:

Park, Chan S. (2011). *Contemporary Engineering Economics*. 5th edition. Upper Saddle River, N.J.: Prentice Hall.

Samuelson, P.A. and Nordhaus, W.D. (2010). *Economics*, 19th edition. McGraw-Hill International Edition.

Supplementary:

Chiang, Y.H. Anson, M. and Raftery, J. (2004). *The Construction Sector in Asian Economies*. London and NewYork: Spon Press. 491pp.

Eccles, T., Sayce, S., and Smith, J. (1999). *Property and Construction Economics,* International Thomson Business Press.

Genberg, H. and Hui, C.H. ed. (2008). *The Banking Sector in Hong Kong: Competition, Efficiency, Performance and Risk.* NY: Palgrave Macmillan.

Glahe, F. & Lee, D. (1989). *Microeconomics,* Harcourt Brace Jovanovich: New York.

Hong Kong Government. *Annual Economic Reports and Reviews,* H.K. Government Printer.

Hong Kong Polytechnic University. *AsiaConstruct Annual Country Reports on Construction and Real Estate Industry*.

Hsu, B. Arner, D., Tse, K.S., Johnstone, S., Li, L. (ed.) and Lejot, P. (ed.) (2006) *Financial Markets in Hong Kong: Law and Practice.* Oxford University Press. 560pp.

Jao, Y.C. (1997). *Hong Kong as An International Financial Centre: Evolution, Prospects and Policies*. HK: City University of Hong Kong Press.

Low, C.K. ed. (2000). *Financial Markets in Hong Kong*. Singapore and NY: Springer.

Raftery, J. (1998), *Principles of Building Economics,* Blackwell Scientific

	Publications: Oxford. Young, L.S.F and Chiang, R.C.P. ed. (1997). *The Hong Kong Securities Industry*, 3rd edition. HK: The Stock Exchange of Hong Kong, and Asia-Pacific Institute of Business, The Chinese University of Hong Kong.

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description Form

Subject Code	BRE265
Subject Title	Introductory Construction Technology and Materials
Credit Value	3
Level	2
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	This subject is intended to: 1. Equip students with an understanding of the function of buildings and how different building elements and components behave, perform, and interact among each other to achieve the general function. 2. To realize the range of building materials available for construction and gain an understanding of the key concepts determining classification, properties, and applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Relate basic construction vocabulary and terminology of construction for various building materials, elements, and components. b. Possess knowledge of functional requirements of various building materials, elements, and components and give preliminary appraisal to the performances of various building elements and components. c. Relate the inter-relationships among building materials, elements, and components. d. Interpret and extract information from construction details/drawings.
Subject Synopsis/ Indicative Syllabus	**Materials (5 lectures)**: • Introduction to building materials – performance requirements, classification, and general applications. • Building materials for structural use: Concrete & Steel. **Technology (8 Lectures):** • Introduction to building and the development of construction technology. System concept in modeling construction process. • Introduction to different forms of loadings to buildings and how different building structures respond correspondingly. • Functional requirements, vocabulary, and construction processes of major building elements/processes include site evaluation, excavation, foundations, walls, floors, and roofs. • Functional requirements, vocabulary, and construction processes of various building components: including stairs, non-load bearing walls, doors, windows, suspended ceilings, and finishes.

Teaching/Learning Methodology

The mode of delivering the subject comprises lectures, tutorials, laboratories, and workshop training. Lectures aim at delivering the basic core concepts and knowledge, which are to be discussed and consolidated through tutorials.

Laboratory sessions (i.e., hands-on training at Industrial Centre) are used for enhancing students' comprehension of the performance of various building materials, whereas workshop training provides hands-on experience to students on selected construction methods.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1.Tutorial Assessments	15%	√	√		√		
2. Laboratory sessions (IC training)	Attendance	√	√				
3. Focus Study Report	25%	√	√	√	√		
4. Written Examination	60%	√	√	√	√		
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Tutorial exercises (quizzes) on construction technology and material will be used to evaluate student learning outcomes.

Successful completion of laboratory sessions (i.e., hands-on training at the Industrial Centre) will allow students to understand current building construction practices.

Focus Study Report allows students to choose specific scenario-based topics on Building Materials and Construction Technology to conduct an in-depth design or study, and this can enhance the depth of the knowledge learned. In this assessment task, it is mandatory to use any form of generative artificial intelligence (GenAI) tools to facilitate the report's completion. The report shall be in a commentary format, and a corresponding presentation detailing lessons learned for using GenAI is required. Students shall acknowledge PolyU's stance and follow the guidelines for using GenAI in this assessment: (https://www.polyu.edu.hk/ar/docdrive/polyu-students/Student-guide-on-the-use-GenAI.pdf).

The examination will comprise multiple-choice and short-answer questions on construction materials and problem-based questions on construction technology.

The split between coursework and examinations is 40/60.

Student Study Effort Required

Class contact:	
▪ Lecture	26 Hrs.

	▪ Tutorial	13 Hrs.
	▪ Laboratories / Workshop	21 Hrs.
	Other student study effort (app.) :	
	▪ Assessments	20 Hrs.
	▪ Reading and Self-learning	40 Hrs.
	Total student study effort	120 Hrs.

Reading List and References

Recommended:

Chudley R. and Greeno R. (2016) *Building Construction Handbook*, 11th ed. Pearson

Chudley R. (2006) *Construction Technology*, 4th edition, Pearson/Prentice Hall

Chudley R. (2012) *Advanced Construction Technology*, 5th edition, Pearson

Doran D. and Cather R. (2014) *Construction Materials Reference Book*, Routledge

Foster J.S., et. al. (2007) *Structure & Fabric Part I & II*, 7th Edition, Prentice Hall

Mamlouk M.S. and Zaniewski, J.P. (2018) *Materials for Civil and Construction Engineers*, 4th edition, Pearson

Shaeffer R.E. (2007) *Elementary Structures for Architects and Builders*, Pearson/Prentice Hall 5th edition

Taylor G.D. (2000) *Materials in Construction*, 2nd and 3rdedition, Longman

Supplementary:

Architectural Services Department (2022) *General Specification for Building*, 2022 edition, HKSAR Government Printer (MiC in Section 27)

Architectural Services Department (2022) *General Specification for Building Services Installation in Government Buildings of the Hong Kong Special Administrative Region*, 2022 edition, HKSAR Government Printer (MiC in Part 2)

HKSAR Government (2021) *The Building Ordinance*, CAP123 HKSAR Government Printer

BRE, *Digests & Current Papers*. Building Research Establishment, Garston, Watford, U.K.

Charlett A.J. (2007) *Fundamental Building Technology*, Taylor & Francis

Fleming E. (2005) *Construction Technology: an illustrated introduction*, Blackwell

Subject Description Form

Subject Code	BRE2691
Subject Title	Introductory Integrated Professional Workshop I
Credit Value	2
Level	2
Pre-requisite	Nil
Objectives	*This subject is intended to:* • Encourage the critical investigation, analysis and synthesis in solving problems in a multi-disciplinary surveying professional context. • Provide a platform for the students in different surveying disciplines to comprehend the essential knowledge of their partnering surveying disciplines. • Introduce the students' concept of the interdisciplinary nature of the surveying professions and equip with knowledge integration across different surveying disciplines. • Cultivate social responsibility, professional ethics and the awareness of trends and opportunities in the surveying professions. • Facilitate the students to develop lifelong learning skills for professional and personal development.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Understand how to integrate subject content and apply it to practical scenarios b) Appreciate the value of teamwork as an approach to solve problems in a multi-disciplinary surveying context. c) Apply knowledge and skills of different surveying professions to solve problems in a multi-disciplinary professional context d) Demonstrate practical skills in building construction drawings e) Develop self-learning abilities and use lifelong learning skills for learning autonomously
Subject Synopsis/ Indicative Syllabus	BRE269, BRE369 and BRE469 are integrated with different levels of complexities. They are provided as a means to let the surveying students to learn and apply knowledge covering the five surveying disciplines (BS, GP, PD, PFM and QS). Students will be equipped with the essential core knowledge of surveying disciplines, other than the one they shall choose to specialize in. The course will be delivered through a mix of seminars, project work and student-centered learning. **Multi-discipline Seminars** A series of seminars will be set to bridge across the professional knowledge of students in different surveying disciplines so as to give them an all-round training in

the surveying profession. They will be given problem-based assignments and asked to attend seminars so as to equip themselves with the knowledge base and professional skills to identify and solve the problems. Qualified surveyors from various surveying practices will also be invited to deliver up-front professional knowledge to the students.

Multi-discipline Project work

A series of construction and property related project scenarios will be set to integrate the knowledge of different surveying disciplines. The project will be designed to link as many of the individual subjects as possible into a common theme. They will study and undertake project work as a surveyor trainee under supervision in different surveying disciplines. The projects will also provide a team work opportunity for the students to simulate the actual work environment in a multi-disciplinary professional or industrial setting. The projects will be delivered by a team of lecturers drawn from different surveying disciplines so as to ensure the students can have an all-round training in the surveying professions.

Student-centered learning

A set of assignments will be delivered to the students to undergo research on specific subject areas that enhance their learning abilities in different surveying disciplines. In addition to seminars, students are expected to undertake guided study through web-based self-learning. They will be required and encouraged to take extra efforts to study subjects beyond their chosen surveying disciplines to acquire the minimum core competence of the five surveying disciplines.

Teaching/Learning Methodology

The project component "P" adopts a holistic approach. Students will form interdisciplinary team to share, integrate and apply knowledge. The seminars and student centred learning component "S" is designed for students to acquire the core competence for surveying disciplines in addition to their own choice of discipline.

The core competence areas related to different surveying disciplines are listed in the first column. Students are grouped accordingly to their choice of progression pattern. The second column "QS" shows that a QS student will attend seminars to acquire the core competence of GP, PD and PFM. Similar interpretations will apply in the cases of BS, GP and PD students.

	Student Group Base on the choice of discipline			
QS				
Construction economics	P	P	P/S	P/S
Contract documentation, measurement & estimating	P	P	P/S	P/S
Construction contract law & administration	P	P	P/S	P/S
Construction technology & structure	P	P	P/S	P/S
Cost & value management	P	P/S	P/S	P/S
Dispute resolution	P	P/S	P/S	P/S
BS				
Maintenance technology & management	P	P	P	P
Building ordinance and related legal aspects	P	P	P	P
Construction technology & structure	P	P	P/S	P/S
Building economics and contract administration	P	P	P/S	P/S
Facility management	P/S	P	P/S	P/S
Design, adaptation and conversion	P/S	P	P/S	P/S
GP				
Property valuation	P/S	P/S	P	P
Property investment and finance	P/S	P/S	P	P/S
Property management and accountancy	P/S	P/S	P	P
Legal Studies: Sales and lettings of land and buildings	P/S	PS	P	P
Urban economics and real estate development	P/S	P/S	P	P/S
Business appraisal and asset management	P/S	P/S	P	P/S

Planning and development (PD)					
Urban planning	P/S	P/S	P/S	P
Property investment and finance	P/S	P/S	P	P
Property development appraisal	P/S	P/S	P/S	P
Business appraisal and accountancy	P/S	P/S	P	P
Urban economics and real estate development	P/S	P/S	P	P
Transportation and environmental impact and assessment	P/S	P/S	P/S	P/S
Property and facility management (PFM)				
Property asset management	P/S	P/S	P	P
Corporate real estate	P/S	P/S	P	P
Project management	P	P	P	P
Property management	P/S	P	P	P

Note:
P: Professional Projects
S: Seminars / Student centre-learning activities

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Coursework	100%	√	√	√	√	√	
Total	100 %						

Student Study Effort Required

Class contact:	
▪ Lectures / seminars	10 Hrs
▪ Seminar / workshop	8 Hrs
▪ Workshop/ Laboratory (IC Training on Technical Drawing & CAD)	21 Hrs
Other student study effort:	
▪ Research, preparation of seminar, assignment and project	41 Hrs.
▪ Total student study effort	80 Hrs.

Reading List and References

To be assigned by participating lecturers of various subjects under the BRE Scheme.

Subject Description Form

Subject Code	**BRE299**
Subject Title	**Work-Integrated Education (WIE)**
Credit Value	2
Level	2
Pre-requisite Co-requisite Exclusion	Nil Nil Nil (Note: Students are encouraged to attend WIE Briefing and Pre-WIE Training.)
Objectives	The subject aims to enable students to: 1. Develop the ability to put theory and concepts into practice; 2. Develop awareness of work-place culture; and 3. Develop all-roundedness attributes. 4. Appreciate the rapid changing work environment; 5. Have a better understanding of workplace culture; and 6. Enhance their employability (and potential of commanding higher wages.)
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Identify, formulate and solve problems related to the profession and industry of building and real estate; b) Communicate effectively; and c) Contribute as a team member and lead effectively. d) Reflect on their capacity for learning through professional practice in the workplace
Subject Synopsis/ Indicative Syllabus	WIE will take the form of an industrial attachment for a minimum period of 4 weeks, generally starting around July/August, in the summer following the completion of stage 2 study. It may be delivered in Hong Kong, Chinese Mainland or overseas. The expected outcomes will be achieved through effective learning knowledge and understanding fundamentals in the work environment.
Teaching/Learning Methodology	A Departmental WIE team will provide support and assistance for students during the WIE process. The team comprises a Departmental WIE Coordinator and also relevant BRE staff members. Particularly, this team helps students seek industrial placements and ensures there is an appropriate and effective learning process during the course of the subject. Upon WIE completion, the team will assess the WIE reports from both students and employers, to make sure that the WIE has achieved the teaching and learning outcomes stated hereinabove. Relevant BRE staff members will provide support for the subject, wherever necessary and appropriate, in relation to training, technical and professional matters. Upon completion of the subject, the team will also verify student's reflective journal in terms of teaching/learning outcomes and assess his/her progress and performance in their learning process. This is to ensure that students meet the intended learning outcomes.

<table>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td colspan="2">The assessment will be on a “PASS” or “FAIL” basis.

<table>
<tr><th>Grade</th><th>Understanding of the WIE</th><th>Ability to demonstrate in WIE</th></tr>
<tr><td>PASS</td><td>The students should have the understanding of the following WIE components:

1. Develop the ability to put theory and concepts into practice;
2. Develop awareness of work-place culture;
3. Develop all-roundedness attributes; and
4. Enhance their employability (and potential of commanding higher wages.)</td><td>The students will be able to:

1. Identify, formulate and solve problems related to the profession and industry of building and real estate;
2. Communicate effectively; and
3. Contribute as a team member and lead effectively.</td></tr>
<tr><td>FAIL</td><td>Inadequate understanding of the above</td><td>Failure to do the above</td></tr>
</table>

To assess the intended outcomes, students are required to submit a WIE Assessment Report, which consists of Personal Reflection Journal, including:

• Business of the company and its management structure. Duties and responsibilities of the student in the placement;;
• Specific tasks and projects;
• Contributions that the student has made;
• Association between academic studies and the placement;
• Reflection on the development of their learning process through gaining knowledge and experience in the industrial attachment; and
• Reflection on personal growth, future career planning and enhancement in the future learning process.</td></tr>
<tr><td rowspan="6">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Nil</td><td></td></tr>
<tr><td>Other student study efforts:</td><td></td></tr>
<tr><td>▪ 4 weeks External Training (44 hrs per week)</td><td>176 Hrs.</td></tr>
<tr><td>▪ Report writing</td><td>4Hrs.</td></tr>
<tr><td>Total student study effort</td><td>200 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Nil</td></tr>
</table>

Subject Description Form

Subject Code	CSE20290
Subject Title	Introduction to Geotechnology
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	1. Provide students with instruction on the fundamentals of geotechnology. 2. Provide an essential background for studies in soil mechanics, rock mechanics, foundation engineering and geotechnical designs.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: a. Understand and classify the different nature and properties of different types of rocks. b. Understand basic soil and rock mechanics. c. Apply the knowledge to foundation designs and construction. d. Interpret the test results of the soil samplings.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	<u>Mineralogy and Petrology</u> (2 week) Physical properties of silicate and non-silicate minerals and their identification; classification of igneous, metamorphic and sedimentary rock and their identification. Hong Kong Rock. <u>Surface processes and Ground-water geology</u> (2 weeks) Weathering; erosion and deposition including river, marine, desert, glacier, karst; formation of engineering soil; hydrological cycle, aquifers and ground water table. <u>Structural geology</u> (1 weeks) Unconformities, fold, fault, joint, map reading and mapping skill. <u>Site investigations</u> (2 weeks) Plan for site investigation; direct and indirect methods for site investigation and sampling, logging of boreholes; insitu tests (e.g. SPT, CPT, PMT, DMT, VST); interpretation of test results. Methods of geophysical exploration. <u>Geology for engineering</u> (2 weeks) Geological applications to tunnels, transportation links, dams, reservoirs, catchments, coastline protection, slopes and foundation. <u>Soil mechanics</u> (2 weeks) Soil formation, Classification of soil, weight–volume relationship, void ratio, porosity, moisture content, specific gravity, unit weight, degree of saturation, consistency of soil and Atterberg limits; compressibility of soil; Darcy's law , permeability; basic concept of shear strength of soil. <u>Rock Mechanics</u> (2 weeks)

<table>
<tr><td></td><td>Rock Mass Classification, Uniaxial and triaxial compressive strength, Brazilian test, Point load index, Mohr-Coulomb model with tensile cutoff, and Hoek-and-Brown failure model.

<u>Laboratory and Fieldwork</u>
Identification of common minerals and rocks, Field and site visits to illustrate course topics, Mapping, Borehole logging.</td></tr>
<tr><td>Teaching/Learning Methodology

(Note 3)</td><td>Fundamental knowledge will be covered in lectures. Tutorial sessions will provide opportunities for identification of minerals & rocks, learning the mapping skill and bore log skill. The students need to complete the work sheets in tutorial sessions. Field studies will help students appreciate the basic principles and familiarize themselves with basic instruments.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="8">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td><td></td><td></td></tr>
<tr><td>1. Continuous Assessment</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Examination</td><td>70%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Students must attain at least grade D in both coursework and final examination (whenever applicable) in order to attain a passing grade in the overall result.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The students will be assessed with three components: the tutorial session, field trip session and assignment. Minerals test and rocks test will arrange after about one month of the tutorial session of identification of minerals and rocks, an examination at the end of the semester. The student will be required to attend tutorial sessions and submit individual reports. The tutorial session will strengthen geotechnology knowledge of students include identify minerals & rocks, mapping skill and bore log. The student will be required to attend field trip session and submit field trip report. These field trip sessions will be acquired the creative thinking. Students will have to exert engineering judgement to complete the tutorial and field trip sessions. The assignment, tutorial session and field trip session to together with the report writing are best to achieve intended learning outcomes a), b), c) and d). Minerals test, rocks test will emphasize on assessing student basic concept and current practices of minerals and rocks identification. It is appropriate to achieve intended learning outcome a). The examination will consolidate students learning in lectures. It is appropriate to achieve the intended learning a), b), c) and d).</td></tr>
<tr><td>Student Study</td><td>Class contact:</td><td></td></tr>
</table>

Effort Expected	▪ Lecture	26 Hrs.
	▪ Tutorial	8 Hrs.
	▪ Field work	5 Hrs
	Other student study effort:	
	▪ Reading and studying	39 Hrs.
	▪ Completion of Assignments	39 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	Atherton, M. J. and Burnett, A. D., Hong Kong Rocks, Urban Council, 1986. Bell, F.G., Engineering Geology, Second Edition, Butterworth-Heinemann, 2007. Davis, G. H. and Reynolds, S. J., Structural Geology of Rocks and Regions, Second Edition, Wiley, 1996. Das, B. M., Principles of Geotechnical Engineering, Seventh Edition, International Thomson Publishing, 2010. Fletcher, C. J. N., Geology of Site Investigation Boreholes from Hong Kong, C. Fletcher, 2004. Goodman, R. E., Rock Mechanics, Second Edition, Wiley, 1989. Lisle, R. J., Geological Structures and Maps, Third Edition, Butterworth-Heinemann, 2004. Lutgens, F. K. and Tarbuck, E. J., Essentials of Geology, Eleventh Edition, Pearson Prentice Hall, 2012. Mottana, A., Crespi, R. and Liborio, G., Simon & Schuster's guide to Rocks and Minerals, Simon & Schuster, 1978. Raymond, L. A., Petrology: The Study of Igneous, Sedimentary & Metamorphic Rocks, Second Edition, McGraw Hill, 2002. Sewell, R. J., Campbell, S. D. G., Fletcher, C. J. N., Lai, K. W. and Kirk, P. A., The Pre-Quaternary Geology of Hong Kong, Printing Dept., 2000. West, T. R., Geology: Applied to Engineering, Prentice Hall, 1995.	

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description Form

Subject Code	LSGI2961
Subject Title	Engineering Surveying
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	Provide students with elementary concept and practice of modern surveying instruments and methods, and their applications for construction projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: Category A - Professional/academic knowledge and skills a. Able to master the elementary concept and methods of engineering surveying. b. Able to operate basic and modern surveying instruments. c. Able to collect, analyse and report basic survey data for the design and construction of civil and building infrastructures. Category B - Attributes for all-roundedness d. Students' communication skill and cooperative attitudes of work with others will be developed through group field practical.
Subject Synopsis/ Indicative Syllabus	**Syllabus Content:** *Fundamentals of Surveying* Geomatics and surveying. Survey reference systems. Measurement errors. *Distance Measurements* Tape measurement and corrections. Offset surveying by taping. Electromagnetic distance measurement and corrections. *Angular Measurements* Optical and electronic digital theodolites. Basic features of a typical theodolite. Operation, observation procedures and data reduction. *Height Measurements* Optical and digital levelling instruments. Basic features of a typical levelling instrument. Operation, observation procedures, and data reduction. *Position Determination* Height determination: ordinary and trigonometric levelling. Horizontal position determination*:* radiation and resection methods. *Satellite Surveying* Concept of satellite surveying. 3-D position determination by Global Navigation Satellite Systems (GNSS).

<table>
<tr><td></td><td>

Horizontal and Vertical Control Surveys
Concept of control survey. Specifications. Monumentation. Traverse computation, quality check and adjustment. Height control establishment by ordinary levelling, quality check and adjustment. Establishment of horizontal and vertical controls by GPS.

Detail Survey
Detail surveying using modern survey instruments and GNSS.

Engineering Surveying
Road alignments: Horizontal alignment: straight, circular, transition curves. Vertical alignment: Parabolic curve. Super-elevation in road/railway design. Area and cross sections. Earthwork volume computation.
Setting out.

</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>

Teaching and learning will be basically lectures and reinforced by tutorials and field practical. In order to consolidate students learning, in-class exercise will be given in tutorials. Group discussion is encouraged for the possible solutions to the in-class exercise, followed by the concluding session at the end of the tutorial.

</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Examination</td><td>60%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>2. Coursework</td><td>40%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Pass both components</td><td>Yes</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The coursework assessments include a practical test and a mini project to reinforce the concepts taught in lectures.

</td></tr>
<tr><td>Student Study Effort Expected</td><td>

<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture (2 Hrs per session)</td><td>26 Hrs.</td></tr>
<tr><td>▪ Practical work (3 Hrs in Weeks 4-9; 6 Hrs in Weeks 10-13)</td><td>42 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study and practical on equipment operation</td><td>64 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>132 Hrs.</td></tr>
</table>

</td></tr>
</table>

Reading List and References	**Recommended:** Schofield, W. (2007). *Engineering Surveying*, 6th ed. Butterworth-Heinemann. Uren, J. and Price, W. F. (2006). *Surveying for Engineers*, 4th ed. Palgrave Macmillan

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Level 3 Subjects:

BRE302	Structure II
BRE315	Property Valuation
BRE3261	Building Maintenance Planning and Technology
BRE336	Development Control Law
BRE337	Property Law
BRE345	Measurement, Documentation and Estimating
BRE349	Building Services I
BRE350	Project Management and Procurement
BRE362	Urban Economics and Property Investment
BRE363	Construction Economics
BRE364	Construction Contract Law and Administration
BRE365	International Study
BRE366	Analytical Skills and Methods
BRE368	AI and Data Analytics for Smart Construction
BRE369	Integrated Professional Workshop II
BRE370	Intermediate Construction Technology and Materials
BRE371	Introduction to Property Management
BRE397	Property Management Accounting
ELC3421	English for Construction and Environmental Professionals

Subject Description Form

Please read the notes at the end of the table carefully before completing the form.

Subject Code	BRE302
Subject Title	Structure II
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	AMA290 & BRE204, or their equivalents
Objectives	Consolidate the knowledge gained in Structure I and to extend this knowledge to include structural principles as related to design/construction of structural elements in building works. At the end of this subject, the student is expected to be able to design building structural elements and appreciate the design of temporary steelworks.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: a) Appreciate the structural design principles in limit state design and their applications to the design of permanent building structures according to the " Code of Practice for the Structural Use of Steel 2011" and the "Code of Practice for Structural Use of Concrete 2013", published by the Buildings Department of Hong Kong SAR. b) Design and analyze the basic types of steel structural members and connections. c) Design and analyze the basic types of Reinforced Concrete (RC) members. d) Improve on problem-solving skills, communication skills in written format, teamwork spirit in professional context.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	*Design Concept* Limit states design: ultimate limit states and serviceability limit states, load combination. *Structural principles applied to the use of structural steel design* Structural steel design to the *Code of Practice for the Structural Use of Steel 2011*. Tension members, beams (laterally restrained and unrestrained), columns, welded and bolted connections. *Structural principles applied to the use of reinforced concrete design* Reinforced concrete design to the *Code of Practice for Structural Use of Concrete 2013*: singly and doubly reinforced concrete beams, shear reinforcement, simply supported slabs, one-way continuous slab, compression members under axial loads and moment, average and local bond stresses.
Teaching/Learning Methodology *(Note 3)*	Interactive lectures will enable students to understand the basic design concepts and learn how to design basic structural members with due consideration to their service conditions; Tutorial will enable students to consolidate the structural design concept through design problem-solving assignments and discussions; Laboratory works will enable students to identify, through a loading test, the

structural behavior of a full-scale simply supported steel beam subjected to bending;

Demonstrations at the Industrial Center will enable students to appreciate the quality control and nondestructive tests on the structural steel welding.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Assignments	35	x	x	x	x	x	
2. Mid-term Exam	15	x	x				
3. Final exam	50	x	x	x	x		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The students will be assessed through their independently completed assignments, which contribute to 35%, a fair percent for exercise/learning/assessment; mid-term and final exams will contribute to 65%, which is used to assess the learning results of individual student; the lab report will be prepared and assessed in small groups, which is counted as a part of the assignments.

Student Study Effort Required

Class contact:	
▪ LEC	26 Hrs.
▪ TUT/LAB	13 Hrs.
Other student study effort:	
▪ Self-study/Assignments	96 Hrs.
▪	Hrs.
Total student study effort	135 Hrs.

Reading List and References

Recommended:

MacGinley, T.J. and Ang, T.C. (2004). *Structural Steelwork: design to limit state theory*, 3rd Edition, Elsevier Butterworth-Heinemann, Jordan Hill, Oxford.

Nethercot, D.A. (2001). *Limit states design of structural steelwork*, 3rd edition, Spon Press. Available in NetLibrary through PolyU Library.

Currie B., Sharp R.A. (1990). *Structural Design*, Stanley Thornes, Surrey, UK.

MacGinley, T.J. and Choo, B.S. (1990). *Reinforced concrete: design theory and examples*, E & FN Spon, London. Available in NetLibrary through PolyU Library.

Moseley W.H., Bungey J.H., Hulse R. (1997). *Reinforced Concrete Design*, 5th

	Edition, Macmillan. **Supplementary:** *Structural Use of Concrete - BS 8110: Part 1*, 1997, British Standards Institution. *Code of Practice for the Structural Use of Steel*, Buildings Department, Government of HKSAR, 2011. *Code of Practice for Structural Use of Concrete*, Buildings Department, Government of HKSAR, 2013. *Steelwork Design Guide to BS 5950: Parts 1 and 2*. The Steel Construction Institute and The British Constructional Steelwork Association Limited, UK.

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description Form

Subject Code	BRE315
Subject Title	Property Valuation
Credit Value	3
Level	3
Pre-requisite	Nil
Objectives	This subject is intended to: 1. Understand the nature of the market and property values. 2. Examine the theories of current valuation methods. 3. Solve valuation problems.
Intended Learning Outcomes	Students will demonstrate their ability to: a. Identify the various frameworks, including physical, economic and legal, that affect property value. b. Evaluate the choices of the various valuation approaches and methods in the valuation of different types of property for different types of value estimate. c. Apply current valuation methods to solve valuation problems. d. Identify the use of valuation in the management and decision making process in real estate development, investment and management.
Subject Synopsis/ Indicative Syllabus	**Brief Syllabus Content:** Value and valuation; concepts; economic principles; valuation tables; role of valuer. Real property market data sources: information; market trends and cycles. Valuation process; valuation report writing. Methods of valuation; comparative, investment, residual, cash flow; cost and profits methods. Valuation of freehold and leasehold interests; capital and rental values; theories of yield; deferred and varying incomes; extension and renewal of leases.
Teaching/Learning Methodology	Lectures will be used to provide students with a good understanding of the basic valuation concepts and theories, and will be supplemented with self-learning packages. Wherever possible, case studies will be used to illustrate how principles can be applied into practice. Tutorials will be used by the lecturer and students to discuss valuation problems and assignments while seminars provide suitable forums for presentation by the students. Students are also required to prepare a 'real life' valuation report. Outside speakers will be invited to give talks on current valuation practice in Hong Kong as well as other countries.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	50%	√	√	√	√		
2. Examination	50%	√	√	√	√		
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students will be assessed through both coursework and examination.

Coursework will consist of valuation report and problem solving assignments in the form of quiz. Both examination and coursework assess learning outcome a to d.

Student Study Effort Expected

Class contact:	
- Lectures	26 Hrs.
- Seminars / Tutorials	13 Hrs.
Other student study effort:	
- Self-studies and group work	90 Hrs.
Total student study effort	129 Hrs.

Reading List and References

Recommended:

Appraisal Institute (2001) *The Appraisal of Real Estate*, Chicago, Ill.: Appraisal Institute.

Baum, A.E. and Mackmin, D. (2011) *The Income Approach to Property Valuation*, Estate Gazette.

Davidson, A.W. (2013) *Parry's Valuation and Investment Tables*, Estate Gazette.

Isaac, David and O'Leary, John (2013) *Property Valuation Techniques*, Palgrave Macmillan.

Li Ling-hin (2000) *Property Valuation in Hong Kong: Theories and Legal Application*, PACE.

Millington, A.F. (2000) *An Introduction to Valuation*, Estates Gazette.

Poon, T.N.T. and Chan E.H.W. (1998) *Real Estate Development in Hong Kong*, PACE Publishing Limited

Scarrett, Douglas (2016) *Property Valuation in the Five Methods*, E. & F.N. Spon.

Subject Description Form

<table>
<tr><td>Subject Code</td><td>BRE3261</td></tr>
<tr><td>Subject Title</td><td>Building Maintenance Planning and Technology</td></tr>
<tr><td>Credit Value</td><td>2</td></tr>
<tr><td>Level</td><td>3</td></tr>
<tr><td>Pre-requisite / Co-requisite/ Exclusion</td><td>BRE265 or equivalent</td></tr>
<tr><td>Objectives</td><td>1. To strengthen students' building technology knowledge with a particular focus on the repair and maintenance disciplines;
2. To give students basic knowledge on how to manage maintenance efficiently and effectively.</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:
<table>
<tr><th>Item</th><th>Intended Professional Learning Outcomes</th></tr>
<tr><td>A1.</td><td>understand the causes of common defects and material deterioration.</td></tr>
<tr><td>A2.</td><td>diagnose common building defects and propose appropriate remedial actions.</td></tr>
<tr><td>A3.</td><td>monitor and supervise the quality of maintenance work.</td></tr>
<tr><td>A4.</td><td>understand the principles and execution of maintenance planning and management.</td></tr>
<tr><td>A5.</td><td>understand principles to evaluate maintenance needs.</td></tr>
</table></td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td><u>Maintenance Technology :</u>
Deterioration of common building materials – mechanisms and protection
Typical deteriorating factors for reinforced concrete in Hong Kong
Common defects of building elements
Health and environmental issues in building maintenance
Testing and diagnosis of building defects, remedies and prevention

<u>Maintenance Management & Planning :</u>
Types of maintenance, classifications and selection criteria
Maintenance planning and scheduling: budgeting, resources allocation and timing of maintenance
Alternative methods on executing of maintenance works: direct labour and contract out
Contract procurement for maintenance works
Safety and environmental considerations for maintenance works
Relationship between design and maintenance; feedback on design
Life cycle costing concept on selection of alternatives</td></tr>
</table>

Teaching/Learning Methodology

Interactive Lectures will enable students to:

1. understand the deterioration mechanisms of common building materials and causes of building defects (A1)
2. be able diagnose the causes of building defects and to rectify the defects (A2, A3)
3. analyse and compare alternatives in the process of building repair (A4, A5)
4. apply the theories and concepts to upkeep the healthy condition of the building stocks (A3, A4)

Laboratory will enable students to:

1. identify the appropriate tests to diagnose defects (A1, A2)

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		A1	A2	A3	A4	A5	
1. Coursework	20 %	✓	✓	✓	✓	✓	
2. Examination	80 %	✓	✓	✓	✓	✓	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students could demonstrate their understanding on the subject through the preparation of coursework and presentation. Problem-based learning and case study approach will be used.

Students' overall understanding of the subject will be assessed in the examination, on both the theoretical knowledge and practical application.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	5 Hrs.
Other student study effort:	
▪ Self-development	39 Hrs.
▪ Coursework preparation	10 Hrs.
Total student study effort	80 Hrs.

Reading List and

Recommended:

Briffett, C., (1995), *Building Maintenance Technology in Tropical Climates,*

References	Singapore University Press Buildings Department, HKSAR, (2002), *Building Maintenance Guidebook*, HKSAR The Chartered Institute of Building, (1990), *Maintenance Management: a Guide to Good Practice*, CIOB Chanter, B & Swallow, P., (2007), *Building Maintenance Management,2nd ed*, Blackwell Hinks, J. & Cook, G., (2001), *The Technology of Building Defects*, E. & F.N. Spon Lee, H.S. & Yuen, C.S., (1993), *Building Maintenance Technology*, Macmillan Lee, R., (2001), Lee's *Building Maintenance Management*, 4th ed., BSP Professional Books **Supplementary:** Addleson, L., (1992), *Building Failures: A Guide to Diagnosis, Remedy and Prevention*, 3rd ed., Oxford Chudley, R., (1981), *The Maintenance and Adaption of Buildings*, Longman Hull, B., (1988), *Non-destructive Testing*, MacMillan Miles, D., & Syagga, P., (1987), *Building Maintenance – A Management Manual*, Intermediate Technology Publications Ransom, W.H., (1987), *Building Failures – Diagnosis and Avoidance*, 2nd ed., E. & F.N. Spon Royal Institution of Chartered Surveyors, (2000), *Building, Maintenance: Strategy, Planning and Procurement"*, RICS Books. Seeley, I.H., (1987), *Building Maintenance*, 2nd ed., MacMillan

Subject Description Form

Subject Code	BRE336
Subject Title	Development Control Law
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	NIL
Objectives	Build up practical knowledge on property development control law and current measures imposed by government affecting the development and use of property.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Comprehend the importance of the planning, building law and other aspects of legislation together with other non-statutory requirements on properties for evaluation of impacts on property development and redevelopment. b) Review and apply relevant legal principles laid down in legal cases to different aspects of development control mechanisms. c) Apply their learnt knowledge on the integrated approach to legal control of new development and existing properties in the course of development and re-development process. d) Conduct a most appropriate planning on design and construction of property amongst other choices on the basis of latest legislative issues. e) Analyze and interpret the liabilities of professionals in the course of property development and re-development. f) Communicate effectively with other players of development or re-development teams.
Subject Synopsis/ Indicative Syllabus	*Town Planning Ordinance:* Planning law affecting property development; function of the Town Planning Board, the Appeal Board and Land Development Corporation; zoning plans and development control administration; enforcement, appeal and enquiries process. *Buildings Ordinance:* Development and building control through administrative measures, regulations and codes of practice on new building works and existing building works; control and enforcement of Minor works and Unauthorized Building Works; role of Authorized Person, Registered Structural Engineer and Registered Contractor. *Government Lease and Conditions:* Land tenure system, Lease conditions; control and enforcement; modification and renewal. *Professional Liabilities:* Professional licensing and liabilities in pre-construction, construction and post-construction stages. *Other Related Laws:* Environmental control laws; law relating to dilapidation and occupation of building; and Practice Notes for building professionals and registered contractors.

Teaching/Learning Methodology

The basic concept of law and critical procedures related to development control will be explained in lectures. Tutorial and seminars will be arranged for discussion in specific topic set for the students in order to facilitate two-way communication and to understand the students' difficulties and needs. Case study projects will be assigned to small group of 4-5 students to encourage students to take initiation to research and explore options, to tackle problem and to benefit from peer group learning. The project shall emphasis on the application of knowledge and to understand the integration of the subject material with other subjects in a development project. Experience practitioners will be invited to deliver lectures and seminars for updated input on the current practice.

Assessment Methods in Alignment with Intended Learning Outcomes

The coursework in the form of continuous assessment will account for 50% and the written examination will account for 50%. The marking will emphasis assessing on both the process and submitted product. Students are encouraged to explore options of property development within the constraint of development control law through project work and tutorial assignments. Questions will be asked during presentation to ensure the students have achieved the intended learning outcomes.

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d	e	f
1. Project	40	√	√	√	√	√	√
2. Tutorial participation and discussion	10	√	√	√	√	√	√
3. Examination	50	√	√	√		√	
Total	100 %						

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Project work	90 Hrs.
▪ Tutorial participation and discussion	30 Hrs.
Total student study effort	159 Hrs.

Reading List and References

Bacon, N. (1996). *Conveyancing 2nd Edition,* Hong Kong: FT Law & Tax Asia Pacific.

Buildings and Lands Department (1991), *Building Control in Hong Kong,* HK Government Printer.

Chan, E.H.W. and E.H.K. Yung (2004) Is the Development Control Legal Framework Conductive to a Sustainable Dense Urban Development in Hong Kong? *Habitat International,* 28(3) 409-426

	H.K. Government (latest edition). *Buildings Ordinance and Regulations*, HK Government Printer. H.K. Government (latest edition). Town *Planning Ordinance and Regulations*, HK Government Printer. H.K. Government *Town Planning in Hong Kong*, HK Government Printer. Built Environment at the crossroads (1996). *The 1996 Fourth World Congress of Building Officials, Hong Kong*, WOBO, HK**.** Hong Kong e-legislation: https://www.elegislation.gov.hk/ Lai, L.W.C. , Ho, D. C.H. and Leung, H.F. (2017) Change in use of land : a practical guide to development in Hong Kong, 3rd Edition, Hong Kong University Press. Litton., J. & Kate, Olley, K. (2018) Planning Law in Hong Kong. LexisNexis. Nissim, R. (2016) Land Administration and Practice in Hong Kong, 4th Edition, Hong Kong University Press. Practice Notes for Authorized Persons, Registered Structural Engineers and Registered Contractors, latest edition, Buildings Department. Tong, A. (2013) Building and Development Control Legislation in Hong Kong, PACE Publishing: Hong Kong.

Subject Description Form

Subject Code	BRE337
Subject Title	Property Law
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	The subject is intended to: 1. Further develop and apply knowledge and reasoning skills. 2. Evaluate and apply property law to factual situations. 3. Examine law relating to property transactions, land use control and compensation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: Use and understand the legal terms relating to the subject and be able to make use of such terms to communicate effectively. a. Identify and evaluate the key concepts and principles of Hong Kong land law and Conveyancing. b. Compare and contrast the different property concepts. c. Apply knowledge and reasoning skills to solve legal problems relating to ownership and land use control. d. Explore and evaluate problem-solving solutions in the context of land use and development. e. Possess the ability to evaluate property law with reference to contemporary issues.
Subject Synopsis/ Indicative Syllabus	The sequence of learning in this module is organized around two themes, and three topics. The two themes are: 1. Acquisition, transfer and extinction of interests in land in Hong Kong. 2. The control of land use (including both private and public control). The topics are: 1. Vendor/purchaser transactions. 2. The relationship between owners and managers of multi-storey buildings. 3. The relationship of landlord and tenant.

Teaching/Learning Methodology

The teaching methods:

1. Interactive lecturing.

2. The themes and topics are developed through problem-solving activities designed to develop the higher order cognitive skills of analysis, argument and critical judgment. Where appropriate, role plays are used to develop skills and enhance awareness of the role of law in property decisions in Hong Kong.

With the methods, the intended learning outcomes afore-mentioned are achieved.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	30%	√	√	√	√	√	
2. Written Examination	70%	√	√	√	√	√	
Total	100%						

The course work:
The students are required to select a judgment, which is related to the subjects being taught, and to present the judgment by analyzing the judgment into issues, the related law, the application of the law to the facts as found by the judge and the to summarize the effect of the judgment.

Prior to the presentation, the students are required to submit to the lecturer all materials relating to the presentation.

Towards the end of the presentation, questions are put to the students by the lecturer and the students are required to answer the questions immediately.

The examination:
As regard the examination, students are required to answer both essay type and problem type questions. The questions are relating to what they have learnt.

As a result, whether the intended learning outcomes have been achieved can be assessed from the performance of the students.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Self studying. Preparation for tutorial classes, course work and examination.	127 Hrs.
Total student study effort	166 Hrs.

Reading List and References	**Recommeded** (the latest editions of the following books should be used): Murphy, W.T., & Robert, S. (2004). Understanding Property Law. (4th ed). Sweet & Maxwell. S.H.Goo., & Alice S.C.Lee. (2015). Land Law in Hong Kong. (4th ed). LexisNexis. Sihombing, J., & Wilkinson, M. (2014). A Student's Guide to Hong Kong Conveyancing. (7th ed). LexisNexis Nield, S. (1997) Hong Kong Land Law. (2nd). Addison Wesley Longman China Limited. Merry M. (2016) Building Management in Hong Kong. (3rd ed). LexisNexis Merry, M. (2016) Hong Kong Tenancy Law, (6th ed). LexisNexis John, Litton., & Kate, Olley. (2018) Planning Law in Hong Kong. LexisNexis. Richard, E. Smith. (2006) Planning Control: Development, Permission and Enforcement. RICS Boooks. **Supplementary**: Authorized Hong Kong Law Report and Digest, Sweet & Maxwell. Government Publications. Halsbury Laws of Hong Kong, Butterworths. Hong Kong Cases, Butterworths. **Useful websites** Polytechnic University library database: Westlaw Department of Legal Justice HK: http://www.doj.gov.hk/eng/legal/index.htm Hong Kong Legal Information: http://www.hklii.org/ Hong Kong e-legislation: https://www.elegislation.gov.hk/

Subject Description Form

Subject Code	BRE345
Subject Title	Measurement, Documentation & Estimating
Credit Value	3
Level	3
Pre-requisite	BRE261
Objectives	This subject is intended to: 1. Enable students to understand the construction process and sequence of building works. 2. Enable students to appreciate the building measurement rules as stipulated in standard method of measurement. 3. Enable students to develop the skills required for measuring, quantifying, and pricing construction work. 4. Enable students to develop the understanding of tendering procedures with reference to producing and checking tender documentation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Describe the construction process and sequence of new building works. (b) Measure the new building works in accordance with the standard method of measurement. (c) Synthesise and analyse the composition of unit rate and tender price. (d) Prepare, examine, and compare documentation to be used in procurement of building works.
Subject Synopsis/ Indicative Syllabus	*Building measurement for building works:* Organisation and systems of measurement including divisions of building works and building trades; mensuration used in measurement; measurement techniques for building works; comparative studies of measurement procedures; measurement using computers; composition of bills of quantities; composition of tender documents; and appreciation of forward trends. *Tender documentation for building works:* Communication between client, designer, and contractor; types of tender documentation and their application; use of bills of quantities, drawings and specifications, preambles, preliminaries, queries; methods of project delivery; types of building contract; procedure of tendering. *Cost estimating for building works:* Factors influencing the pricing of new building works; evaluation of unit rate based on resources (labour, plant, and material); enquiries for cost rates; and calculation of unit rates for pricing tenders.
Teaching/Learning Methodology	Theories and rationales will be delivered in lecture periods. In-class exercises will be given in lecture periods. Practical knowledges and experiences will be shared and delivered in tutorial periods. E-learning materials and e-discussion forums will be provided. Building measurement software trainings will be delivered in the workshops.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Coursework 1: Individual assignment (taking off exercise, preparing bills of quantities)	15%	√	√				
2. Coursework 2: Individual assignment (taking off exercise, preparing bills of quantities, pricing bills of quantities)	15%	√	√	√			
3. Coursework 3: Group project (documentation and estimating problems)	20%			√	√		
4. Examination	40%	√	√	√	√		
5. Effort	10%	√	√	√	√		
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Coursework 1, Coursework 2

Coursework 1 and Coursework 2: Students are given assignments (taking off exercise) for measuring the building works using the provided construction drawings. Coursework 1 and Coursework 2 are to assess students' ability:

(i) To identify and familiarise with the building components through reading construction drawings.

(ii) To understand the construction activities and sequence.

(iii) To gather the necessary work and cost information.

(iv) To develop the bills of quantities in standardised format.

Upon completion of Coursework 1 and Coursework 2, students will be able to achieve learning outcomes (a), (b) and (c).

Coursework 3

Coursework 3: Students are given a group project to solve the tender documentation and cost estimating problems. This coursework is to assess students' ability:

(i) To organize themselves and fellow group members because a surveyor or an engineer work with others as a team to accomplish the estimating and tendering tasks.

(ii) To use technical terminologies for work quantification, cost estimation and tender documentations.

(iii) To solve a problem or task that is given (e.g., by your employer).

(iv) To demonstrate presentation, communication and writing skills.

	Through the problem-solving exercises relating to documentation and estimating activities (Coursework 3), students will be able to achieve learning outcomes (c) and (d). Examination is used to assess students' understanding of building measurement, cost estimating, and tender documentation concepts and practices learned in the lectures and tutorials. Students will be able to achieve learning outcomes (a), (b), (c), and (d). Through students' effort in solving the problem exercises given in lectures and tutorials, the students will be able to achieve learning outcomes (a), (b), (c), and (d).	
Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Seminars / Tutorials	13 Hrs.
	Other student study effort:	
	▪ Student study effort	120 Hrs.
	Total student study effort	159 Hrs.
Reading List and References	Ashworth, A. and Hogg, K. (2007). *Willis's practice and procedure for the quantity surveyor—12th edition*. Blackwell, Oxford. Buchan, R., Fleming, F.W., and Grant, F.E. (2003). *Estimating for builders and surveyors—2nd edition*. Butterworth-Heinemann, Oxford. Chan, C.T.W. (2020). *Estimating and measurement for simple building works in Hong Kong*. Routledge. Holroyd, T.M. (2000). *Principles of estimating*. Thomas Telford, London. Packer, A.D. (1996). *Building measurement*. Addison Welsey Longman, Essex. Picken, D.H. and Drew, D.S. (1996). *Building measurement in Hong Kong: Worked Examples*. Longman Asia Ltd., Hong Kong. The Hong Kong Institute of Surveyors (2021). *Hong Kong standard method of measurement of building works—5th revised edition (HKSMM4R)*. The Hong Kong Institute of Surveyors, Hong Kong.	

Subject Description Form

Subject Code	BRE349
Subject Title	Building Services I
Credit Value	3
Level	3
Pre-requisite	BRE2031
Objectives	This subject is intended to: 1. Provide students with an overview of the various building services engineering systems in modern buildings, 2. Understand the basic design intent of various building services systems and their integration with the building fabric and architectural features.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Possess a knowledge of the system configuration and operation of various building services systems. 2. Relate how different building services systems can help to control and improve the indoor environment. 3. Identify the relationships between the design of building services systems and the overall building design. 4. Appreciate the cost and value relationship on the selection of appropriate building services systems. 5. Relate issues on environmental impact to the design of building services systems and overall building design.
Subject Synopsis/ Indicative Syllabus	Plumbing & Drainage Water supply and drainage system for high rise buildings. Simple design on pipe sizing for plumbing and drainage pipes. Sewage treatment process and fresh water recycling Electricity: Assessment of electricity demand. Lightning protection. Safety and Earthing provisions for electricity distribution within buildings. HVAC: Principles of air-conditioning process. Assessment on the efficiency of air-conditioning and air mixing processes. Large scale air conditioning system configurations and operations. Internal transportation: The configuration and operation of lifts and escalators. Assessment on the quality of services of lift operation. Fire Services: Active prevention, detection and suppression systems for Fire Services. Passive approaches to Fire Services. Integration of fire services system to other building services systems.

Teaching/Learning Methodology

The learning and teaching approaches for the subject comprises lectures, tutorials and laboratories.

Lectures aims at delivering the basic core of concepts and knowledge of respective topics whilst further design and operation arrangements will be elaborated and discussed in the tutorials. Presentation by students on selected topics will also be arranged at tutorials. Laboratories are included to allow students to relate theories and concepts to real situations.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	
1. Laboratory Report	6%	√	√			√	
2. Oral Presentation	14%	√	√	√	√	√	
3. Test	20%	√	√	√	√	√	
4. Examination	60%	√	√	√		√	
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment for the subject comprises end-of-semester written examination, laboratpry report, oral presentation, and in-class test.

The overall split between continuous assessment and examinations has been set at 40%60%. Students must pass both continuous assessment elements and the end-of-term examination in order to pass the subject.

Laboratories allow students to relate theories to actual practices and operations. Written examination aims to assess students' ability to apply concepts learned for solving problems on building services design and operation.

Oral presentations on specific topics on building services serve to assess students' understanding on selected topics.

The test aims to determine the understandings of students on fundamental knowledge and key words on building services

For the presentation coursework, Students are encouraged to use Artificial Intelligence (AI) tools to assist in the development of the topic areas, identify related contents to be included and to conduct initial evaluation on different options and solutions. Students will be required to document the adoption of AI tools in the coursework as an integral part of the submission for assessment.

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Laboratory	6 Hrs.
	▪ Self-Learning	75 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Recommended:** Hall F. & Greeno R. (2017) *Building Services Handbook*, 9th ed., Routledge. Burberry P. (1997) *Environment & Services*, 8th ed., Longman Scientific & Technical. Chadderton D.V. (2013) *Building Services Engineering*, 6th ed., Taylor & Francis. Wang S. K. (2001) *Air Conditioning and Refrigeration*, 2nd ed., McGraw Hill. CIBSE (2020) *Guide D – Vertical Transportation*, CIBSE **Supplementary:** HKSAR (2015), *Code of Practice for the Electricity (Wiring) Regulations*. HKSAR (2016), *Code of Practice for Fire Safety in Buildings 2011 (2015 edition)*. HKSAR (2012), *Code of Practice for Minimum fire Services Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment*. HKSAR, *Building Ordinance and Regulations* CAP.123. NFPA (1997) *Fire Protection Handbook*, 18th Edition. BRE (various) *Digests and Current Papers*. Building Research Establishment, Garston, Watford, U.K. Various Standards and Codes published by British Standard Institution (BSI).	

Subject code	BRE350
Subject title	Project Management and Procurement
Credit value	3
Level	3
Pre-requisite	None
Objectives	This subject is intended to: Project procurement
	• Enable students to appreciate project procurement in context of available form of contracts (e.g., standard form of building contract, general condition of contract, and new engineering contract). • Enable student to understand traditional project delivery options of design-bid-build, design-built, design-build-operate, and design-build-finance-operate, along with alternate options such as new-engineering-contract and public-private-partnership. • Enable students to appreciate procurement process and bidding strategies at pre-contract stage, tendering stage, tender evaluation stage, contract award stage, and explain the tendering methods and procedures, including the use of bidding theory, analysis of tender performance, and selection of tenders. Project management
	• To become conversant with commonly applied terminology, methods, and practices in connection with project management. • To master the fundamental knowledge and techniques for project planning and control including Work Breakdown Structure, Project Cost Breakdown, Project Team Organization, Project Network Diagramming. • To master and apply mainstream analytical methods for bid price analysis, project schedule analysis (critical path method), schedule risk analysis (PERT) and cost control analysis (earned value management). • To appreciate the role of 3D BIM in communicating design information and facilitating project management. • To understand the critical components of quality and safety management in project management.
Intended learning outcomes	Upon completion of the subject, students will be able to: Project procurement
	(a) Understand key terminologies of project procurement in context of contractual and tendering responsibilities. (b) Articulate knowledge on construction procurement practice, including tendering systems, tendering strategies, tendering process, tender evaluation, and tendering report. Project management
	(a) To be able to understand and apply analytical methods for unit-rate bidding, critical path scheduling and earned value analysis for cost control.

<table>
<tr><td></td><td>(b) To be able to implement project planning application frameworks of Work Breakdown Structure, Project Cost Breakdown, Project Team Organization, Project Network Diagramming, Resource Leveling.
(c) To acquire fundamental concepts and lay the knowledge basis to pursue project management studies at advanced levels.</td></tr>
<tr><td>Subject synopsis / indicative syllabus</td><td><u>Project management</u>
• Introduction of Project Management in the construction context.
• Scope/Stakeholders/Communication management
• Time management.
• Cost management.
• Quality management.
• Safety management.
Project procurement
• Principles of procurement practices.
• Spirit of contracts in procurement.
• Tendering procedure and practice (employers' perspectives).
• Tendering documents.
• Tendering strategies (tenderers' perspectives).</td></tr>
<tr><td>Teaching / learning methodology</td><td>• Conceptual models and analytical methods will be delivered in lectures.
• Practice problems will be solved in tutorial classes.
• Practical knowhow and experiences will be shared in classes.
• E-learning materials and e-discussion forums will be provided.
• Basic software use (MS Excel/Project) will be instrumental but not mandatory; guidance on spreadsheet application will be provided to those in need of help.
• Guest lecture will be arranged to share the most updated project management and procurement practice in Hong Kong construction industry.</td></tr>
<tr><td>Assessment methods in alignment with intended learning outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Coursework 1</td><td>25%</td><td>√</td><td>√</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Coursework 2</td><td>25%</td><td></td><td></td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>3. Examination</td><td>50%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
• Coursework 1: Students are given individual or group assignments relevant to project procurement. Upon completion of Coursework 1, students will be able to achieve learning outcomes (a) and (b).
• Coursework 2: Students are given individual or group assignments relevant to project management. Upon completion of Coursework 2, students will be able to achieve learning outcomes (c) and (d).
• For Coursework 1 and 2: Students will be assessed by individual written assignment.
• Examination is used to assess students' understanding of concepts and practices learned in the lectures and tutorials. Students will be able to achieve learning outcomes (a), (b), (c), and (d).
• Through students' effort in solving the problem exercises given in lectures and tutorials, the students will be able to achieve learning outcomes (a), (b), (c), and (d).</td></tr>
<tr><td rowspan="6">Student study effort expected</td><td>Class contact:</td><td></td></tr>
<tr><td>• Lectures</td><td>26 Hrs.</td></tr>
<tr><td>• Tutorials</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>• Independent study</td><td>96 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>135 Hrs.</td></tr>
<tr><td>Reading list and references</td><td colspan="2"><u>Project management</u>
• Computer-based Construction Project Management (2001) Prentice Hall (by T. Hegazy, U of Waterloo)
• Project Management Institute. (2017). A guide to the project management body of knowledge. Newtown Square, Project Management Institute, Newtown Square, Pennsylvania, United States.
• Tang, S.L., Ahmed, S.M., Aoieong, R.T., and Poon, S.W. (2008). Construction quality management. Hong Kong University Press, Hong Kong.
• Tang, S.L., Poon, S.W., Ahmed, S.M., and Wong, K.W. (2008). Modern construction project management. Hong Kong University Press, Hong Kong.
Construction procurement
• Chan, A.P.C., and Yung, E.H.K. (2000). Procurement selection model for Hong Kong, 1st Edition, Department of Building and Real Estate, The Hong Kong Polytechnic University.
• Morledge, R. (2013). Developing a construction procurement strategy and selecting an appropriate route, 1st Edition, Royal Institution of Chartered Surveyors, United Kingdom.
• Greenhalgh, B., Squires, G., and Mahamadu, A.M. (2022). Construction procurement: complex property development. Routledge, United Kingdom.</td></tr>
</table>

	• Hong Kong Institute of Architects, the Hong Kong Institute of Construction Managers, and the Hong Kong Institute of Surveyors. (2005). *Agreement and schedule of conditions of building contract for use in the Hong Kong Special Administrative Region, Standard form of building contract private edition, With quantities*. Hong Kong. • Hong Kong Institute of Architects, the Hong Kong Institute of Construction Managers, and the Hong Kong Institute of Surveyors. (2006). *Agreement and schedule of conditions of building contract for use in the Hong Kong Special Administrative Region, Standard form of building contract private edition, Without quantities*. Hong Kong. • Morledge, R. (2013). *Developing a construction procurement strategy and selecting an appropriate route*. Royal Institution of Chartered Surveyors, United Kingdom. • Masterman, D.J., Masterman, J., and Masterman, J.W. (2003). *An introduction to building procurement systems*. CRC Press, Florida, United States. • Naoum, S.G., and Egbu, C. (2016). Modern selection criteria for procurement methods in construction: A state-of-the-art literature review and a survey. *International journal of managing projects in business*, 9(2), 309–336. • Oo, B.L., and Tang, O.S. (2023). Information feedback in construction contract bidding: Perceptions of Hong Kong contractors. *International journal of construction management*, 23(6), 1044–1052.

Subject Description Form

Subject Code	BRE362
Subject Title	Urban Economics and Property Investment
Credit Value	3
Level	3
Pre-requisite	BRE217
Objectives	1. Equip students with the financial principles and the appraisal techniques applied to land development and property investment decisions. 2. Enable students to understand the economic role of real estate played in the urban economy.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: Intended Professional Learning Outcomes a. use relevant economic principles to analyze the relationship between urban economy and the real estate market, b. use investment theories to assess a landed property as an investment asset with regard to its economic value, c. draw upon the implications of financial planning in making decisions on property investment and finance, d. utilize skills to synthesize coherent arguments and policy implications to support decision-making processes in urban real estate development/redevelopment. Intended Generic Learning Outcomes e. possess skills to identify, analyze and solve problems on contemporary issues, f. communicate effectively in both oral and written reporting.
Subject Synopsis/ Indicative Syllabus	Economic value of land and real property Nature of land economics and analysis of a real estate market. Theories of urbanization, land use pattern and land rent. Economic value of land and real property and the investment appraisal. A portfolio approach to real estate investment and the availability of real estate finance. Real estate market and the urban economy The role of real estate in a wider economy. The competitive structure and efficiency of a real estate market. Justification of government intervention in land and property markets. Cost and benefit analysis of real estate development and redevelopment. Tools and techniques available for real estate analysis.
Teaching/Learning Methodology	The main theory and concepts are delivered through lectures, with application and discussion being covered in seminars and tutorials. The syllabus covers 2 main sections: (i) Economic value of land and real property, and (ii) Real estate market and the urban economy. The fundamental knowledge and relevant theories on the economic value of real estate and its role in the urban economy will be delivered in mass lectures and the key issues to be highlighted. Supplementary learning materials and case studies will also be given to enhance the students' understanding of the topic. Subsequent workshops and seminars will be organised to give hands-on practice on the alternative investment

appraisal techniques and interpretation of the results. Seminar topics go in parallel with that of lectures so that the framework and techniques introduced in the lecturers can be further illustrated, exemplified, and discussed in-depth.

Apart from face-to-face lectures and seminar discussions, teaching materials including the teaching notes and lecture powerpoints will also be uploaded to the electronic teaching platform for students' easy reference.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Presentation and Tutorial Discussions	30%	√	√	√	√	√	√
2. Written Assignment	20%	√	√	√	√	√	√
3. Examination	50%	√	√	√	√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

<u>Coursework</u>

The coursework elements comprise an individual oral presentation and a written group report on contemporary issues.

Presentation and communication skills will be assessed through the individual verbal presentation and participation in discussion in the tutorials which will count for 30% of the total marks. The assessment criteria include their oral communication skills, familiarity with the topic, quality of the visual aids and their performance in the Q&A session.

Their understanding on the contemporary issues will be assessed through the group reports which will count for 20% of the total marks. Assessment criteria of the written report include communication skills, identification of the problem issue, information collection, data analysis and the conclusions drawn.

<u>Examination</u>

Multiple choice and essay questions are contained in the 2-hr exam paper. Students must attempt the multiple choice questions which are used to assess their understanding on the fundamental economic and investment theories, principles and the appraisal techniques. Essay-type questions are used to test whether the students can articulate the relationship covering real estate development and its economic value through discussion and argument.

Student Study Effort Required	Class contact:	
	▪ Lectures	26 Hrs.

	▪ Seminars/Tutorials	13 Hrs.
	Other student study effort:	
	▪ Independent study	90 Hrs.
	Total student study effort	129 Hrs.
Reading List and References	Recommended Choy, Lennon H.T., Ho, Winky K.O. & Mak, Stephen W.K., (2012) "Housing attributes and Hong Kong real estate prices: a quantile regression analysis," *Construction Management.* DiPasquale, D. and Wheaton, W. C. (1996) The Markets for Real Estate Asset and Space: A Conceptual Framework, *Journal of the American Real Estate and Urban Economics Association*, 1992, Vol. 20, pp 181-197. Geltner, Miller, Clayton and EichHortz (2014) *Commercial Real Estate: Analysis and Investments*, Chapter 2, OnCourse Learning. Bengs, C., & Ronka, K. (1994) Competition restrictions in housing production. *Economic Modeling, 11*(2), pp. 125-133. Lai, N. and Ko, W. (1999) Land-supply restrictions, developer strategies and housing policies: The case in Hong Kong, *International Real Estate Review*, Vol. 2, No. 1, pp. 143-159. Landis, J. D. (1986). Land regulation and the price of new housing: Lessons from three California cities. *Journal of the American Planning Association*, Winter 1986, pp. 9-21. Tse, R. Y. C., Hui, E. C. M., & Chan, C. H. K. (2001). On the competitive land market: evidence from Hong Kong. *Review of Urban and Regional Development Studies, 13*(1), pp. 46-61. Leung B.; Hui, E. and Seabrooke, B. (2007), Pricing of Presale Properties with Asymmetric Information Problems, *Journal of Real Estate Portfolio Management*; Apr-Jun 2007; 13, No. 2. Whitehead, C.M.E. (1983) The rationale for government intervention, Urban Land Policy: Issues and Opportunities, p.108 –129. Hui, Eddie C.M.; Leung, Barbara Y.P. and Yu, Ka Hung (2014) The impact of different land-supplying channels on the supply of housing, *the Journal of Land Use Policy*, Vol. 39, pp. 244-253. Leung, Y.P.B. and Ma, A.S.C. (2013) Exploration of the presale market in China from an institutional perspective, *International Journal of Strategic Property Management.*, 17(3), pp. 248-262. Zhang, X.L.; Hu, J; Skitmore, M. and Leung, Y.P.B. (2013) Inner-city urban redevelopment in China metropolises and the emergence of gentrification: the case of Yuexiu, Guangzhou, *Journal of Urban Planning and Development*, 05014004, 13 June 2013. Leung, Y.P.B.; Hui, C.M.E.; Tan, J.H., Chen, L. and Xu, W.B. (2011) SWOT dimensional analysis for strategic planning – The case of overseas real estate developers in Guangzhou, *International Journal of Strategic Property Management.*, 15(2), pp. 105-122. Leung, Y.P.B.; Hui, C.M.E. and Seabrooke, B. (2007) Pricing of presale properties with asymmetric information problem, *Journal of Real Estate Portfolio Management*, 13(2), pp. 139-152. Leung, Y.P.B.; Hui, C.M.E. and Seabrooke, B. (2007) Risks transfer of presale properties and the construction of forward property price index,	

	Pacific Rim Property Research Journal, 13(2). Brealey, R.A. and Myers, S.C. (2004) *Principles of Corporate Finance*, McGraw Hill. Brown, G.R. and Matysiak, G.A. (2000) *Real Estate Investment: A Capital Market Approach*, Prentice Hall. Harvey, J. (2000) *Urban Land Economics: The Economics of Real Property*, London: MacMillan. Hui, C.M., Chan, P.C., Wong, K.W., Wong K.C. & Leung, Y.P. (2000) *The Supply of Land for Housing in Hong Kong*, Research Monograph, The Hong Kong Polytechnic University O'Sullivan, A. (2009) *Urban Economics*, 7th edition, London: Irwin. Pirounakis, N.G. (2013) Real Estate Economics – A Point-to-point handbook, Routledge, 2013. Lumby, Steve (1994) *Investment Appraisal and Financial Decisions*, 5th edition, Chapman & Hall.

Subject Description Form

Subject Code	BRE363
Subject Title	Construction Economics
Credit Value	3
Level	3
Pre-requisite	Nil
Objectives	1. Enable students to understand the factors affecting construction cost 2. Enable students to contribute to the economic efficiency of construction throughout a project life cycle in conjunction with its stakeholders
Intended Learning Outcomes	a. Analyse the factors affecting construction cost at an industry and project level. b. Compile and use cost data effectively for forecasting and controlling purpose c. Compare cost of alternative designs d. Evaluate life cycle cost of construction e. Communicate principles and cost data effectively. f. Identify contemporary issues related to construction economics
Subject Synopsis/ Indicative Syllabus	Demand and supply for construction Factors affecting construction cost at industry and project level Productivity and its measurement Types of client and the client's brief Real estate developers and their costs The roles of construction and property professionals Compilation and use of cost data Building cost and tender price indices Design economics Cost planning and cost analysis An introduction to cost modeling Life cycle costing Cost control measures

Teaching/Learning Methodology

The principles and concepts are delivered through lectures (each at 2 hrs per week), with application and discussion being covered in seminars and tutorials (each at 1 hrs per week in small groups), for a total period of 13 weeks.

The syllabus on construction economics will take students through the macro and micro factors affecting construction cost, both from the client and contractor's perspectives. Seminar topics (some of which are case-based) and reports demand students' individual research and data analysis, as well as presentation.

Apart from face-to-face lectures and discussion, students can download teaching materials from an electronic teaching platform.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1.Seminars/reports	40 %	√	√	√	√	√	√
2. Examination	60 %	√	√	√	√	√	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Learning outcomes	Oral Seminar Presentation	Written Seminar Report	Examination
1. to possess skills to identify, analyze and		√	√
2. to have an understanding of professional, social and ethical responsibilities	√	√	
3. to communicate effectively	√	√	√
4. to contribute as team member and to lead effectively	√	√	
5. to identify contemporary issues	√	√	
6. Analyse the factors affecting construction cost at an industry and project level.	√	√	√
7. Compile and use cost data effectively for forecasting and controlling purpose	√	√	√
8. Compare cost of alternative designs	√	√	√
9. Evaluate life cycle cost of construction	√	√	√

<table>
<tr><td></td><td colspan="2">The assessment criteria adopted in tutorial/seminars
(“plus” grade for enhanced performance possible for each grade except F; students may work on one or more topics, hence averaging coursework grades may apply)

1. Seminar (oral presentation) – individual assessment (20%)
• Oral presentation skills: A for excellent, B for good, C for clear, D for reading from script, F for mumbling
• Familiarity with the topic: A for excellent, B for good, C for adequate, D for poor, F for no knowledge
• Quality of visuals: A for excellent, B for good, C for adequate, D for barely sufficient, F for poor
• Answer during discussion: A for excellent, B for good, C for adequate, D for barely sufficient, F for poor

2. Seminar (Group report) – overall (group) assessment (20%)
• Written communication skills: A for excellent, B for good, C for clear, D for barely sufficient, F for poor
• Data/information collection: A for excellent, B for good, C for adequate, D for barely sufficient, F for poor
• Data interpretation & analysis: A for excellent, B for good, C for adequate, D for barely sufficient, F for poor
• Identification of problem/issue: A for excellent, B for good, C for adequate, D for barely sufficient, F for poor
• Conclusion: A for excellent, B for convincing, C for adequate, D for barely sufficient, F for poor</td></tr>
<tr><td rowspan="6">Student Study Effort Required</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Seminars/Tutorials</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Independent study</td><td>81 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>120 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Gruneberg, S. and Francis, N. (2019) The Economics of Construction, Agenda Publishing Ltd.
Ferry, D. & Brandon, P.S., (2007) Cost planning of Buildings, 7th Edition, Oxford, Blackwell Publications

Ive, G.J. and Gruneberg, S. (2000) The economics of the modern construction sector, Basingstoke: Macmillan
Myers, D. (2017) Construction Economics: a new approach, Abingdon, Oxon: Routledge, 4th edition (online version available)

Ashworth A., (2010) Cost Studies of Buildings, Harlow, England: Pearson
Supplementary:
Smith, J. (1998) Building Cost Planning for the Design Team, Deakin University Press
Seeley, I. (1996) Building Economics, MacMillan
Pilcher, R. (1994) Project Cost Control in Construction, Blackwell Scientific Publication
Chris, M. (2009) Finance and control for construction, Taylor & Francis
Samuelson, P.A. and Nordhaus, W.D. (2010). Economics, 19th edition. McGraw-Hill International Edition.
Hong Kong Statistics (current issues), Hong Kong SAR Government</td></tr>
</table>

	Websites of major QS practices Journal articles (e.g., *Construction Management and Economics*: update issues)

Subject Description Form

Subject Code	BRE364
Subject Title	Construction Contract Law and Administration
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to: 1. Introduce aspects of law that have particular relevance to construction contracts. 2. Provide a practical knowledge of modern development in construction contract law and application of laws and procedures relating to construction contracts and their administration.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Relate and apply the legal principles and modern development of contract law to construction contract administration. b. Familiarize and review the features of some common local and international standard of forms of construction contracts. c. Analyze the contractual issues and evaluate the contractual position of different parties in various contractual situations. d. Communicate effectively with legitimate reasoning. e. Develop the ability to engage in life-long learning on construction contract law.
Subject Synopsis/ Indicative Syllabus	1. *Construction contracts*: modern development of law in contract; legal interpretation and application in construction contract. 2. *Legal basis for Standard form of contract*: characteristics of various standard forms of local and international building contracts and sub-contract. 3. *Duties and responsibilities of the contract administrators and the parties to the contract*: implications of contract clauses; legal implication in the procedures for instructions, variations, payments and certification. 4. *Construction claims*: evaluation and presentation of claims; contractual and common law remedies.
Teaching/Learning Methodology	Lectures and tutorials will be run throughout the semester period. The lectures and tutorials will not only disseminate the relevant knowledge but also provide guidance for students to search materials for self-study. Tutorial projects will also be set requiring the student to evaluate and apply the relevant law principles and deduce solution for the cases. The projects require students to analyze, critically appraise and resolve administrative, organizational and managerial problems in the practice of construction contract administration. Key topics will be set for groups of 4-5 students to carry out legal research and

	prepare for presentation and discussion in tutorial class. The tutorial classes encourage peer group learning and provide an interactive learning environment to develop critically thinking and legal reasoning.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d	e	
Coursework	40%	√	√	√	√	√	
Examination	60%	√	√	√	√		
Total	100%						

Students will be assessed by:

(i) Examination: In the form of problem analysis and essay type question.
(ii) Coursework: In the form of presentation of project assignment, short quiz and critical discussion in class.

Student Study Effort Required

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Student effort hours	81 Hrs.
Total student study effort	120 Hrs.

Reading List and References

Indicative Reading List:

Recommended:

Aqua Group, (1996) *Contract Administration for the Building Team, 8th Ed.* Oxford: Blackwell Science.

Chappell, D. (2003), *Understanding JCT Standard Building Contracts*, 7th Ed., E & FN Spon, London.

Chee, Simon (2016), *Construction Dispute Prevention and Resolution in Hong Kong*, Sweet & Maxwell and Hong Kong Construction Arbitration Centre, Limited

Chee, Simon (2013), (Thesis) *From right to Interest – Specialised Facilitative Mediation (Construction)*, City University of Hong Kong.

David Chappell. (1998) Powell. *Smith & Sims' Building Contract Claims*. 3rd Ed. Malden, Mass.: Blackwell Science.

Hong Kong Arbitration Ordinance Cap. 609

HKIA / HKIS / HKICM Standard Forms of Building Contracts (2005, 2006 Editions)

HKSAR Government Development Bureau. *Additional Conditions of Contract (ACC for NEC RSC 20 June 2017)*

HKSAR Government Development Bureau. *Circular Letter : 510/83/03 dated 15 October 2014*

	HKSAR Government Development Bureau. *General Conditions of Contract for Building Works,* (1999 Edition) HKSAR Government Development Bureau. *Practice Notes for NEC – ECC for Public Works Projects in Hong Kong,* June 2017 HKSAR Government Development Bureau. *Proposed Security of Payment Legislation for the Construction Industry - Consultation Document,* 1 June 2015 *Hong Kong Mediation Ordinance Cap 620* Murdoch, J. & Hughes, W. (2002) *Construction Contracts Law and Management*, 3rd Ed., Spon Press. *New Engineering Contract,* 3rd Edition (2005), 4th Edition (2017) Poon N.T. & Chan E.H. (1998) *Real Estate development in Hong Kong*, Pace Ltd. H.K. Thomas, R. (2001), *Construction Contract Claims*, 2nd Ed., Macmillan, U.K. Teresa, C. Wong, E and Soo, G., (2004) *Construction Law and Practice in Hong Kong*, Thomson, Sweet & Maxwell Asia. Uff, J. (2002) *Construction Law: Law and Practice Relating to the Construction Industry*, 8th Ed. Sweet & Maxwell, UK. Furst, S. (2001), *Keating on Building Contracts*, 7th Ed., Sweet & Maxwell, London. **Supplementary:** Powell-Smith, V. (2000) *Powell-Smith & Furmston's Building Contract Casebook*, Blackwell Science: Oxford. Wallace, Ian Norman Duncan. (1995), *Hudson's Building & Engineering Contracts: including the Duties and Liabilities of Architects, Engineers and Surveyors*, 11th Ed, London : Sweet & Maxwell. Ramus, J.W(1996) *Contract Practice for Quantity Surveyors.* 3rd ed., Oxford : Heinemann Newnes. Latham, M. (1994), *Constructing the Team*, HMSO. Ashworth, A., (2002) Willis's *Practice and Procedure for the Quantity Surveyor, 11th Ed.* Malden, M.A.: Blackwell Science.

Subject Description Form

Subject Code	BRE365
Subject Title	International Study
Credit Value	1
Level	3
Pre-requisite	BRE262 or BRE269
Objectives	*This subject is intended to:* • Widen students' horizons through in-depth investigation and research on construction and real estate industry of other cities / countries • Enhance students' problem solving skills on issues of Hong Kong construction industry by expanding their visions beyond local practices and conventions. • Provide an opportunity for students to initiate, organize, plan and execute a study project and to learn to work and contribute in a team
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Comprehend different aspects of the real estate and construction industries of selected city/country through research, guided study and/or study tour b) Conduct detail investigation and researches on selected topics of real estate and construction industries of a foreign city/country c) Compare and contrast different aspects of real estate and construction industries between Hong Kong and other cities/countries d) Analyze and appraise issues and solutions for Hong Kong construction and real estate industries at industry and/or regional levels with reference to practices in other cities / countries e) Work as a team and coordinate among team members to accomplish common project goals and present quality deliverables
Subject Synopsis/ Indicative Syllabus	Comparative study of real estate and construction industries between Hong Kong and a city/country selected by students followed by presentation and written report.

Teaching/Learning Methodology

Students in groups are required to conduct a comparative study to the real estate and construction industry of a city/country of their own choice and Hong Kong. Students are required to investigate into one or more of the following aspects: the formation and structure of the industry and roles of stakeholders in the industry, the outlook and performance of the industry in term of value added and/or productivity, the prospects and future development of the industry, and specific topics like practicing sustainability in the industry, innovative construction technology and management approaches, real estate finance, property and facility management, etc. where appropriate.

The study shall be conducted in the form of a compulsory study tour to the selected city/country. A presentation of the study and the findings of the study tour will be held and to be assessed by the tour supervisors. Students are also required to prepare a written report for assessment along with the presentation.

The subject lecturer will play a coordinator role and adopt "minimum-intervention" policy for the study tour, as it is believed the preparation and organization for the study tour can contribute to students' learning on generic skills about team building and problem solving.

Each tour group will have two academic staff from the Department serving as tour supervisors (arranged by the tour groups) to provide guidance on the planning and execution of the tour, join the tour and in charge of the assessment of the subject.

At the planning stage, student groups are to be required to use generative AI tools (such as chatGPT) on the planning of the tour programme, e.g., identifying issues in selected destination, determination of the study/research topics, notable institutes / organizations / individuals to be visited, purposes of the visit, planning and scheduling of the tour, etc. It is expected students will make use of the recommendations from the generative AI tools by working with their tour supervisors on the development of the tour programme.

After the study tour, the student groups can make use of generative AI tools to help with their report writing, and presentation.

Assessment Methods in Alignment with Intended Learning Outcomes

Assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Oral Presentation	40 %	√	√	√	√	√	
2. Research Report	40 %	√	√	√	√	√	
3. Individual Assessment	20 %			√	√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

	This is a project based subject and it is believed presentation followed by written presentation can ensure students have learned and enriched themselves through the study tour and present their learning gain in a systematic manner for assessment. In addition to the group submissions (presentation and report), individual assessment based on contributions of individual participants towards the whole process of study tour project are included as part of the assessment. Personal reflective journal may also be used as the tool for individual assessment if appropriate. Tour groups are required to document the adoption on generative AI at different stages of the study tour, including, planning, implementation and presentation/report preparation and students will be required to indicate their views on using generative AI in this subject through personal reflection. The following declaration should be made in the preface of the report. "*I/We declare that Generative AI tools have been used to prepare the submitted work. The Generative AI tools used and the manner in which they were used are as follows*:" _____ The students are also required to submit Turnitin plagiarism check, including AI indicator, with their study tour report.	
Student Study Effort Required	Class contact:	
	▪ Introduction / Consultation	2 Hrs.
	▪ Oral Presentation	2 Hrs.
	Other student study effort:	
	▪ Preparation and organization of the study	18 Hrs.
	▪ Preparation of presentation and report	18 Hrs.
	Total student study effort	40 Hrs.
Reading List and References	There are no standard reading materials for the subject, Students are expected to conduct in-depth research study and materials like research study reports, statistical data from different sources are considered essential study materials. Case Studies are believed to aid and deepen learning impact.	

Subject Description Form

Subject Code	BRE366
Subject Title	Analytical Skills and Methods
Credit Value	2
Level	3
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: Level 2 core subjects Co-requisite / Exclusion: Nil
Objectives	To prepare students for undertaking a manageable piece of research leading to a dissertation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Describe and appraise the key concepts, elements and requirements in research. b. Describe the meaning of plagiarism and demonstrate the proper ways to avoid it. c. Apply the knowledge of fundamental statistics in collecting, organizing, summarizing, presenting and analyzing data, as well as drawing valid conclusions. d. Conduct hypothesis testing and valid multiple regression analysis with its diagnostic tests. e. Produce a dissertation research proposal with researchable topic related to the fields of construction and real estate.
Subject Synopsis/ Indicative Syllabus	A. Concepts: Philosophy of sciences, theory, hypothesis, methodology, method, research objective, problem statement, classification of research, etc. B. Process: Literature search and review, referencing and plagiarism, work plan, authorship skills, data assembly, time management, writing up, etc. C. Qualitative research: Strategy, approaches, methods, analysis, examples, limitations, etc. *D.* Quantitative research methods: Descriptive and inferential statistics, normal distribution, basic quantitative statistical techniques, hypothesis testing and decision making, correlation and regression analysis, and application of computer softwares/programs to handle statistical problems and calculations, etc. *(Remarks: Students are expected to learn these statistical techniques in more details and many other relevant quantitative techniques by their own initiatives.)* E. Writing out a dissertation proposal.
Teaching/Learning Methodology	In the lectures, teachers will introduce the course materials, explain the key theories and concepts and showcase examples of the methodology, elements and possible loopholes in doing a piece of research. The essential concepts and principles of various key subject areas under the qualitative and quantitative research methods will be presented in the lectures, leading to the preparation of initial dissertation proposals for submission.

	Tutorials will be used for discussion, problem-solving, hands-on demonstration, consultation and library visits. Interactive multi-media self-accessed learning materials will be provided via the department's computer network (e.g. LEARN@PolyU blackboard subject websites). Coursework will be designed to assess the students' ability to demonstrate their understanding of the course materials and their abilities to achieve the intended learning outcomes.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Continuous assessment	100%	√	√	√	√	√	
Total	100 %						

The subject "Analytical Skills and Methods" is a major component leading to the completion of Dissertation or Capstone Project. Students must complete and pass each of the five assessment components of the subject in order to obtain an overall Grade of the subject. There are four assessment components.

1. A term paper for qualitative research methods (40%)
2. One quiz on quantitative research methods (40%)
3. One library workshop (attendance plus test) (10%)
4. Personal Reflection Journal on students' learning experience and learning-to-learn process development (10%)
5. Initial Dissertation Proposal (0%, Pass/Fail Assessment)

Students must discuss their initial dissertation topics with their academic advisors and get their academic advisors' signature approval for the Initial Dissertation Proposal for getting a "Pass" grade for the assessment component.

BRE students who participate in the exchange programme can register the subject outside Hong Kong. They need to fulfill all coursework assignments/components, by learning the subject materials from LEARN@PolyU. They need to attend the face-to-face quiz (Component 2) upon their returning to BRE, if no on-line option is provided.

The subject will be assessed on a continuous basis and no examination is required. The approach to coursework assessment is guided by two principles. First, the need to assess the extent to which the students have achieved the learning outcomes with respect to grading criteria. Second, the assessment itself should contribute in some way towards reflection and learning of the importance of research methods in Dissertation or Capstone Project. The total coursework mark will be based on a portfolio comprising a series of in-class written tests, attendance to library workshop, online quizzes and discussion. These assessment tools attempt to test the level of students' knowledge and application of fundamental qualitative research concepts and statistical techniques, in manipulating data for presentation, analysis and decision-making.

Student Study Effort Required	Class contact:	
	• Lectures	10 Hrs.
	• Tutorials	5 Hrs.

	Other student study effort:	
	• Self learning and recommended reading	65 Hrs.
	Total student study effort	80 Hrs.

Reading List and References

Reference List:

Essential:

HKPolyU - Department of Building and Real Estate. *Dissertation Guide.* Continuously updated.

Recommended:

Bell, J. and Waters, S. (2014) *Doing Your Research Project: A Guide for First-time Researchers*, 6th Edition, Maidenhead: McGraw-Hill Education.

Blaikie, N (2010) *Designing Social Research: The Logic of Anticipation*. 2nd Edition, Cambridge: Polity Press.

Booth, W.C., Colomb, G.G. and Williams, J.M. (2003) *The Craft of Research*. 2nd ed. Chicago: The University of Chicago Press.

Chau, K.W., Raftery, J. and Walker, A. (1998) The Baby and the Bathwater: Research Methods in Construction Management. *Construction Management and Economics*, Vol. 16, No. 1, pp. 99-104.

Collis, J. and Hussey, R. (2013) *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*, 2nd edition. Basingstoke: Palgrave Macmillian, England.

Fellows, R. and Liu, A. (2015) *Research Methods for Construction*, 4th ed., John Wiley & Sons.

Harris, R. and Cundell, I. (1995) Changing the Property Mindset by Making Research Relevant. *Journal of Property Research*, 12, pp.75-78.

Holt, G. (1998) *A Guide to Successful Dissertation Study for Students of the Built Environment*, 2nd edition. The Built Environment Research Unit, University of Wolverhampton.

Kennedy, P. (2003) *A Guide to Econometrics*, 5th Edition, Cambridge: MIT Press.

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2. Bland, J.A. (1985). *Statistics for Construction Students*, Construction Press.
3. Devore, J.L. (2016). *Probability and Statistics for Engineering and the Sciences*, 9th Edition, Cengage Learning, Boston, USA.
4. Hogg, R.V., McKean, J.W. and Craig, A.T. (2013). *Introduction to Mathematical Statistics*, 7th Edition, Boston, USA.
5. Lapin, L.L. (1990). *Probability and Statistics for Modern Engineering*, 2nd Edition, PWS-Kent Publishing Company, Massachusetts, USA.
6. Levin, R.I. and Rubin, D.S. (1998). *Statistics for Management*, 7th Edition, Prentice-Hall, New Jersey, USA.
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8. Mendenhall, W., Beaver, R.J. and Beaver, B.M. (2013). *Introduction to Probability and Statistics*, 14th Edition, Pacific Grove, California, USA.
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Subject Description Form

Subject Code	BRE 368
Subject Title	AI and Data Analytics for Smart Construction
Credit Value	3
Level	3
Pre-requisite /Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to: 1. Equip students with the ability of using data analytics and machine learning in building engineering and management. 2. Enable the students appreciate the mathematical basis and the applications of the main models and methods used in the analysis of problems in the built environment. 3. Provide students an understanding of data-driven or AI-supportive building development and optimized operation of efficient building systems as a part of the integrated system of building fabric, building space, occupants, building services and controls. 4. Introduce applications of various digital construction technologies that can benefit from AI and DA, including robotic technologies, Modular Integrated Construction (MIC), and Building Information Modelling (BIM) in building design, construction, maintenances and operations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Apply data analytics and AI tools to building and construction data. b. Apply mathematical modelling tools to analyse problems in the built environment. c. Understand the data-driven decision making process for practical construction engineering and management issues. d. Evaluate appropriateness of digital technologies in building construction, maintenance and operations.

Subject Synopsis/ Indicative Syllabus	This multi-faceted subject encompasses technologies in building construction, maintenance and operations. Combined with tools from big data analytics, AI, robotics and BIM, the subject enables better strategic decisions for designers, building managers and property owners to consider the building in the context of smartness and future needs. 1. Introduction to AI and DA applications in construction • Importance of big data in construction • Theoretical background of AI and DA • Concept of data-driven decision making and problem solving • Advanced technologies for field data collection and analysis • Examples of AI and DA applications in construction • Required knowledge and skill sets 2. Machine learning theory and tools • Introduction to machine learning • Supervised and unsupervised learning • Mathematical models for machine learning e.g., regression, classification, clustering etc. • Machine learning tools e.g., MATLAB machine learning tool box, Weka 3. AI and DA applications with construction data • Data mining and data analytics for construction management • Sensor data analysis for construction safety and health o Motion data analysis for unsafe behaviour identification o Physiological data analysis for physical and mental fatigue assessment • Video analytics o Construction activity recognition based on computer vision o Construction worker behaviour analysis based on computer vision o Construction component defects identification based on computer vision • 3D point cloud analysis o Object localization, detection, and identification based on 3D point clouds 4. Applications of digital construction technologies • Robotic technologies for various construction operations (e.g., plastering, rebar installation, curtain wall installation, cleaning and air quality control etc.) • Sensing technologies • Modular Integrated Construction (MIC) • Building Information Modelling (BIM)

Teaching/Learning Methodology

The concept, theory and applications of AI and DA in construction will be delivered through lectures. Tutorials will provide hands-on exercises on AI and DA tools to learn how to apply these tools with given data. Through a group project, students will explore the use of AI and DA tools for practical problem solving in construction. Students will be also required to study online learning materials.

Online learning materials:

- MATLAB Onramp (about 2hrs): https://www.mathworks.com/learn/tutorials/matlab-onramp.html
- WEKA Tutorials: https://www.tutorialspoint.com/weka/index.htm

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Individual Assignments (Tutorials)	20	√	√	√	√		
2. Focus Study Report (Group project)	30	√	√	√	√		
3. Written Examination	50	√	√	√	√		
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Coursework and examination will each constitute 50% of the overall assessment for the subject. The coursework mark will be based on the individual assignments and one group project (i.e., a focus study on AI and DA applications in construction practice).

The examination will be based on a 2 hours examination gearing towards the materials covered in the lecture periods and background readings. Coursework by assignment and group projects will be set to assess the students' abilities and skills required in this subject.

Student Study Effort Required

Class contact:	
• Lecture	26 Hrs.
• Tutorial	13 Hrs.
•	
Other student study effort:	
• Self-study, assignments, e-learning	40 Hrs.
• Group projects	40 Hrs.
Total student study effort	119 Hrs.

Reading List and References	Recommended: • Rafael Sacks, Chuck Eastman, Ghang Lee, Paul Teicholz (2018) BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers, 3rd Edition. Wiley. • Zacharias Voulgaris and Yunus Emrah Bulut (2018) AI for Data Science: Artificial Intelligence Frameworks and Functionality for Deep Learning, Optimization, and Beyond First Edition, Technics Publications • Bock, T., & Linner, T. (2016). Construction Robots Elementary Technologies and Single-Task Construction Robots. In Construction Robots: Elementary Technologies and Single-Task Construction Robots (p. I). Cambridge: Cambridge University Press. • Wang, D., Dai, F., & Ning, X. (2015). Risk Assessment of Work-Related Musculoskeletal Disorders in Construction: State-of-the-Art Review. *Journal of Construction Engineering and Management*, *141*(6), 04015008. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000979 • Hou, L., Wu, S., Zhang, G. (Kevin), Tan, Y., & Wang, X. (2020). Literature Review of Digital Twins Applications in Construction Workforce Safety. *Applied Sciences*, *11*(1), 339. https://doi.org/10.3390/app11010339 • Guo, B. H. W., Zou, Y., Fang, Y., Goh, Y. M., & Zou, P. X. W. (2021). Computer vision technologies for safety science and management in construction: A critical review and future research directions. *Safety Science*, *135*, 105130. https://doi.org/10.1016/j.ssci.2020.105130 • Wang, Q., & Kim, M.-K. (2019). Applications of 3D point cloud data in the construction industry: A fifteen-year review from 2004 to 2018. *Advanced Engineering Informatics*, *39*, 306–319. https://doi.org/10.1016/j.aei.2019.02.007 • Fan, H. and Li, H. (2012). "Retrieving similar cases for alternative dispute resolution in construction accidents using text mining techniques ". Automation in Construction, Elsevier, Vol. 34, pp.85-91 (2013). • Fan, H., Xue, F. and Li H. (2015). Project-based As-needed Information Retrieval from Unstructured AEC Documents, ASCE Journal of management in Engineering, January 2015, Vol. 31, No. 1. • Shen, L., Yan, H., Fan, H., Wu, Y., & Zhang, Y. (2017). An integrated system of text mining technique and case-based reasoning (TM-CBR) for supporting green building design. Building and Environment, 124, 388-401. • Yan, H., Yang, N., Peng, Y., & Ren, Y. (2020). Data mining in the construction industry: Present status, opportunities, and future trends. Automation in Construction, 119, 103331. • https://www.coursera.org/learn/machine-learning/home/welcome • https://www.mathworks.com/solutions.html?s_tid=gn_sol

Subject Description Form

Subject Code	BRE369
Subject Title	Integrated Professional Workshop II
Credit Value	3
Level	3
Pre-requisite	BRE269
Objectives	This subject is intended to: 1. Encourage the critical investigation, analysis and synthesis in solving problems in a multi-disciplinary surveying professional context. 2. Provide a platform for the students in different surveying disciplines to comprehend the essential knowledge of their partnering surveying disciplines. 3. Promote the students' understanding of the interdisciplinary nature of the surveying professions and enhance knowledge integration across different surveying disciplines. 4. Cultivate social responsibility, professional ethics and the awareness of trends and opportunities in the surveying professions. 5. Facilitate the students to develop lifelong learning skills for professional and personal development.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand how to integrate subject content and apply it to practical scenarios. b. Be aware of the value of teamwork as an approach to tackle a project and solve problems. c. Apply knowledge and skills of different surveying professions to solve problems in a multi-disciplinary professional context. d. Be aware of issues, policies and trends relating to the broader professional practice and the society. e. Identify needs for self-learning and use lifelong learning skills for learning autonomously.
Subject Synopsis/ Indicative Syllabus	BRE269, BRE369 and BRE469 are integrated with different levels of complexities. They are provided as a means to let the surveying students to learn and apply knowledge covering the five surveying disciplines (BS, GP, PDD, FPM and QS). Students will be equipped with the essential core knowledge of surveying disciplines, other than the one they shall choose to specialize in. The course will be delivered through a mix of seminars, project work and student-centered learning.

Multi-discipline Seminars

A series of seminars will be set to bridge across the professional knowledge of students in different surveying disciplines so as to give them an all-round training in the surveying profession. They will be given problem-based assignments and asked to attend seminars so as to equip themselves with the knowledge base and professional skills to identify and solve the problems. Qualified surveyors from various surveying practices will also be invited to deliver up-front professional knowledge to the students.

Multi-discipline Project work

A series of construction and property related project scenarios will be set to integrate the knowledge of different surveying disciplines. The project will be designed to link as many of the individual subjects as possible into a common theme. They will study and undertake project work as a surveyor trainee under supervision in different surveying disciplines. The projects will also provide a team work opportunity for the students to simulate the actual work environment in a multi-disciplinary professional or industrial setting. The projects will be delivered by a team of lecturers drawn from different surveying disciplines so as to ensure the students can have an all-round training in the surveying professions.

Student-centered learning

A set of assignments will be delivered to the students to undergo research on specific subject areas that enhance their learning abilities in different surveying disciplines. In addition to seminars, students are expected to undertake guided study through web-based self-learning. They will be required and encouraged to take extra efforts to study subjects beyond their chosen surveying disciplines to acquire the minimum core competence of the five surveying disciplines.

Teaching/Learning Methodology

This subject comprises two components: (a) BRE project component; and (b) Industrial Centre (IC) training.

The project component "P" adopts a holistic approach. Students will form interdisciplinary team to share, integrate and apply knowledge. The seminars and student centred learning component "S" is designed for students to acquire the core competence for surveying disciplines in addition to their own choice of discipline.

The core competence areas related to different surveying disciplines are listed in the first column. Students are grouped accordingly to their choice of progression pattern. The second column "QS" shows that a QS student will attend seminars to acquire the core competence of GP, PDD and PFM. Similar interpretations will apply in the cases of BS, GP and PDD students.

	Student Group Base on the choice of discipline			
QS				
Construction economics	P	P	P/S	P/S
Contract documentation, measurement & estimating	P	P	P/S	P/S
Construction contract law & administration	P	P	P/S	P/S
Construction technology & structure	P	P	P/S	P/S
Cost & value management	P	P/S	P/S	P/S
Dispute resolution	P	P/S	P/S	P/S
BS				
Maintenance technology & management	P	P	P	P
Building ordinance and related legal aspects	P	P	P	P
Construction technology & structure	P	P	P/S	P/S
Building economics and contract administration	P	P	P/S	P/S
Facility management	P/S	P	P/S	P/S
Design, adaptation and conversion	P/S	P	P/S	P/S
GP				
Property valuation	P/S	P/S	P	P
Property investment and finance	P/S	P/S	P	P/S
Property management and accountancy	P/S	P/S	P	P
Legal Studies: Sales and lettings of land and buildings	P/S	PS	P	P
Urban economics and real estate development	P/S	P/S	P	P/S
Business appraisal and asset management	P/S	P/S	P	P/S

Planning and development (PDD)					
Urban planning	P/S	P/S	P/S	P
Property investment and finance	P/S	P/S	P	P
Property development appraisal	P/S	P/S	P/S	P
Business appraisal and accountancy	P/S	P/S	P	P
Urban economics and real estate development	P/S	P/S	P	P
Transportation and environmental impact and assessment	P/S	P/S	P/S	P/S
Property and facility management (PFM)				
Property asset management	P/S	P/S	P	P
Corporate real estate	P/S	P/S	P	P
Project management	P	P	P	P
Property management	P/S	P	P	P

Note:
P: Professional Projects
S: Seminars / Student centre-learning activities

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Coursework	80%	√	√	√	√	√	
IC training (BIM training)	20%	√		√	√	√	
Total	100%						

Students must complete and pass all the assessment components of the subject in order to obtain an overall Grade of the subject.

Student Study Effort Required

Class contact:	
▪ Lectures / Seminars / Project Presentation	18 Hrs.
▪ Workshops / Laboratory (BIM Training)	21 Hrs.
Other student study effort:	
▪ Student effort hours	81 Hrs.
Total student study effort	120 Hrs.

Reading List and References

To be assigned by participating lecturers of various subjects under the BRE Scheme.

Subject Description Form

Subject Code	BRE370
Subject Title	Intermediate Construction Technology & Materials
Credit Value	3
Level	3
Pre-requisite	BRE261 or equivalent
Objectives	1. To identify and understand the range of building materials and advanced technologies that is available and appropriate for the construction of high-rise buildings. 2. To facilitate an understanding of the centrality of technological decision making in the context of the planning and execution of construction projects. 3. To provide the necessary skills facilitating evaluation of technical solutions and alternatives for construction operations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. possess knowledge of processes and methods for the planning and execution of construction projects. 2. possess knowledge of identifying appropriate construction materials for different applications. 3. apply the knowledge and methods for different types of construction. 4. solve identified technological problems in construction projects.
Subject Synopsis/ Indicative Syllabus	The overall process of a construction project. - Construction materials: non-ferrous metals, structural use of timber, glazing materials, behaviour of construction materials at fire - Sub-structure construction: deep foundations including pile foundations and caissons, basement's construction. - Super-structure construction: structural materials, reinforcement concrete structures, steel structures, introduction to composite building systems. - System formworks & falsework - Precast Concrete - Claddings and curtain walls - Environmental and safety issues in construction process. - Construction equipment economy - Machine productivity - Earthwork
Teaching/Learning Methodology	Interactive Lectures will enable students to: 1. understand the working processes of high-rise buildings from sub-structure to super-structure. 2. analyse and compare alternatives on structural design of buildings and construction processes. 3. apply the theories and concepts in compliance with environmental and safety constraints. Tutorials will enable students to consolidate the knowledge and application of technological knowhow throughout the building production process via problem-solving assignments, case study and discussions.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4		
1. Coursework	20%	✓	✓	✓	✓		
2. Mid-term Test	20%		✓	✓	✓		
3. Examination	60 %	✓	✓	✓	✓		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students could demonstrate their understandings on the subject through the preparation of coursework and/or presentation. Problem-based learning and case study approaches will be used.

Mid-Term Test with multiple choice and short questions is for assessing students' general understandings of the subject content.

Students' overall understanding of the subject will be assessed in the examination on both the theoretical knowledge and practical application.

Students must pass both the continuous assessment elements (Coursework and Mid-term) and the end-of-term examination in order to pass the subject.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Self-development	60 Hrs.
▪ Coursework preparation	21 Hrs.
Total student study effort	120 Hrs.

Reading List and References

Recommended :

Chew, Y.L.M. (2012) *Construction Technology for Tall Buildings*. 4th edition Singapore: Singapore University Press.

Chudley, R. (2006) *Advanced Construction Technology* (Rev. ed.) 4th edition, Longman.

Foster J.S. & Greeno R., (2007) *Structure & Fabric – Part II*, 7th edition, Mitchell, Pearson Prentice Hall.

	Supplementary: Allen E. (2009) *Fundamentals of Building Construction: Materials and Methods*. 5th Edition, John Wiley & Sons, New York. Blanc, A. (1994) *Internal Components*, Mitchell, Longman. BRE (British Research and Establishment) Digests. Brookes A.J. & Meijs M. (2008), *Cladding of Buildings*, 4th Edition, Taylor & Francis. Council on Tall Buildings and Urban Habitat (1995), *Architecture of Tall Buildings*, America: McGraw Hill. Chudley, R. (2012) *Advanced Construction Technology*. *Harlow, Pearson* Illingworth, J.R. (2000) *Construction Methods and Planning*. 2nd Edition. London: E&FN Spon. Mamlouk, M.S. (2011) *Materials for civil and construction engineers.* 3rd Edition. Prentice Hall McEvoy, M. (1994) *External Components*. Mitchell, Longman. Nunnally, S.W. (2011) *Construction Methods and Management*. 8th Edition. Prentice Watts A., (2007), *Facades – Technical Review*, RIBA Publishing Wong, W.M.R. (1998) *15 Most Outstanding Projects in Hong Kong*. Hong Kong: China Trend Building Press Ltd. Ascher K. (2011), *The Heights – Anatomy of a Skyscraper*, Penguin.

Subject Description Form

Subject Code	BRE371
Subject Title	Introduction to Property Management
Credit Value	3
Level	3
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	*This subject is intended to:* 1. Introduce to the students the principles and practice of property management. 2. Focus on the application of the principles to the property management services. 3. Give the students a basic knowledge for managing buildings in the private and public sectors. 4. Help them to develop management skills in practice.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Review the fundamentals of property management. b. Identify the business and work environment in property management services in Hong Kong. c. Apply the principles and practice necessary for efficient planning and administration of property management. d. Synthesize their knowledge to solve problems in property management.
Subject Synopsis/ Indicative Syllabus	*Managing Marketing of Property Management Services* An introduction to the nature of property management and the market for property management services. An analysis of existing services; types of buildings and estates; internal organization of property management business; marketing of property management services. *Managing Common Areas of Owner's Property* Pre-management planning before take-over of premises: Organizational principles and establishment of a new management office; testing of building services; identifying defects of premises. Provision of services after take-over of premises: Staff management; financial management; security services; fire services installations; water and electricity supply; cleansing services; air-conditioning and so on. Environmental and conservation issues in property management: energy saving; control of illegal structures and estate modernization. *Managing Leased Property* Leasing and tenancy arrangements: Contractual and statutory lease conditions; tenancy renewals; tenant mix rent reviews; Landlord and Tenant (Consolidation) Ordinance. *Managing Owner and Tenant Relations*

	Formation of Owners' Incorporation: Deed of Mutual Covenant; Building Management Ordinance; consultation channels with landlords and tenants. *Managing Risk and Liability* Statutory and professional liability in property management: Insurance; negligence; nuisance; employer's liability and contractor's liability.
Teaching/Learning Methodology	The principles of property management will be introduced in lectures. Application of the principles to solve property management problems will be taught in case studies, role play and management games. Discussion will be facilitated in tutorial by small group studies, which provide opportunities for students to deliver their discussion results and thinking. Lectures, seminars, laboratory as well as tutorials will form a basic skeleton for learning the subject.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Coursework	30 %	√	√	√	√		
3. Examination	70 %	√	√	√	√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students will be assessed through both coursework and examination.

Coursework will consist of 1 term paper and problem solving assignments.

Both examination and coursework assess learning outcome a to d.

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Seminar/Tutorial	13 Hrs.
	Other student study effort:	
	▪ Self-study	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Recommended:** Dunlap N. (2018) Principle of Real Estate Management, Institute of Real Estate Management, Chicago, IL, Seventeenth edition. Kyle, R. C. (1995) *Property Management. Chicago*: Real Estate Education Co.	

	Loo, F.K. (1992) *A Guide to Effective Management in Hong Kong*. The Hong Kong University Press. **Essential**: "Chapter 626 of the Laws of Hong Kong". Hong Kong e-Legilsation. Retrieved 15 April 2020. "Deed of Mutual Covenant and Owners' Corporation". The Community Legal Information Centre operated by the Law & Technology Centre of the University of Hong Kong. Retrieved 15 April 2020. "Licensing Regime Consultation". Property Management Services Authority. Retrieved 15 April 2020. **Supplementary:** Bachner, P.J. (1991) *The Guide to Practical Property Management*. Mc Graw-Hill, Inc. Cushman, RF. & Rodin, N.I. (1985) *Property Management Handbook: A Practical Guide to Real Estate Management*. U.S.A.: John Wiley & Sons Inc. Edmington, G. (1997) *Property Management: A Customer Focussed Approach*. England: Macmillan. Downs, A. (1991*) Principles of Real Estate Management*, Institute of Real Estate Management. Scarett, D. (1983) *Property Management.* London: E. & F.N. Spon Ltd.

Subject Description Form

<table>
<tr><td>Subject Code</td><td>BRE397</td></tr>
<tr><td>Subject Title</td><td>Property Management Accounting</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>3</td></tr>
<tr><td>Pre-requisite / Co-requisite/ Exclusion</td><td>Nil</td></tr>
<tr><td>Objectives</td><td>1. To introduce to students the basic principles of accounting that are relevant to the property managers

2. To focus on the various applications of the accounting principles that related to the real estate industry</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:
a. Evaluate the concepts, tools and techniques of property management accounting.

b. Apply fundamental accounting concepts and principles in solving property management problems.

c. Formulate and evaluate the financial planning and control system in a property management company.</td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>Introduction to accounting and finance, measuring and reporting financial position and performance, measuring and reporting cash flows, analyzing and interpreting financial statements, budgeting and managing working capital.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The principles of financial accounting and management accounting will be introduced in lectures. Application of the principles to solve problems in relate to the real estate industry will be learnt through case studies, problem-solving exercises, presentation etc. Discussion will be facilitated in small tutorial groups.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. Coursework</td><td>50 %</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Examinations</td><td>50 %</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the</td></tr>
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<table>
<tr><td></td><td colspan="2">intended learning outcomes:
Students will be assessed through both coursework and examination.

Both examination and coursework assess learning outcome a to c.</td></tr>
<tr><td rowspan="7">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorials</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-studies</td><td>90 Hrs.</td></tr>
<tr><td>▪</td><td>Hrs.</td></tr>
<tr><td>Total student study effort</td><td>129 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Recommended:

Chan, F.K.C. and Cheng, C.K.C. (2013) AAT Paper 1, Accounting and Computerized Accounts, Pearson.

Atrill, Peter (2015) Accounting and Finance for Non-specialists, 9th edition, Pearson Education Limited

Brealey, Myers and Allen (2017) Fundamentals of Corporate Finance, 12th edition, Irwin/McGraw Hill

Subramanyam, K.R. (2014) Financial Statement Analysis, 11 edition, McGraw-Hill

Wood F (2008) Vol. 1 & 2 Frank Wood's business accounting London: Pitman 2003 2nd rev.Edition</td></tr>
</table>

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC3421
Subject Title	English for Construction and Environmental Professionals
Credit Value	3
Level	3
Pre-requisite	LCR English subjects
Objectives	This subject aims to enhance students' English language and communication skills within the context of construction and environmental fields. Students will learn strategies to express themselves clearly, appropriately and persuasively in both spoken and written forms, demonstrating their competence as entry-level professionals. Topics covered include language skills for workplace presentations, job application and interview techniques in the digital age, discipline-specific report writing, and professional reflection.
Intended Learning Outcomes *(Note 1)*	Upon completing the course, students will be able to: a. communicate ideas clearly and concisely in various written and spoken formats b. employ persuasive language and strategies, including multi-modal means, to influence audiences to adopt a viewpoint c. demonstrate critical analysis on the problem explored or ideas presented in both written and spoken outputs, and d. apply language and communication strategies appropriate to the target audience, purpose and professional context To achieve the above outcomes, students are expected to use language and writing style appropriate to the context, and the broader professional environment, critically select information, and present and support their knowledge, stance and opinion in a persuasive way.

Subject Synopsis/ Indicative Syllabus *(Note 2)*	The syllabus is indicative. The balance of the components, and the corresponding weighting, will be based on the specific needs of the students. **1. Interview and Discussion in Technical Contexts** • analysing employers' needs and expectations • interacting with potential employers and professionals in face-to-face and virtual contexts • employing advanced language and communication strategies to convey meaning accurately, appropriately, and persuasively • using personal stories and achievements to impress audiences • establishing rapport and connection with the audience • analysing and discussing workplace issues with a range of participants such as co-workers, clients and staff of government departments • integrating evidence and discipline-specific knowledge in discussions convincingly **2. Workplace correspondence** • critically extracting and analysing relevant information from different sources for writing • adapting language, tone and style appropriate to the purpose, context and intended audience • using appropriate email etiquette and design for the intended audience • employing advanced language and communication strategies to convey meaning accurately, appropriately, and persuasively • writing with clarity • establishing rapport and connection with the audience **3. Professional report** • conducting a study to address an issue related to construction and /or environment • developing a clear problem statement, along with defined goals and objectives • fostering teamwork and collaborative experience • critically analysing the collected data to derive meaningful insights • examining the structure and language of technical reports • integrating evidence and discipline-specific knowledge effectively and convincingly • organising content logically and coherently • employing advanced language and communication strategies to convey meaning accurately, appropriately and persuasively • producing a professional, visually appealing, and reader-friendly multimodal document
Teaching/Learning Methodology *(Note 3)*	The study method is primarily seminar-based. Students will engage in project-based learning using scenarios relevant to professionals in the construction and environmental industry. Activities include discussions, text analysis, student-led investigations, process writing, mini-presentations, role plays and video presentations. Core materials developed by the ELC will be blended with online activities and additional resources. Students will also be referred to the services and initiatives of the ELC's Centre for Independent Language Learning. Students' personal integrity in the fast-changing technological landscape is also nurtured.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
Assessment 1 a. AI interview b. In-person job interview c. Professional discussion	50% 5% 25% 20%	✓	✓	✓	✓
Assessment 2 (out-of-class) Workplace correspondence	15%	✓	✓	✓	✓
Assessment 3 Two in-class progress reports Professional report	35% 3% each 29%	✓	✓	✓	✓
Total	100 %				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

1. Interview and discussion in technical context

The use of digital tools and social media for recruitment has become increasingly prevalent. This assignment simulates a real-life scenario that enables students to develop essential job application and interview skills for the digital age. These skills include researching current employment trends, adopting appropriate persuasive strategies to influence opinions, and delivering clear, appropriate messages in both virtual and face-to-face interviews, as well as in professional discussions.

2. Workplace correspondence

Email is the most common form of workplace communication in the digital age. This assignment enables students to develop essential email etiquette and writing skills. These skills include setting a clear purpose in writing that balances the interest of various stakeholders, providing relevant information to justify a proposition, employing language and strategies appropriate to intended readers, and presenting in a style, structure and design which best deliver the message.

3. Professional report

Writing professional reports is a common task for graduates in the construction field. This assignment provides students with practical experience in identifying construction-related problems, collecting relevant data, and composing technical reports. Students are required to analyse a problem and discuss

<table>
<tr><td></td><td colspan="2">collected data critically, and to develop a clear, concise, and well-structured report with feasible recommendations for the intended audience.
To monitor report progress and support students' learning, two consultations in the form of oral reports will be conducted. During these sections, students will present updates on their project progress and receive feedback on their work. Each consultation will be assessed and will contribute 3% to the overall grade.</td></tr>
<tr><td rowspan="5">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Seminars</td><td>39 hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Classwork-related, assessment-related, and self-access work</td><td>78 hrs.</td></tr>
<tr><td>Total student study effort</td><td>117 hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Required resources
Course materials prepared by the English Language Centre.
Recommended resources
You can update the links in the reading list - copy them from below:
Students are encouraged to use the range of services and initiatives provided by the ELC including our Speaking Assistance Programme, Writing Assistance Programme, workshops, and Open Online Courses

Beer, D. F. (2015). Writing and speaking in the technology professions: A practical guide (2nd ed.). Wiley. https://doi.org/10.1002/9781119134633

Hoevemever, V. A. & Falcone, Paul. (2017). High-Impact Interview Questions. AMACOM

Houp, K. W., Pearsall, T. E., Tebeaux, E. & Dragga, S. (2006). Reporting technical information (11th ed.). New York: Oxford University Press.

Kupchik, K. (2022). I hope this email finds you never: The official guide to blissfully surviving the modern workplace. Nashville, TN: HarperCollins Leadership.

Lindsell-Roberts, S. (2024). Business Writing with AI for Dummies (1st ed). John Wiley & Sons, Incorporated.

Markel, M. (2016). Practical Strategies for Technical communication (2nd ed.). Boston – New York: Beford/St. Martin's

McWhir, C., Scudamore, C., & Scudamore, P. (2018). The ultimate job hunting book: Write a killer CV, discover hidden jobs, succeed at interview (Second ed., Teach yourself books). London: Hodder & Stoughton
Northey, M. & Jewinski, J. (2009). Making sense: A student's guide to research and writing: Engineering and the technical sciences (3rd ed.). Don Mills, Ontario: Oxford University Press.

Serula, D. (2020). LinkedIn profile optimization for dummies (2nd ed., For dummies). Newark: Wiley.</td></tr>
</table>

Level 4 Subjects:

BRE415	Dispute Resolution
BRE418	Real Estate Development
BRE426	Geotechnical and Foundation Engineering
BRE427	Applied Property Investment
BRE4281	Construction Engineering Management
BRE4291	Real Estate Marketing
BRE431	Housing Studies
BRE435	Design, Adaptation and Conversion
BRE436	Applied Property Valuation
BRE437	Facility Management
BRE439	Engineering Contract Procedures
BRE4393	Temporary Work Design
BRE440	Cost and Value Management
BRE442	Forecasting and Competition in the Built Environment
BRE453	Building Services II
BRE461	Environment Impact and Assessment
BRE462	Advanced Construction Technology
BRE463	Business Valuation and Accounts
BRE464	Urban Planning (Workshops)
BRE465	Asset Management
BRE466	Capstone Project
BRE4661	Integrated Capstone Project
BRE469	Integrated Professional Workshop III
BRE471	Advanced Property Management
BRE472	Information Technology and Building Information Modelling for Construction Management

Subject Description Form

Subject Code	BRE415
Subject Title	Dispute Resolution
Credit Value	3
Level	4
Pre-requisite	BRE206
Objectives	Provide an understanding of the aspects of law and procedures relating to the resolution of dispute in the construction industry and develop students' ability to appropriately apply theoretical aspects of dispute resolution to practical solutions.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Explain the evolution of dispute resolution in an international context. b. Identify the relevant laws, regulations and procedures and apply them to the resolution of disputes in Hong Kong's construction industry. c. Analyse the process of arbitration, mediation, litigation and adjudication in construction context; d. Evaluate the implications involved, in terms of contractual and business relations, when making decisions about the choice of method to be used to settle construction related disputes. e. Propose solutions to complex construction dispute cases both orally and in writing. f. Communicate effectively
Subject Synopsis/ Indicative Syllabus	Litigation as a means of settling construction disputes. Origins of arbitration and of alternative dispute resolution (ADR) Different forms of ADR. Dispute resolution processes in Hong Kong standard construction contracts. Application of laws relating to litigation, arbitration and ADR. Law of civil evidence.
Teaching/Learning Methodology	The course is conducted by way of problem-based learning around theoretical knowledge transfer in lectures and students' performance individually or in groups in tutorial classes that forms the basis for dynamic learning. Before and during lectures and tutorials, students are given problem scenarios around which the lecturing materials are built. During the tutorials, the problems are discussed and feedback will then be given. The problem scenarios are designed with the purpose of achieving the intended learning outcomes. By preparing, attending and involving in the discussion,

presentation and debate during the lectures and tutorials, the outcomes are achieved.

The knowledge acquired by the students then forms the fundamental knowledge of the students about the subject. The assessment methods, which stated below, then give the students the opportunity to widen the scope of their knowledge over the subject and to apply the knowledge in real situation.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Oral presentation and written report relating to the practical, procedural or legal aspects of topics which have not been covered by first assignment. After the presentation, questions are put to the students by the lecturer/tutor to test the students' abilities in applying the knowledge they acquired.	50%	√	√	√	√	√	√
2. Oral presentation and written report relating to the theoretical aspects of the topics covered by the syllabus. After the presentation, questions are put to the students by the lecturer/tutor to test the students' abilities in applying the knowledge they acquired.	50%	√	√	√	√	√	√
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessments for this module will be by two Coursework Assignments. There will be no assessment by examination.

	The assessments are designed to contribute to learning, and to determine the extent to which a student has achieved the ILO and hence the programme outcome. For the first assignment, problem scenarios are designed by the lecturer. The students are required to form groups to complete the assignment by selecting one of the problem scenarios and to present their answers. In addition, each of the groups is required to submit a written report relating to the presentation. For the second assignment, each group is required to select any topic covering by the syllabus and the topic cannot be those already been dealt with in the first assignment by any of the problem scenarios. The students are then required to make a presentation relating to the topics they have selected and to submit a written report relating to the presentation. Both of the assignment are designed to test the students' abilities to: 1. organize themselves with minimal instructions 2. organize through negotiation with other members of the same group without direction from the tutors or lecturer 3. work in a team environment 4. coordinate or negotiate selection of topics with other groups 5. complete the task through the use of initiative and ingenuity, *i.e.*, creativity and cleverness 6. use effectively the resources available to the students in the library and on-line 7. test the students' knowledge and the ability to apply the concepts that they have learnt as well as the students reasoning ability and their abilities in making critical judgment. In that way, whether the students have acquired the abilities as statement in the ILO above can be assessed.	
Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Self studying. Preparation for discussion of the problems to which the lectures relate and doing the course works.	120 Hrs.
	Total student study effort	159 Hrs.
Reading List and References	**Reading List and References:** Fisher, R.; Patton, B. M.; & Ury, W. L. (1992) *Getting to Yes: Negotiating an Agreement without Giving In*, 2nd ed. London: Random House. Goldberg, S. B. (1999), *Dispute Resolution: Negotiation, Mediation and other Processes*. Aspen Law & Business Chee, Simon (2016), *Construction Dispute Prevention and Resolution in Hong Kong*, Sweet & Maxwell and Hong Kong Construction Arbitration Centre, Limited Chee, Simon (2013), *(Thesis) From right to Interest – Specialised Facilitative Mediation (Construction)*, City University of Hong Kong. Hills, M.J. (2001), *Building Contract Procedures in Hong Kong*. Longman Hong Kong Education	

	Hong Kong Arbitration Ordinance Cap. 609 *Hong Kong Mediation Ordinance Cap 620* *HKIA / HKIS / HKICM Standard Forms of Building Contracts* (2005, 2006 Editions) *General Conditions of Contract for Building Works, HKSAR Government* (1999 Edition) Judiciary. *Civil Justice Reform – Final Report, Chief Justice's Working Party on Civil Justice Reform*, HKSAR Government, 2004 Judiciary. Practice Direction 6.1 Construction and Arbitration List (Feb 2009) Kaplan, N. (1994), *Hong Kong & China Arbitration: Cases and Materials*, Butterworths Asia.Ma, Geoffrey, General Editor-in-Chief., (3rd Ed., 2014) *Arbitration in Hong Kong: A Practical Guide*, Hong Kong: Sweet & Maxwell. *Proposed Security of Payment Legislation for the Construction Industry - Consultation Document*, HKSAR Government Development Bureau, 1 June 2015 Morgan, R. (1997). *The Arbitration Ordinance of Hong Kong: A Commentary with 1997 Supplement*. Butterworths Asia. Riches, John & Dancaster, Christopher. *Construction Adjudication*, John Wiley & Son, Second Ed. 2008 Tapper, R. (1990). *Cross on Evidence*, Butterworths Uff, J. (1996), *Construction Law & Practice Relating to the Construction Industry*, Sweet & Maxwell. **Supplementary:** Chan, E. H. (1997). *Amicable Dispute Resolution in the PRC and its Implication for Foreign-related Construction Disputes*. Construction Economics and Management, Nov. 1997, Vol.15, No. 6, pp.539-548. Fenn, P.; O'Shea, M. & Davies, E. (eds.)(1998). *Dispute Resolution and Conflict Management in Construction: An International Review*. E. & FN Spon. Hills, M.J. (1992), *A Case for an Alternative Approach to the Resolution of Disputes Under JCT 80 Standard Form of Building Contract, MSc dissertation (Supervisor: Dr. R.F. Fellows)*, University of Bath Kaplan, N. (1983), *Hong Kong Arbitration Cases and Materials*, Butterworths Asia Langan, P. St. J. (1983), *Civil Procedures*, Sweet & Maxwell Merkin, R. (1996), *Arbitration Act 1996: An Annotated Guide*, Lloyds of London Press Relevant Ordinances and Regulations of the Hong Kong Government **Others:** 1. Those being stated in the syllabus of the course. 2. Other suggested reading: : the latest edition of the following books 2.1. Building Contract Procedures in Hong Kong 2.2. Hong Kong Civil Procedures, i.e. the White Book. 2.3. Hong Kong International Arbitration Centre Rules of Arbitration

	2.4. Hong Kong Construction Arbitration Centre Construction Arbitration Rules, Construction Mediation Rules and Construction Adjudication Rules 2015 2.5. Brookers' Arbitration Law and Practice 2.6. Arbitration in Hong Kong – A Practical Guide. 2.7. The related ordinances of the Hong Kong Special Administrative Region.

Subject Description Form

Subject Code	BRE 418
Subject Title	Real Estate Development
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to provide an integrated and consolidated intellectual framework for students to comprehend and analyze the current factors and key issues in affecting production and consumption of the built environment in society.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Describe and evaluate the existing research literature on land and property development. 2. Describe and evaluate the complex and dynamic process of real estate development, with special reference to the local context. 3. Distinguish and explain the significance of all the key social, political, economic, physical and regulatory factors affecting the performance of the property development industry. 4. Appraise the theoretical models and concepts in analyzing the current issues in property development. 5. Synthesize knowledge from various disciplines and apply them in solving practical problems in real estate development. 6. Communicate and present ideas in a clear and articulate manner using appropriate academic conventions
Subject Synopsis/ Indicative Syllabus	*Real Estate Development Model and Process:* Key steps of real estate development process; strengths and weaknesses of various development models; factors influencing real estate development; transformation of urban built environment. *Public Sector Regulations and Development Potential:* Concepts of project feasibility; approaches in development control analysis; political vs technical considerations in Government Regulations; land development potential assessment. *Current Issues in Real Estate Development:* Globalization of real estate; land system and institutions; property-led urban regeneration, state, market and community in real estate development.
Teaching/Learning Methodology	Lectures - The lectures provide an explanation and evaluation of the important theories, models and concepts in the course contents. Tutorial Sessions - Tutorials are organized for students to intensively evaluate the relevance of the research literature and/or work on particular problems in real estate development. Students are required to present and communicate their ideas and/or

	discuss their recommendations at the tutorials. Tutorials may be conducted on-line, if appropriate. Coursework may comprise short quizzes, tutorial assignments and projects. Final examination normally comprises essay type questions.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. Coursework	50%	√	√	√	√	√	√
2. Final Examination	50%	√	√	√	√	√	√
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment consists of both coursework and final examination. Coursework covers all the learning units in this subject. It assesses the students' abilities to identify the theoretical concepts and apply them to the analysis of practical cases. The Final Examination covers essay-type questions and allows students to further synthesize the knowledge and apply to practical scenarios and specific situations. Both examination and coursework assess learning outcomes 1-6.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Coursework assignments	52 Hrs.
▪ Independent Self-study	82 Hrs.
Total student study effort	173 Hrs.

Reading List and References

Adams, C.D., Russell, L. & Taylor-Russell, C.S. (1993). Development constraints, market processes and the supply of industrial land. *Journal of Property Research*, 1993(10), 49-61.Brown, P. H. (2015). *How Real Estate Developers Think: Design Profit and Community*. USA: University of Pennsylvania Press.

Brueggeman, W. B. (1995). The impending recovery in ten major office markets: A strategic assessment of suburban versus CBD conditions. *Real Estate Finance*, 12(1), p.32-39.

Charney, I. (2007). Intra-metropolitan preferences of property developers in greater Toronto's office market. *Geoforum*, 38(6), 1179-1189.

Coakley, J. (1994). The integration of property and financial markets, *Environment and Planning A*, 26, 697-713.

Daniels, P. W., & Bryson, J. R. (2002). Manufacturing services and servicing manufacturing: knowledge-based cities and changing forms of production. *Urban Studies*, 39(5-6), 977-991.

De Magalhaes, C. (1998). Economic instability, structural change, and the property markets: the late-1980s office boom in Sao Paulo. *Environment and Planning A*, 30(11), 2005-2024.

Gospodini, A. (2006). Portraying, classifying and understanding the emerging landscapes in the post-industrial city. *Cities*, 23(5), 311-330.

Henneberry, J. (1988). Conflict in the industrial property market. *Town Planning Review*, 59(3), 241-262.

Knox, P. L. (1991). The restless urban landscape: economic and sociological change and the transformation of Metropolitan Washington, D.C. *Annals of the Association of American Geographers*. 81(2), p.181-209.

Mueller, G. R. (1995). Understanding real estate's physical and financial market cycles. *Real Estate Finance*, 12(3), p.47-52.

Tang, B.S. and Yiu, C.Y. (2010) Space and scale: a study of development intensity and housing price in Hong Kong. *Landscape and Urban Planning*. 96 (3), 172-182.

Wong, S.W., Tang, B.S. and Liu, J.L. (2018).Village Redevelopment and Desegregation as a Strategy for Metropolitan Development in Southern China: Some Lessons from Guangzhou City. *International Journal of Urban and Regional Research*, 42(6), 1064-1079.

Wu, F. (1998). The new structure of building provision and the transformation of the urban landscape in metropolitan Guangzhou, PRC. *Urban Studies*, 35(2), p.259-283.

Subject Description Form

Subject Code	BRE426
Subject Title	Geotechnical and Foundation Engineering
Credit Value	3
Level	4
Pre-requisite	CSE20290 & BRE302
Objectives	a) Provide students with knowledge of the basic principles of geotechnical engineering and the relation and implications to foundation choices and designs and the ground works needed to be carried out.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Apply the understanding of soil properties, mechanics principles and theories to the behaviour of soils under different kinds of pressures and the effects of water. b) Relate the importance of safety and geotechnical considerations in designing/undertaking site formation and earth-retaining works. c) Describe the basics concepts of soil mechanics and its application to analyze soil retaining structures. d) Illustrate an understanding of modern soil improvement techniques and retaining slopes, soil and excavation techniques. e) Appraise foundation design concepts in the choice of appropriate foundation and design simple foundations.
Subject Synopsis/ Indicative Syllabus	*Soil Mechanics and Geology:* Shear strength of soil, lateral earth pressure. Site investigation for deep and complex foundation/basement design and construction, interpretation of borehole log (field and laboratory tests). *Site Formation:* Techniques of excavation and de-watering. *Stability of Slopes and Earth Retaining Structure:* Slope stability, drainage of slopes, ground anchor, slope protection methods. Active and passive lateral earth pressures, analysis and design of soil retaining structures in particular gravity retaining walls, cantilever and anchored sheet pile walls, diaphragm walls, braced or strutted excavation, failure of retaining structure. *Foundation Design and Geotechnical Problems:* Ground & soil stabilisation improvement: compaction and pre-compaction, grouting and chemical stabilization, vibratory methods, soil reinforcement and the use of geosynthetics for drainage. Stresses in subsoil, load bearing capacity and settlement of foundations, rate/magnitude of settlement; factors to be considered in foundation design; pile foundation method and construction process of percussion and bored piles, pile capacity and pile driving formula, plant and equipment for piling, pile testing and Code of Practice.

Teaching/Learning Methodology

Interactive Lectures will enable students to:
1. Appreciate basic concepts of soils mechanics.
2. Relate geotechnical considerations regarding construction works.
3. Apply the soil mechanics concept to analyse slope stability, retaining wall structure and design simple foundations.

Tutorial will enable students to:
1. Consolidate the geotechnical and foundation engineering concepts through problem-solving assignments and discussions.

Laboratory will enable students to:
1. Identify and appreciate the shear strength and permeability of soils.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
		a	b	c	d	e
1. Problem-solving assignment	12 %	√	√	√	√	√
2. Laboratory report	3 %	√				
3. Mid-term test	15 %	√	√			
4. Final examination	70 %	√	√	√	√	√
Total	100 %					

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The problem –solving assignments are used to assess students' ability to solve geotechnical and foundation engineering problems with good numerical accuracy based on the theories and concepts studied in the lectures.

The laboratory report is used to assess students' ability to observe and verify the shear strength and the permeability of soils and to present the experimental results in a logical and clear format.

The mid-term test and the final examination are used to assess students' i) understanding of the geotechnical and foundation engineering theories and concepts learned in the lectures and ii) ability to solve geotechnical and foundation engineering problems with good numerical accuracy.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial and Laboratory	13 Hrs.
Other student study effort:	
▪ Assignment, lab report	96 Hrs.
▪	Hrs.
Total student study effort	135 Hrs.

Reading List and References	**Recommended Text** Das, B M "Introduction to Geotechnical Engineering". ISE. 2nd edition, 2008, Thomson. **References** Bowles J E "Foundation analysis and design" McGraw Hill. "Code of Practice for Foundations" (2017), Buildings Department, HKSAR Government. Tomlinson M.J. "Foundation design and construction", 2001 Prentice Hall. Tomlinson M.J. "Pile design and construction practice", 1994 E & FN Spon. *****Liu C and Evett J B "Soils and Foundations", 2014 Boston : Pearson. *****Coduto, D. P., Yeung, M.-C., & Kitch, W. A. (2011). *Geotechnical engineering: Principles and practices*. Upper Sadddle River: Pearson. Geotechnical Engineering Office Geoguides 1, 2 and 3; CED Hong Kong Government, Government Publication Centre. Pile design and construction, GEO Publication No. 1/96 CED Hong Kong Government. ** Good reference books*

Subject Description Form

Subject Code	BRE427
Subject Title	Applied Property Investment
Credit Value	3
Level	4
Pre-requisite	BRE315
Objectives	This subject is intended to:- a. Give to the students an appreciation of the scope of real property investment. b. Enable them to apply the techniques available to select suitable investment vehicles for different types of investor under different market conditions. c. Enable the students to apply the techniques in business valuation to solve practical problems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to:- 1. Identify and analyse of the investment environment for real estate in Hong Kong, PRC and Overseas. 2. Recognise the scope of real estate investment in Hong Kong. 3. Use their knowledge to solve practical problems in real estate investment business and business valuation.
Subject Synopsis/ Indicative Syllabus	Rationale of property investment: major investors in real property in the public and private sectors; principal types of real property investment and their characteristics; causes for historical property market cycles, present market trends and projections; direct and indirect investment; securitization such as REIT (real estate investment trust) in the property market; property investment in the People's Republic of China and overseas. The investment decision: sources and manipulation of information; analysis of direct real property investments; comparative investment analysis; returns on investment; risk and uncertainty. Investment psychology. Analysis of indirect property investment (business valuation): Open market and notional market; Approaches to value determination: Going Concern approach and Liquation Value approach; Valuation techniques: asset-based techniques, Income approach and market approach; Market capitalization and discount rates; Goodwill valuation.
Teaching/Learning Methodology	Emphasis is made on the application of the investment principles and techniques developed over the past two years to solve actual problems in property investment. Students' awareness on the investment market, particularly the real estate investment market, will be enhanced. It will be learnt through case studies, problem-solving exercises, presentation etc. Discussion will be facilitated in small tutorial groups. Lectures, seminars, projects and tutorials will form the basic skeleton for learning the subject.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	30%	√	√	√			
2. Examination	70%	√	√	√			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and coursework will constitute 70% and 30% of the overall mark for the subject respectively. The coursework mark will be based on the assignments and presentations. Both examination and coursework assess learning outcomes 1 to 3.

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
Other student study effort:	
▪ Seminar/ Tutorial	13 Hrs.
Total student study effort	39 Hrs.

Reading List and References

Recommended:

Andrew Baum (1995), Property Investment Appraisal, 2nd edition.

Brown R. Gerald (2000), Real Estate Investment: a capital market approach.

Reilly F. and Brown K. (2000), Investment Analysis and Portfolio Management, 6th edition.

Hersh Sefrin (2000), Beyond Greed and Fear: understanding behavioural finance and the psychology of investing.

Nofsinger John R. (2002), The Psychology of Investing 1st edition.

Stowe, Robinson, Pinto and McLeavey (2002), Analysis of Equity Investments: Valuation AIMR.

Krishna G. Palepu, Paul M. Healy, and Victor L. Bernard (2000) Business Analysis and Valuation using Financial Statements, 2nd edition, South-Western College Publishing.

James R. English (2001), Applied Equity Analysis: Stock Valuation Techniques for Wall Street Professionals, McGraw-Hill, New York.

Supplementary:

	Graham and Dodd (1962), Security Analysis: principles and technique, 4th edition. Graham (1973), The Intelligent Investor: a book of practical counsel. Michael E. Porter (1998), Competitive Strategy: The Core Concepts, Free Press, New York. Howard Schilit (2002), Financial Shenanigans, 2nd edition, McGraw-Hill, New York. Robert J. Shiller (2000), Irrational Exuberance, Broadway Books, New York.

Subject Description Form

Subject Code	BRE4281
Subject Title	Construction Engineering Management
Credit Value	3
Level	4
Pre-requisite	BRE350
Objectives	This subject is intended to develop the students' ability to apply decision making theories and operational research techniques in the management of construction projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. identify and diagnose management problems accurately and effectively across a wide range of construction engineering activities, including management practices, human resources and plant management, operations, and strategic management. b. formulate construction engineering management problems into analytical models. c. find out and plan sound solutions from various analytical models by using quantitative (operational research) techniques.
Subject Synopsis/ Indicative Syllabus	Construction productivity measurement and analysis Decision theory and applications Inventory control theory and applications Monte Carlo simulation and applications Fast track construction systems Risk management for construction projects Value management for construction projects Linear programming techniques and applications Green labelling schemes for buildings and construction International construction management practices
Teaching/Learning Methodology	Student learning will be facilitated through a combination of self-study and class contact sessions. The self-study will include guided reading, library searching skills, problem solving, reflection and textual & graphical communication as individuals and as part of a group. Some assignments will involve the training and development of problem analysis and presentation of results. Class contact will include lectures for providing an overall framework to topic areas and for those areas where textbooks do not provide adequate coverage. Small group sessions will be used for a combination of student-led seminars, role plays and workshop exercises for skills development and the raising of ethical awareness.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Continuous assessment	50%	√	√	√			
2. Examination (2 hours)	50%	√	√	√			
Total	100 %						

The subject will be assessed on both a continuous basis and a close-book written examination. Coursework (50%) and examination (50%) will constitute equal parts of the overall marks of the subject (100%). The coursework mark will be based on a portfolio comprising role play, seminar discussion, group verbal presentation, group written report and individual tutorial participation. Marks will be allocated on group and individual basis. To complete the whole subject successfully, students have to achieve a pass in both the coursework component and the examination component.

The individual in-class problem-based assignments and group assignment presentations attempt to test the level of students' knowledge and application of various decision making theories and operational research techniques to construction projects, and then to determine the best option or the most optimal solution for implementation with strong justifications or sound recommendations.

Typical coursework assessment criteria include:

- logical structure;
- clarity and depth of thought;
- quality of written presentation;
- knowledge and information;
- problem analysis skills;
- oral and visual presentation skills;
- participation and leadership.

The examination questions attempt to test students' knowledge and understanding of various decision making theories and operational research techniques to construction projects, and then to suggest the most desirable strategies with justified arguments.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials / Seminars	13 Hrs.
Other student study effort:	
▪ Self learning and recommended reading	80 Hrs.
Total student study effort	119 Hrs.

Reading List and References

Recommended:

Chan, D.W.M. and Chan, A.P.C. (2002) "Public Housing Construction in Hong Kong:

A Review of its Design and Construction Innovations". *Architectural Science Review*, 45(4), December, 349-359.

Chan, D.W.M., Chan, A.P.C., Lam, P.T.I., Yeung, J.F.Y. and Chan, J.H.L. (2011) "Risk Ranking and Analysis in Target Cost Contracts: Empirical Evidence from the Construction Industry". *International Journal of Project Management*, 29(6), August, 751-763.

Chan, D.W.M., Chan, A.P.C., Lam, P.T.I. and Lau, E.W.K. (2015) "Predicting Construction Durations and Enhancing Construction Productivity: A Taxonomic Review". *Innovation in Construction – Creating Impacts through Innovation*, Research Journal of Construction Industry Council, Hong Kong, Issue 2, November, 31-44, ISSN 2312-8291 (URL: http://www.cic.hk/cic_data/files/inno_construction_issue2_nov_2015/mobile/index.html#p=1)

Chan D.W.M. and Kumaraswamy M.M. (1995) "A Study of the Factors Affecting Construction Durations in Hong Kong". *Construction Management and Economics*, 13(4), July, 319-333.

Chan D.W.M. and Kumaraswamy M.M. (1995) "Effects of Technology and Site Productivity on Construction Times of Building Projects in Hong Kong". *Proceedings of the 16th Annual ASEM Conference*, American Society for Engineering Management, 21-23 September 1995, Washington DC, USA, 309-316.

Chan, D.W.M. and Kumaraswamy, M.M. (2002) "Compressing Construction Durations: Lessons Learned from Hong Kong Building Projects". *International Journal of Project Management*, 20(1), 23-35.

Dai J.K., Goodrum P.M. and Maloney W.F. (2007) "Analysis of Craft Workers' and Foremen's Perceptions of the Factors Affecting Construction Labour Productivity". *Construction Management and Economics*, 25(11), November, 1137-1150.

Harris F., McCaffer, R. and Edum-Fotwe, F. (2013) *Modern Construction Managemen*t, 7th Edition, Wiley-Blackwell, West Sussex.

Kumaraswamy M.M. and Chan D.W.M. (1995) "Determinants of Construction Duration". *Construction Management and Economics*, 13(3), May, 209-217.

Olomolaiye P.O., Jayawardane A.K.W. and Harris F.C. (1998) *Construction Productivity Management*, Longman, Essex, England: Chartered Institute of Building.

Render, B. and Stair, R.M. Jr (2006) *Quantitative Analysis for Management*. 12th Edition, Pearson Education, India.

Shen G.Q.P. and Yu A.T.W. (2016) Value Management in Construction and Real Estate: Methodology and Applications. New York: Routledge.

Shen L.Y., Lu W.S., Li H. and Shen Q.P. (2003) "Computer-aided decision support system for assessing contractor's competitiveness", *Automation in Construction*, 12(5), 577-587.

Shen L.Y., Li Q.M. and Li H. (2002) 'Alternative concession model for BOT-contract project', *Journal of Construction Engineering and Management, ASCE*, 128(4), 326-331.

Shen L.Y, Wu M. and Wang J.Y. (2002) 'A model for assessing the feasibility of construction project in contributing to the attainment of sustainable development', *Journal of Construction Research*, 3(2), 255-271.

	Shen L.Y., Wu W.C. and Ng S.K. (2001) 'Risk Analysis for Construction Joint Ventures in China' *Journal of Construction Engineering and Management,* ASCE, 127(1), 76-82. Shen L.Y., Drew D. and Zhang Z.H. (1999) 'An Optimal Bidding Model for Price-Time Bi-parameter Construction Contracts' *Journal of Construction Engineering and Management,* ASCE, 125(3), 204-209. Fisher N. and Shen L.Y. (1992) *Information Management within a Contractor - a Model for the Flow of Data* Thomas Telford Publications, U.K., ISBN 0-7277-1666-2 (This book is based on the research studies 'information management system for construction companies'), pp. 260. Shen L.Y. (1999) 'Risk Management', *Building in Value: Pre-design Issues,* (Ed., Best & De Valence) Arnold Publishers, ISBN: 0340741600, 248-267. Tang S.L., Ahmad I.U., Ahmed S.M. and Lu M. (2004) *Quantitative Techniques for Decision Making in Construction*, Hong Kong University Press: Hong Kong. Xu Yelin, Yeung J.F.Y., Chan A.P.C., Chan D.W.M., Wang Shouqing and Ke Yongjian (2010) 'Developing a Risk Assessment Model for PPP Projects in China - A Fuzzy Synthetic Evaluation Approach' *Automation in Construction*, 19(7), 929-943. **Journals:** *Hong Kong Engineer: The Journal of The Hong Kong Institution of Engineers,* Printers' Circle Ltd *Construction Management and Economics,* Routledge, Taylor & Francis *Engineering, Construction and Architectural Management,* Emerald *Facilities,* Emerald *Journal of Construction Engineering and Management,* ASCE *Journal of Facilities Management*, Emerald *Journal of Management in Engineering*, ASCE *International Journal of Construction Management,* Routledge, Taylor & Francis *International Journal of Project Management*, Elsevier *Building and Environment,* Elsevier *Building Research and Information,* Routledge, Taylor & Francis *Built Environment Project and Asset Management*, Emerald *Automation in Construction*, Elsevier

Subject Description Form

Subject Code	BRE4291
Subject Title	Real Estate Marketing
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to equip with students: a) Ability to examine and apply marketing theories in the real estate industry, and b) Capability to comprehend practices and regulations in relation to real estate marketing.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Apply marketing theory in the real estate industry; b) Understand key literature pertaining to the field of study; c) Evaluate the practices and marketing strategies in both primary and secondary markets; d) Comprehend the impacts to the industry by the introduction of regulatory controls.
Subject Synopsis/ Indicative Syllabus	1. Introduction and simple marketing concepts 2. Marketing theory and applications in the real estate market a) Target Marketing and Market Segmentation b) Product Strategies c) Pricing Strategies d) Placing Strategies e) Promotion Strategies 3. Salient elements of the regulatory controls a) Estate Agents Ordinance b) Estate Agents Authority c) Licensing d) Practice regulations e) Code of conducts 4. Other topics include applications of game theory in real estate marketing, estate agency industry in China etc.
Teaching/Learning Methodology	This subject adopts Criterion-Referenced Assessment (CRA). Format of assessment: ◦ Coursework (50%) • In-class assessment - comprehension of key literature • Identifications of Salient Product features • Preparation of Marketing Plan ◦ Examination (50%) • 2-hr exam essay type questions

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1.In-class assessment	10 %		√				
2. Product features	10 %			√			
3. Marketing Plan	30 %	√		√	√		
4. Examination	50 %	√	√	√	√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The students will assure the instructors of their timely comprehensions of the key literature through the weekly in-class assessments. The design of the coursework will emphasize on testing the students' understandings on the applications of marketing theory and regulatory controls in the industry. Rooms are also allowed for the students to demonstrate their critical thinking ability and creativity in the coursework. All the intended learning outcomes will be evaluated in the final examination.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Reading	39 Hrs.
▪ Coursework	36 Hrs.
Total student study effort	114 Hrs.

Reading List and References

Armstrong, G and P. Kolter. 2008. *Marketing: An introduction* (9th ed.) Prentice Hall.

Choy, H.T. 1998. Real Estate Marketing. In Real Estate Development ed. Poon and Chan, PACE

Estate Agency Ordinance Cap.511, Laws of Hong Kong.

Bajtelsmit, Vickie and Elaine Worzala. 1997. Adversarial brokerage in residential real estate transactions: The impact of separate buyer representation. Journal of Real Estate Research. 14(1/2):65-75.

Worzala E. et. al. 2002. E-commerce and retail property in the UK and USA. *Journal of property investment and finance*. 20(2):142-58.

	Raftery, J. and G. Runeson. 1997. Money illusion in consumer perception of housing transactions. Journal of Property Valuation & Investion. 16(2): 175-84. Tang, B.S., S.W. Wong and S.C. Liu. 2006. Property agents, housing markets and housing services in transitional urban China. Housing Studies. 21(6):801-25. Estate Agents Authority website (standard forms, code of ethics and practice circulars etc.) Choy, Lennon and Edwin Chan. 2002. Extending Estate Agents Ordinance to non-domestic properties. Working paper series. Department of Building and Real Estate, The Hong Kong Polytechnic University.

Subject Description Form

Subject Code	BRE431
Subject Title	Housing Studies
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	*This subject is intended to:* 1. Understand housing theories and their applications; examine housing policies, programmes, instruments and organizational arrangements in Hong Kong, the China Mainland and other countries. 2. Consider the implications of housing development in the social-economic context.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Apply housing theories and models. b. Analyse housing policies, programmes, instruments and organisational arrangements in countries at different levels of economic development. c. Draw out the implications of housing development in Hong Kong and in major cities in the China Mainland.
Subject Synopsis/ Indicative Syllabus	*Housing Theories & Policies* Economic models and techniques underlying housing market analysis and their limitations. The broad scale and contents of housing policies in different countries and regions, and the economic rationales for public sector intervention, social and political aspects of housing policies. *Housing Organisation* The roles and function of housing suppliers and facilitators, including government, housing authorities, housing associations and other related bodies. *Housing Programmes and Instruments* Effective use of various housing programmes including rental housing and housing for sale, and also to understand the housing instruments such as rent rebate and rent certificates. *Housing Development* Development of housing in Hong Kong and the China Mainland.

Teaching/Learning Methodology

Lectures will be used to introduce theories and models, and seminars will be used for the discussion and understanding of influence of housing policies on socio-economic development. Case studies and comparisons will be used.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	50 %	√	√	√			
2. Examination	50 %	√	√	√			
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The coursework and examination assess learning outcomes (a) (b) and (c).

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Seminar/Tutorial	13 Hrs.
Other student study effort:	
▪ Independent study	120 Hrs.
Total student study effort	159 Hrs.

Reading List and References

Recommended:

Balchin, (1995), *Housing Policy*, London: Routledge.

Castells, Kwok and Goh (1990) *The Shek Kip Mei Syndrome: Economic Development and Public Housing in Hong Kong and Singapore*, London: Pion Limited

Hong Kong Housing Authority (1996), *Housing for Millions: The Challenge Ahead*, Housing Conference Report 20-23 May 1996.

Wong, R.Y.C, (1998), *On Privatizing Public Housing*, Hong Kong: City University of Hong Kong Press.

Supplementary:

DiPasquale, and Somerville, C.T. (1995) "Do House Price Indexes Based on Transacting Units Represent the Entire Stock? Evidence from the American Housing Survey." *Journal of Housing Economics* 4, 3.

Hong Kong Housing Authority, (1996-1999) *Hong Kong Housing Authority Annual Reports*, various issues.

	Hui C.M., Wong K.W., Yeung C.W., Howes R., Kong S.P., (1999) *A Study of Welfare Housing Development in Southern China – Guangzhou and Shenzhen*, Research Monograph, *The Hong Kong Polytechnic University.* Hui, C,M., Chan, P.C., Wong, K.W., Wong, K.C, & Leung, Y.P. (2000), *The Supply of Land for Housing in Hong Kong*, Research Monograph, The Hong Kong Polytechnic University. Institute of Housing (1991), *Housing Finance*, The Institute of Housing (Services) Ltd. Miles, David (1994), *Housing Financial Markets and the Wider Economy*, New York: Wiley. Wong, K.W., Yeung, C.W. and Howes, R. (1995), *A Comparative Study of Affordable Housing Development in the United Kingdom, Hong Kong and the People's Republic of China*, Research Monograph, The Hong Kong Polytechnic University. Wong K.W., Yeung C.W., Hui C.M., Howes R., and Kong S.P., (1998) *A Study of Welfare Housing Development in Major Cities in China*, Research Monograph, The Hong Kong Polytechnic University. Wong K.W., Hui C,M., Li S.R., Howes R., and Wu M., (2001) *A Study of Manufactured Affordable Housing in Chongqing*, Research Monograph. The Hong Kong Polytechnic University. Yeung, Y.M. and Wong, T.K.Y. (ed) (2004) *Fifty Years of Public Housing in Hong Kong - A Golden Jubilee Review and Appraisal,* The Chinese University Press.

Subject Description Form

Subject Code	BRE435
Subject Title	Design, Adaptation and Conversion
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	BRE370
Objectives	To equip students with basic knowledge on regulations and statutory requirements related to town planning and buildings; and develop skills necessary in building conversion projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Identify problems and constraints in the course of design for conversion and adaptation work. b. Understand the concepts of economic and physical obsolescence for buildings for evaluation of their impacts on process of conversion work. c. Comply with the local statutory requirements in the course of adaptation and conversion to existing buildings. d. Relevance and clarity of sketches and drawings. e. Communication skills
Subject Synopsis/ Indicative Syllabus	● The design and structural considerations and implications that affect the conversion, improvement and adaptation work on existing buildings in relation to users requirements. ● The physical and economical considerations that determine the viability and feasibility of conversion or adaptation of existing buildings. ● Relevant legislation controlling the conversion and adaptation work of existing buildings including those of architectural and historical nature. ● The special considerations of planning the project management and contract administration for conversion and adaptation work. ● Special considerations for the conversion and adaptation work of buildings of architectural and historical interest.
Teaching/Learning Methodology	The subject involves both theoretical and practical approaches in local context relating to project work and tutorial assignments, such as lectures, seminars, case studies, site visits, criticism of presentations and projects by peer groups and practicing professionals and etc.

Assessment Methods in Alignment with Intended Learning Outcomes

The focus of assessment is on understanding of local statutory requirements, practical skills associated with solving the problems of adapting buildings. Coursework and projects will be integrated in the assessment and to achieve key learning outcomes. The subject will be assessed by group project work (60% weighting) and examination (40% weighting).

Specific assessment methods/tasks	% weighting	Intended assessed subject learning outcomes to be (Please tick as appropriate)				
		a	b	c	d	e
1. Group Project	60%	√	√	√		
2. Examination	40%	√	√	√	√	√
Total	100 %					

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

(a) Appropriate report structure.
(b) Participation and contribution.
(c) Relevant focus and depth.
(d) Analysis, synthesis and technical competence of design and construction.
(e) Logic of explanation
(f) Relevance and clarity of sketches and drawings.
(g) Communication skills

Student Study Effort Expected

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Project work	80 Hrs.
▪ Project and exam preparation	43 Hrs.
Total student study effort	162 Hrs.

Reading List and References

- Hong Kong Government, *Chapter 123 Buildings Ordinance*, latest Edition, Government Printer.
- Hong Kong Government, *Code of Practices and Guidelines*, Buildings Department (URL: https://www.bd.gov.hk/english/documents/index_crlist.html)
- Mostedi, A. (2003). *Building Conversion & Renovation*. Barcelona, Carles Broto & Josep Ma Minguet.
- O'Kelly, E., & Dean, C. (2007). *Conversions*. London: Laurence King.
- Frideman, D. and Oppenheimer, N. (1997). *The Design of Renovations*, London, W.W. Norton & Company.

Subject Description Form

Subject Code	BRE436
Subject Title	Applied Property Valuation
Credit Value	3
Level	4
Pre-requisite	BRE315
Objectives	1. To stimulate the students in tackling practical valuation issues. 2. To enhance the abilities of the students in the interpretation of relevant legislations and guidelines that related to property valuation. 3. To analyze valuation standards of selected overseas countries.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Explore the effects of land administrative measures and land tenure on property value. b. Apply current legislative measures which affect property value and valuation approaches in resumption, modification and taxation cases. c. Apply the techniques of valuation to appraise, analyze and solve complex valuation problems in both private and public sectors. d. Explore the sources of international valuation standards and their importance. e. Possess knowledge of contemporary issues.
Subject Synopsis/ Indicative Syllabus	Land administrative measures and land tenure in Hong Kong. Valuation of development land. Valuation for lease modification and lease exchange Valuation for resumption purposes. Valuation for taxation purposes Asset Valuation
Teaching/Learning Methodology	This subject is aimed at developing the students' ability to appraise and solve advanced statutory valuation problems. Lectures will be used to highlight the various valuation approaches and the current statutory provisions affecting development and value of property. Case studies will be employed as illustrations, wherever possible. Tutorials will be used by the lecturer and students to discuss valuation problems while seminars provide suitable forums for presentation by the students. Senior professionals may also be invited f to give talks on specific valuation topics and share their experience with the students.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	50 %	✓	✓	✓	✓	✓	
2. Examinations	50 %	✓	✓	✓	✓	✓	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students will be assessed through both coursework and examination. Assessment for coursework will be based on assignments and presentations.

Both examination and coursework assess learning outcome a to e.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Self-studies	120 Hrs.
▪	Hrs.
Total student study effort	159 Hrs.

Reading List and References

Reading List:

Recommended:

Cruden, G.N., (2009) *Land Compensation and Valuation Law in Hong Kong*, Butterworths

HKIS, (1999) *Hong Kong Guidance Notes on the Valuation of Assets*

Baum, A., & Sams, G., (1997) *Statutory Valuations*, Routledge

Butler, D. & Richmond, D., (1990) *Advanced Valuation*, MacMillan

Poon, N.T., & Chan, H.W., (1998) *Real Estate Development in Hong Kong*, PACE

Supplementary:

	Nissim, R., (2008) Land Administration & Practice in Hong Kong, HKU Press Rees, W.H. (ed), (1992) *Valuation: Principles into Practice*, Estates Gazette Hong Kong SAR Government: Building Ordinance (Cap 123) Land (Miscellaneous Provisions) Ordinance (Cap 28) Land Resumption Ordinance (Cap 124) Government Leases Ordinance (Cap 40) Government Rights (Re-entry and Vesting Remedies) Ordinance (Cap 126) Estate Duty Ordinance (Cap 111) Hong Kong Airport (Control of Obstruction) Ordinance (Cap 301) Landlord and Tenant (Consolidation) Ordinance (Cap 7) Lands Tribunal Ordinance (Cap 17) Mass Transit Railway (Land Resumption and Related Provisions) Ordinance (Cap 276) Rating Ordinance (Cap 116) Stamp Duty Ordinance (Cap 117) Roads (Works, Use and Compensation) Ordinance (Cap 370) Railways Ordinance (Cap 519) Land (Compulsory Sale For Redevelopment) Ordinance (Cap 545)

Subject Description Form

Subject Code	BRE437
Subject Title	Facilities Management
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	Introducing the concept of facilities management and its application in various organizations. The development of facility management, the challenges and opportunities for facility manager will be examined. Contemporary issues in the role and responsibilities of FM in organization, value creation through facilities, facilities audit, space planning and relocation decision making, performance measurement and benchmarking, ISO standards, emergency preparedness,.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Articulate management concepts within a variety of facility contexts. b. Assess the performance of a real estate facility across a wide range of performance criteria. c. Relate facilities management functions and practice to the effectiveness of core and non-core operations of business organisations. d. Analyse the role of a facility manager, and apply key competences of a manager on problem solving and decision making.
Subject Synopsis/ Indicative Syllabus	Basic concepts of facility management – an integrated approach The changing and evolving workplace – space utilization, requirements and culture The development of facility management in Hong Kong Facility audit and building performance assessment – criteria of assessment, HK-BEAM, IBI, Balanced Scorecard etc. FM ISO integrated standards Factory relocation and decision making modeling Sustainable facility management- optimizing financial, environmental & social factors Emergency preparedness, assessment and planning
Teaching/Learning Methodology	Topics will be introduced by lectures with guidance to various reference materials. Case studies and assignments will be used to create an 'action learning' environment in which the students will critically evaluate practices and procedures for the achievement of quality. Small group discussion will enhance the information flow and

evaluation process.

- Lectures and seminars
- In-class tutorials
- Independent study
  - Assignment
  - Self-study

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1.Assignment 1	20 %	√	√		√		
2. Case study + presentation	30 %	√		√	√		
3. Examination	50 %	√	√		√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assignment (20%) and case study with presentation (30%) assess the students' ability to apply the theoretical concepts. Presentation assesses the students' ability to communicate their ideas and project.

Examination (50%) tests the students' ability to articulate the relationships through discussions and arguments, whilst application is tested via scenario-based questions.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Coursework assignment	24 Hrs.
▪ Independent self-study	100 Hrs.
Total student study effort	163 Hrs.

Reading List and References

Recommended:

Finch, E. (2011) *Facilities Change Management*, Hoboken : John Wiley & Sons.

Hodges, C & Sekula, M (2013) *Sustainable facility management : the facility manager's guide to optimizing building performance*, Alexandria, Va. : Vision Spots

	Publishing. Langston, C & Rima Lauge-Kristensen (2002), Strategic management of built facilities, Oxford : Butterworth-Heinemann. Teicholz, E (2012), *Technology for facility managers the impact of cutting-edge technology on facility management*, Hoboken, NJ : John Wiley & Sons, Inc. Then, Danny Shiem-Shin & Tan Teng Hee (2013), *Facilities management and the business of managing assets*, Abingdon England : Routledge. **Journals for references:** *Facilities* *Facility Management Journal* *IFMA News* *Property Management*

Subject Description Form

Subject Code	BRE439
Subject Title	Engineering Contract Procedures
Credit Value	3
Level	4
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	To learn and apply general knowledge and applicable techniques in making critical decisions commonly associated with engineering contract procedures (project planning and control, claims, standard method of measurement, general condition of contract). To develop an understanding of the technological, practical, procedural, contractual and economic characteristics of engineering work including building services in building projects and civil engineering work.
Intended Learning Outcomes	1. Upon completion of the subject, students will be able to: 2. Possess the knowledge of the technological practices of engineering work including basic mechanics of material, explain more how the system/technology work. 3. Understand the practices of procurement and contractual arrangements of engineering work. 4. Understanding the Standard Method of Measurement including measurement unit, item coverage, preamble 5. Understanding the term and work mechanism is under Condition of Contract 6. Understanding the role of Drawings and Specification and Standard 7. Understanding the Construction Data Management in market 8. Understanding the contract interfacing management 9. Produce and evaluate the measurement and documentation of engineering work. 10. Appraise and apply the principle and practices of contractual procedures and administration in engineering work. 11. Communicate effectively with contractual negotiation skills.
Subject Synopsis/ Indicative Syllabus	1. Technological and cost appraisal of building services work and civil engineering work. 2. Procurement systems and contractual arrangements for building services and civil engineering projects. 3. Documentation, measurement and valuation of building services and civil engineering work. 4. Contract administration and procedure in building services and civil engineering projects. 5. Application of Government standard forms and new engineering contracts. 12. Interpreting the implication and impact of total float and analysis of project time delay. 13. Interpreting the implication and impact of resource availability on the project network model and project time extension. 14. Interpreting the implication and impact of non-finish-to-start relationships (commonly known as smart relationships) in project network diagrams upon project plan and schedule. 15. Analysing the breakdown and implications of resource rate schedules (i.e. hourly rates for various labour trades and major equipment submitted by a contractor as part of unit rate contract).

16. Interpreting the implication and impact of potential earthwork quantity changes on project cost performance based on commonly used contract conditions.

Teaching/Learning Methodology

The course addresses general knowledge and applicable techniques in support of critical decisions commonly associated with engineering contract procedures (project planning and control, delay analysis, change orders, claims). In addition, the course places engineering contract procedures in the perspective of Hong Kong's current practices. Industry professionals experienced with contract administration and construction laws will serve as Visiting Lecturer to introduce commonly applied contract forms for building services on Hong Kong's public housing and infrastructure projects. Important terms will be elaborated by referring to specific contract terms and real-world application cases.

Contract documentation and administration will form the main thrust of the course, to be underpinned on a comprehensive engineering work technologies and practices. Interactive lectures on the various technologies, practice and economic aspects will be conducted with a view of providing the background knowledge necessary for developing competence in documentation, procurement and administration in the field of engineering work. Interactive lecture and case studies will be utilized. Professional practitioners will be invited to facilitate problem-based learning on different contract strategies in different projects. Tutorial sections will be provided to practice knowledge and techniques learned, conduct case studies and guided discussions.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	50%	√	√	√	√	√	
2. Examination	50%	√	√	√	√	√	
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and coursework will constitute the 50% and 50% of the overall mark for the subject respectively. The coursework mark will be based on the assignments by producing documentation, seminar presentations and discussions. At least two assignments with equal contribution will be set.

The assessment by examination will be based on a 2 hour examination. The coursework will be evaluated on; (i) a basic understanding of engineering work practices, economics of engineering work development, and its impact on the economy; (ii) a working knowledge of the contract documentation and administration of typical engineering work; (iii) a critical appraisal of alternative contract strategies, procedures and administration in engineering work.

A student may intend to apply Generative AI to facilitate homework such as literature review or essay writing style. To make the submission acceptable for grading, one needs to declare in the submission what tool and to what extent GenAI is applied and write down a clear statement reflecting on the usefulness and limitations. If the student does not apply AI tools in completing the homework, one needs to explicitly declare in the submission.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials / Seminars	13 Hrs.
	Other student study effort:	
	▪ Self learning and recommended reading	120 Hrs.
	Total student study effort	159 Hrs.

Reading List and References

Recommended:

Construction Industry Council (CIC): Frequently Asked Questions on NEC3 Collaborative Contracts (Version 1 – September 2015). http://www.cic.hk/eng/main/aboutcic/publications/reference_materials/index.html

Wong K.D. (2008) *Target Cost Contracting in Hong Kong* – Chapter 12 of the book by PACE Publishing Ltd, namely "*Contractual and Regulatory Innovations in Building and Real Estate*" edited by Edwin Chan and Edward Yiu, Page 69 to 74, June 2008.

Wong K.D. (1998) "*Real Estate Development in Hong Kong"* Chapter 12 *Procurement & Tendering* and Chapter 13 *Contractual Arrangement and Construction Management*, a book by PACE Publishing Limited 1998 ISBN 962-7723-09-6.

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HKSAR Government General Conditions of Contract for Electrical and Mechanical Engineering Works 1999 Editions.

HKSAR Government General Conditions of Contract for Design and Build Contracts 1999 Editions.

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Subject Description Form

Subject Code	BRE4393
Subject Title	Temporary Work Design
Credit Value	3
Level	4
Pre-requisite	BRE302 & BRE361 & BRE370
Objectives	Bring students' attention to the vertical integration of the subject areas learned in Level 2 such as Structure, Construction Technology, Engineering Mathematics along with the working experience gained in Industrial Centre to the subject areas of Level 3 Structure II & Construction Technology & Materials II through design project whilst the inter-relation of the horizontal integration between subjects are also important in solving a problem-based project work. Integrate and apply knowledge gained from individual subject areas in technology, management, economics and legal aspects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Design falsework and formwork for building construction b) Appraise alternative solutions to falsework and formwork design c) Recognize the inter-relationship and interdependence of various areas in construction related to temporary works, such as cost, time, safety, and quality assurance d) Comprehend the design and construction operations, technology & structure, management, economics and legal impacts of the construction industry both locally and in other countries through guided learning and case study. e) Understand the implications of temporary design and construction in professional and social contexts; develop and improve communications skills and teamwork spirits in term project, and international/comparative study.
Subject Synopsis/ Indicative Syllabus	• Introduction, basic concepts of formwork and falsework. • Bamboo scaffolding: design and safety • Metal scaffolding: components, loads, foundations, and design • shoring design • Formwork materials, formwork types, and quality of finishes • Project handout and briefing • Design of slab forms • Design of wall forms • Design of beam forms • Design of column forms • Selection of horizontal formwork systems • Selection of vertical formwork systems
Teaching/Learning Methodology	Structured lecture/tutorial sessions are carried out at different stages during the progress of project to provide learning support to students in achieving the intended learning outcomes. Lecture/tutorial sessions of 2.0 hours per week are intended for teaching of key concepts, principles, and methods in temporary works design/application. The students are provided with useful resources on Blackboard for self study. A structured design project based on real life situation is to be used for term project and consists of the several components for applied learning:

	1. Understand the structural elements of building components, 2. Prepare design of falsework systems to facilitate the construction of the structural elements. 3. Evaluate the different systems of formwork and falsework and to appraise alternation solutions. 4. Propose a suitable structural form for the formwork of various building components, and to prepare the subsequent design drawings, structural calculations and specifications 5. Produce plan and proposal for the falsework/formwork to facilitate building construction 6. Appreciate the multi-objective nature of building construction related to temporary works

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Temporary Works Design Report	80% (Group project)	√	√	√	√	√	
Temporary Works Design, debate assignment on selection of materials and types of formwork and falsework	10%	√	√	√	√	√	
Quizzes and class attendance	10%	√	√		√		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The subject is mainly project-based, the students will work in groups to complete the design report for a 2000-design school building project, which requires efforts from each team member to demonstrate that the group understands the problem and present the solutions in a professional report. The student in each group will also be individually assessed in contributions, contents, and quality of presentation based on the design report.

In the debate assignment, the school building project of 2000-design is used for study on solutions to temporary works. The students are divided into 2~3 larger groups to represent different options/solutions in each of the tasks (1) Selection of formwork materials; (2) Selection of formwork types; (3) selection of falsework/scaffoldings for working platform, shoring/supporting of formwork, etc. Student groups are required to present their proposal and defend their solutions, and then question the other groups which hold different views and propose different solutions. The groups are required to seek assistance from chatGPT through interactive queries, and make their professional judgement and provide supplementary information based on cited reference sources.

	The students will take 4-5 quizzes in the form of multiple choice questions to assess their understanding of basic design principles, practice, and knowledge in temporary works, the students are required to attend all the lectures. **1. <u>Report assessment (80%):</u>** Report presentation (20%) 1. Report presentation: logical and coherent organization, clarity, citations and appendices, 10% 2. Command of written English: succinct writing, grammar and spelling, 10% Report contents (80%) 1. Project introduction, 5% 2. Introduction to temporary works design: materials, types, and selection, 10% 3. Falsework and scaffolding design (including Bamboo scaffolding), 10%* 4. Formwork design: columns (introduction, calculations, sketches and drawings) , 10%* 5. Formwork design: walls (introduction, calculations, sketches and drawings) , 10%* 6. Formwork design: Beams (introduction, calculations, sketches and drawings) , 10%* 7. Formwork design: slabs (introduction, calculations, sketches and drawings) , 10%* 8. Construction management issues in temporary works, sustainability, organization, environment, time, cost, safety, quality, 10% 9. Conclusions, 5% <u>Assessment criteria</u> *Report presentation (20%)* A+, A, A- (Excellent): 1. Excellent design drawings. 2. Excellent use of English language in the report. 3. Excellent use of tables, charts, figures, sketches in the report. 4. Excellent citation and references (including AI generated contents). 5. The report is organized in logical and professional format. B+, B, B- (Good): 1. Good design drawings, with occasional errors in details. 2. Good use of English language in the report, with few typos, grammatical errors. 3. Proper use of tables, charts, figures, sketches in the report. 4. Good citation and references (including AI generated contents). 5. Overall the report is organized in logical and professional format. C+, C, C- (Satisfactory): 1. Satisfactory design drawings, with some non-critical errors in design and drawing details.

	2. Proper use of English language in the report, with some typos, grammatical errors. 3. Proper use of tables, charts, figures, sketches, with some formatting errors, in the report. 4. Satisfactory citation and references (including AI generated contents). 5. The report is overall organized in logical and professional format, with some parts of contexts misrepresented. D+, D (Pass): 1. Barely adequate design drawings, with many non-critical errors in design and drawing details. 2. Barely satisfactory use of English language in the report, with typos, grammatical errors, which may prevent understanding of some contents. 3. Use of tables, charts, figures, sketches is marginal, with many formatting and contents errors, in the report. 4. Barely adequate citation and references (including AI generated contents). 5. The report is barely organized in logical and professional format, with some parts of contexts misrepresented, or difficult to understand. F (Fail): 1. Inadequate design drawings, difficult to understand the design and drawing details. 2. Poor use of English language in the report, with typos, grammatical errors, which prevents clear understanding of the report. 3. Managed to use tables, charts, figures, sketches for presentation in the report, with improper use and format. 4. Inadequate citation and references (including AI generated contents). 5. The report is poorly organized, sometimes misrepresented, and difficult to understand. *Report contents (80%):* A+, A, A- (Excellent): 1. All the contents and topics required for temporary works design are completed. 2. The design for each part of the temporary works is excellent, with proper assumptions, design calculation, design analysis and design drawings. 3. Clear statement of design assumptions. 4. No significant errors in design calculations. B+, B, B- (Good): 1. All the contents and topics required for temporary works design are completed, with very few missing contents, or occasionally inadequate presentation. 2. The design for each part of the temporary works is good, with proper assumptions, design calculation, design analysis and design drawings. Occasional inconsistence in design and drawings. 3. Good statement of design assumptions. 4. Few noncritical errors in design calculations, some inaccuracies in design calculations may appear.

C+, C, C- (Satisfactory):

1. All the contents and topics required for temporary works design are completed, with some noncritical contents missing or inadequately presented.
2. The design for each part of the temporary works is satisfactory, with proper assumptions, design calculations, design analysis and design drawings. some errors in design and drawings. Some design errors.
3. Satisfactory statement of design assumptions.
4. Some errors in design calculations, but not critical and not affecting the overall design.

D+, D (Pass):

1. All the contents and topics required for temporary works design are completed, with some contents missing or inadequately presented
2. The design for each part of the temporary works is barely satisfactory, with largely proper assumptions, design calculations, design analysis and design drawings. some errors in design and drawings. design errors are often serious in some items.
3. Barely satisfactory statement of design assumptions
4. Many errors in design calculations, may be critical but not affecting overall design.

F (Fail):

1. Not all the contents and topics required for temporary works design are completed, with many contents or chapters missing and inadequately presented.
2. The design for each part of the temporary works is inadequate, with usually inadequate assumptions, design calculations, design analysis and design drawings. Extensive errors in design and drawings. design errors are usually serious.
3. Inadequate statement of design assumptions.
4. Extensive errors in design calculations, may be critical and affecting the validity of the overall design.

Indicative descriptors for modifier grades

Main Grade (solid)	The student generally performed at this level, indicating mastery of the subject intended learning outcomes at this level.
+ (exemplary)	The student consistently performed at this level and exceeded the expectations of this level in some regards, but not enough to claim mastery at the next level.
- (marginal)	The student basically performed at this level, but the performance was inconsistent or fell slightly short in some regards.

Note: The above indicative descriptors for modifier grades are not applicable to the pass grades D and D+.

2. <u>In-class debate assignments (10%):</u>

A+, A, A- (Excellent):

1. Make very good use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner

2. Make strong persuasive points to defend his/her solutions.
3. Make very good citations of reference sources (including AI generated contents), use of facts, data, cases, etc. to the statements, claims, etc.
4. Excellent presentation/debate skills.

B+, B, B- (Good):

1. Make good use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Some improvements can be made to make better use of the AI tool for designing an engineering solution.
2. Make good persuasive points to defend his/her solutions.
3. Make proper citations of reference sources (including AI generated contents), use of facts, data, cases, etc. to support the statements, claims, etc.
4. Relatively good presentation/debate skills.

C+, C, C- (Satisfactory):

1. Make use of chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Many improvements should be made to make good use of the AI tool for designing an engineering solution.
2. Make fairly persuasive points to defend his/her solutions.
3. Demonstrate ability in citing reference sources (including AI generated contents), to a satisfactory level, in using facts, data, cases, etc. to support the statements, claims, etc.
4. Demonstrate satisfactory presentation/debate skills in a professional context.

D+, D (Pass):

1. Can barely use chatGPT or other Gen-AI tools with interactive queries designed with a professional manner. Major improvements should be made to make good use of the AI tool for designing an engineering solution.
2. Make persuasive points to defend his/her solutions.
3. Demonstrate minimum ability in citing reference sources (including AI generated contents), in using facts, data, cases, etc. to support the statements, claims, etc.
4. Demonstrate minimum satisfactory presentation/debate skills in a professional context.

F (Fail):

1. Clear difficulty in using chatGPT or other Gen-AI tools with interactive queries designed with a professional manner.
2. Make some points to defend his/her solutions but not persuasive.
3. Demonstrate poor ability in citing reference sources (including AI generated contents), in using facts, data, cases, etc. to support the statements, claims, etc.
4. Fail to demonstrate basic presentation/debate skills in a professional context.

3. Quizzes and class attendance (10%)

	A+, A, A- (Excellent): A+: Over 95% of the questions are answered correctly A: 90% - 95% of the questions are answered correctly A-: 85% - 90% of the questions are answered correctly B+, B, B- (Good): B+: 80% - 85% of the questions are answered correctly B: 75% - 80% of the questions are answered correctly B-: 70% - 75% of the questions are answered correctly C+, C, C- (Satisfactory): C+: 65%- 70% of the questions are answered correctly C: 60%- 65% of the questions are answered correctly C: 55%- 60% of the questions are answered correctly D+,D (Pass): D+: 50% - 55% of the questions are answered correctly D: 45% - 50% of the questions are answered correctly F (Fail): F: Under 45% of the questions are answered correctly The grade will be lowered by at least one letter grade if the student is absent from the lectures for up to 3 weeks; a failure grade will be given if the student is absent from the lectures for up to 6 weeks.	
Student Study Effort Expected	Class contact:	
	▪ LEC	26Hrs.
	▪ Tutorial/Project Consultation	13 Hrs.
	Other student study effort:	
	▪ SELF-STUDY/REPORT WRITING	90 Hrs.
	§	Hrs.
	Total student study effort	129 Hrs.
Reading List and References	**Reading List:** No standard textbook is recommended, since students have to refer to various literatures in order to achieve the requirement of the design project. Reference will be made to current articles in journals, local newspaper, would press, proceedings dealing with topics of current importance. **Recommended:** The Concrete Society (2012), *Formwork A guide to good practice*, 3rd Edition, the Concrete Society, London. Illingworth J.R. (1987). *Temporary Works: Their Role in Construction*, Thomas Telford, London. Labour Department (2017). Code of Practice for Bamboo Scaffolding Safety. Available from: http://www.labour.gov.hk/eng/public/os/B/Bamboo.pdf	

	Buildings Department (2001). Guidelines on the Design and Construction of Bamboo Scaffolds. Available from: http://www.bd.gov.hk/english/documents/code/GDCBS.pdf Wong, Francis K.W. (1998). Bamboo Scaffolding Safety Management for the Building Industry in Hong Kong. Labour Department (2013). *Code of Practice for Metal Scaffolding Safety*. Available from: http://www.labour.gov.hk/eng/public/os/B/mss.pdf Chudley, R. (1999). *Advanced Construction Technology*, 3rd ed. revised by Roger Grano, Longman. Illingworth, J.R. (2000). *Construction Methods and Planning*, 2nd ed., E & FN Spon.

Subject Description Form

Subject Code	BRE440
Subject Title	Cost and Value Management
Credit Value	3
Level	4
Pre-requisite	Nil
Objectives	*This subject is intended to:* • Focus on both theories and applications of value management in different phases of a development, • Develop an appreciation for what can be accomplished using the techniques of VM and applied creativity, and • Identify management and technical issues that can be solved or addressed using the techniques of VM and critical thinking.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the development of Value management in different regions b. Comprehend and identify issue and problems concerning the function and value of land, property and construction c. Formulate and implement strategies, policies and solutions for sustainable development and construction d. Possess skills to identify, analyse and solve problems e. Communicate effectively
Subject Synopsis/ Indicative Syllabus	Notion of value: value, function and cost. Value management basics: historical development; project selection (types, values, and timing); alternative workshop approaches (e.g. the 40-hour job plan, the Charette, the VM audit, and the contractor's change proposal). Value management methodology: - VM job plan (information, analysis, creativity, evaluation, development, proposal); function analysis, group dynamics, creativity, and problem-solving skills Life cycle costing for construction projects Comparison of value management and traditional cost management techniques. Case studies of the practice of value management in Hong Kong and overseas.
Teaching/Learning Methodology	▪ Interactive lectures with discussions and Q&A to test students understanding before starting a new topic ▪ Use of videos or cases to introduce concepts and pose discussions during tutorials ▪ In-class questions to test students understand on this subject ▪ Small team projects to simulate real-life work settings ▪ Sharing, discussions, and presenting the answers of tutorial questions in tutorials ▪ Use workshop settings to facilitate students understanding of value management concepts ▪ Introduce both local and overseas real-life case studies to facilitate understanding and appreciation of real-life practices

	The generative AI tools (genAI) is not allowed for (1) functions identification and function analysis; (2) generating creativity ideas during Value Management workshop but encouraged for (1) search for typical examples or cases of value management (2) helping improve structure, grammar, writing, presentation slides, etc.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Workshop project report	25 %	√	√	√	√	√	
Tutorial question	25 %	√	√		√	√	
Examination	50 %	√	√	√	√	√	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The team project brief resembled real-life scenario but modified to suite students' level. The project asked the students to design and facilitate a value management workshop for a project and they also need to bid for the project from the perspective of a professional service firm. Finally, students were asked to identify, analyse and solve problems that they encountered in that particular project. Since they are acting as professional advisor for the client/owner, they need to possess skills that they can communicate effectively to their client. At the conclusion of this subject, all students had achieved the intended subject learning outcomes assessed through the quiz, team project and examinations.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Seminars	13 Hrs.
Other student study effort:	
▪ Self study materials	20 Hrs.
▪ Assignments/Workshop Preparation	56 Hrs.
Total student study effort	115 Hrs.

Reading List and References	Akiyama, K. (1991), *Function Analysis: Systematic Improvement of Quality and Performance*, Productivity Press. Ashworth, A. and Perera, S. (2015), *Cost Studies of Buildings*, Routledge. Connaughton, J.N. (1996), *Value Management in Construction: A Client's Guide*, Construction Industry Research and Information Association. Dell'Isola, A.J. (1997), *Value Engineering: Practical Applications - for Design, Construction, Maintenance & Operations*, R.S. Means Company. Fong, P.S.W. et al (1998), *Applications of Value Management in the Construction Industry in Hong Kong*, Dept. of Building & Real Estate, The Hong Kong Polytechnic University. Fowler, T.C. (1990), *Value Analysis in Design*, Van Nostrand Reinhold.

	Hayden, G.W. (1996), *Value Engineering of Building Services*, Building Services Research and Information Association. Institution of Civil Engineers (1996), *Creating Value in Engineering*, Thomas Telford. Kelly, J., Male, S. and Graham, D. (2015), *Value Management of Construction Projects*, John Wiley & Sons. Kirk, S. J. and Dell'Isola, A. J. (1995), *Life Cycle Costing for Design Professionals*, McGraw-Hill. Norton, B.R. (1995), *Value Management in Construction: A Practical Guide*, Macmillan. Palmer, A. (1992), *A Comparison of US Value Engineering with British Cost Control Procedures*, Value and the Client, Surveyors Publications. Park, R.J. (1999), *Value Engineering: A Plan for Invention*, St. Lucie Press. SAVE International. (2020). *VM Guide: A Guide to the Value Methodology Body of Knowledge*. SAVE International. Shen Q.P. and Liu G.W. (2003) Critical success factors for value management studies in construction, *Journal of Construction Engineering and Management, American Society of Civil Engineers (ASCE)*, 129(5), 485-491. Shen, G. Q., & Ann, T. W. (2015). *Value management in construction and real estate: Methodology and applications*. Routledge. *Various materials provided in the designated e-learning management system.*

Subject Description Form

Subject Code	BRE442
Subject Title	Forecasting & Competition in the Built Environment
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to help students acquire knowledge and skills to forecast and compete for work in the built environment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: 1. Select and employ appropriate techniques in price forecasting and strategies for improving survival and profitability. 2. Recognize the usefulness and limitations of forecasting models. 3. Integrate risk management with forecasting and competition strategies. 4. Analyze forecasting accuracy and competitive performance. 5. Draw conclusions and make recommendations on improving forecasting accuracy and competitive performance .
Subject Synopsis/ Indicative Syllabus	*Forecasting* • Microeconomic foundation and the efficient market hypothesis • Time series analyses and process of forecasting • Forecasting methods: theory and practice • Price estimation • Risk management in pre and post contract stages *Competition* • Introduction on the competitive built environment • Auction institutions • Competitor analysis and competitiveness measurement • Bidding models: theory and practice • Tender assessment

<table>
<tr><td>Teaching/Learning Methodology</td><td>Lectures introduce the concepts and approaches in practice followed by discussion on background reading and forecasting and competition analyses in the tutorials based on case studies.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td></td></tr>
<tr><td>Tutorial tasks</td><td>40%</td><td>√</td><td></td><td></td><td>√</td><td>√</td><td></td></tr>
<tr><td>Examination</td><td>60%</td><td></td><td>√</td><td>√</td><td></td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="5"></td></tr>
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</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorials</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Student effort hours</td><td>81 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>120 Hrs.</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>Indicative Reading List:

Adrian J. Smith (1995). Estimating, tendering and bidding for construction. Macmillan.

Ashworth A. (1994) Cost Studies of Buildings, Longman; Harlow.

Beeston, D.T. (1983). Statistical methods for building price data, E&FN Spon

Brook M. (2004) Estimating and Tendering for Construction Work, Butterworth Heineman, Oxford.

Cartlidge D. (2004) Procurement of Built Assets, Elsevier Oxford.

Chapman, C., & Ward, S. (1996). Project risk management: processes, techniques and insights. John Wiley.

Clements, M. P., & Hendry, D. F. (Eds.). (2002). A companion to economic forecasting. Oxford: Blackwell.

Ferry D. and Brandon P.S. (1999) Cost Planning of Buildings, Blackwell Science, Oxford.

Friedman, L. (1956). A competitive-bidding strategy. Operations research, 4(1), 104-112.</td></tr>
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Granger, C. W. J., & Newbold, P. (2014). *Forecasting economic time series*. Academic Press.

Hillebrandt, P.M. (2000). *Economic theory and the construction industry* (3rd ed.). Macmillan Press, Basingstoke.

Milgrom, P. (1989). Auctions and bidding: A primer. *Journal of Economic Perspectives*, 3(3), 3-22.

Milgrom, P. R. (1987). *Auction theory. In Advances in economic theory: Fifth world congress* (Vol. 1, p. 32). Cambridge: Cambridge University Press.

Milgrom, P. R., & Weber, R. J. (1982). A theory of auctions and competitive bidding. *Econometrica: Journal of the Econometric Society*, 1089-1122.

O'malley, P. (2012). *Risk, uncertainty and government*. Routledge.

Park W.R. & Chapin W.B. (1992) *Construction Bidding: Pricing for Profit*. John Wiley & Sons, New York.

Seeley I. (1996) *Building Economics*, Macmillan, Basingstoke.

Shmueli, G., & Lichtendahl Jr, K. C. (2016). *Practical time series forecasting with r: A hands-on guid*e. Axelrod Schnall Publishers.

Subject Description Form

Subject Code	BRE453
Subject Title	Building Services II
Credit Value	3
Level	4
Pre-requisite /	BRE349
Objectives	1. Provide further knowledge of building services engineering systems, including the ventilation and air conditioning system, acoustics and vibration control systems, and information systems; 2. Understand the importance of the quality of installation and proper co-ordination on the overall performance and maintainability of buildings; 3. Provide students an understanding that sustainability can be achieved by environmental-friendly design of building services systems.
Intended Learning Outcomes	*Students will demonstrate their ability to:-* a. Understand the principles and various attributes of ventilation and air conditioning systems; b. Have an understanding of the importance of energy conservation in buildings for environmental protection, and the use of renewable resources in buildings for sustainability; c. Perform analyses on acoustic and vibration control of building services systems; d. Have an understanding of the concepts of green buildings, intelligent building, building automation, and information system of buildings; e. Properly co-ordinate the installation, commissioning and maintenance of various building services systems; and perform life-cycle cost analysis for selection of appropriate building services systems.
Subject Synopsis/ Indicative Syllabus	Integrated design: factors affecting selection of services/systems. Provision of space in the building to accommodate building services. Structural integrity of building services equipment. Sound and vibration attenuation features. Provisions for safe operation and maintenance. Building services engineering system for intelligent buildings: introduction to information transmission systems, communication and protection system, call systems, public address system and Building automation/management systems. The concepts and importance of sustainability in building services systems design, and operation; selection of environmentally friendly products and materials used in building services systems. Cooling load estimation for HVAC system. Indoor air quality monitoring

	Co-ordination and management of design and installation of various building services systems during the design and construction stages in particular the builder's works; and testing and commissioning of building services systems. Building services design for safety – Passive measures on fire safety & introduction to alternative approaches on fire safety design.
Teaching/Learning Methodology	The subject can be divided into three main parts; introduction to complex building services systems; management, co-ordination, installation and maintenance of the building services systems; and introduction to sustainable buildings and environmental-friendly design of building services systems. A "case oriented" approach is to be adopted for teaching the subject; A number of up-to-date case studies on building services systems of high-rise buildings are used to illustrate the current state-of-the-art on the design and operation of complex building service systems. Where applicable, practitioners from the industries will be invited to present lecture on the management of the building services installations and on operation and maintenance of building services systems. The subject will be delivered through lectures, laboratories (where applicable) and small groups tutorials. The lectures and laboratories aim at introducing theories, concepts and practices whereas tutorials are for in-depth small group discussions.
Assessment Methods in Alignment with Intended Learning Outcomes	

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	40	√	√	√	√	√	
2. Examination	60	√	√	√	√	√	
Total	100						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and coursework contributes 60% and 40% of the overall grade for the subject respectively. Student must pass both the examination and coursework components in order to achieve an overall pass for the subject.

The coursework may comprises a combination of exercises at tutorials, group presentations, and in-class test. Both the coursework and examination assessment methods are intended to ensure the students achieve the learning objectives set, and to assist in students' learning through constructive feedback.

Students are encouraged to use Artificial Intelligence (AI) tools to assist in the development of the topic areas, identify related contents to be included and to conduct initial evaluation on different options and solutions for the presentation coursework. Students will be required to document the adoption of AI tools in the coursework as an integral part of the submission for assessment.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Independent study including assignments and project works	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	**Reading List:** **Recommended:** Grondzik, Walter T; Alison G. Kwok, (2019) *Mechanical and Electrical Equipment for Buildings*, 13th Edition, Wiley Chadderton D.V. (2013) *Building Services Engineering*, 6th ed., Taylor & Francis. Greeno R. (2013) *Building Service, Technology and Design*, Routledge. CIBSE (1994) *Building Services Maintenance Management*, CIBSE CIBSE (2016). *Air Conditioning and Refrigeration*, CIBSE **Supplementary:** Various publications at Hong Kong Green Building Council Atkin B. (1993) *Intelligent Buildings: Application of IT and Building Automation to High Technology Construction Projects*, Unicom Seminars, England	

Subject Description Form

Subject Code	BRE461
Subject Title	Environmental Impact and Assessment
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	To provide students with an overview and understanding of the environmental issues and the principles and current practices of environmental impact assessment (EIA). Particular emphasis will be given to environmental impact assessment related to Hong Kong.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Enhance the awareness of the environmental issues and realize the importance of sustainable development; b. Gain an in-depth understanding of the concepts, processes and methodologies of environmental impact assessment; c. Contribute significantly in conducting environmental impact assessment in a team; d. Apply the environmental assessment in city and land use planning and management.
Subject Synopsis/ Indicative Syllabus	Environmental objectives & sustainable development: environmental issues in global, regional, and local context, such as ozone depletion, acid rain, global warming, extreme weathers etc; international agreements, Kyoto Protocol; Environmental legislations: regulations and ordinances for air pollution control, waste disposal, water pollution control, noise control, ozone layer protection, and hazardous chemicals control etc. Environmental protection administrative system in H.K.: administrative system for environmental assessment in HK; procedures to conduct environmental impact assessment; Environmental impact studies and impact prediction: Methods for assessing direct and indirect environmental impacts; identification, prediction and assessment of environmental impact; performance benchmarks and targets; Types of environmental impact assessment and environmental impact statement: Strategic environmental impact assessment; life-cycle environmental impact assessment; Ecological, socioeconomic, visual, and risk impact assessment; Role of environmental impact statement, statement scope& content, report writing skills;

<table>
<tr><td></td><td>Application of environmental assessment in city and land use planning: Interaction between environmental impact assessment and city/land use planning; mitigation and control measures;

Environmental planning and management: decision making, planning and management of construction projects with due consideration given to the environmental, social, and economical factors;

Environmental auditing: environmental impact assessment, review, monitoring and audit.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The subject teaching will adopt a range of methods including: (1) lectures; (2) tutorial sessions; (3) group discussions and presentations; (3) reading materials and video presentations; (4) seminars (where applicable) by invited speakers from professional environmental consultants; and (5) group project (case study).

The lectures aim at introducing the basic concepts and principles. Reading materials and video presentations as well as seminars by invited speakers aim at provide students the current practices of environmental impact assessment. Group discussion/presentations and group project will encourage students to review what they have learned in class and apply the principles in practices.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td></td></tr>
<tr><td>1.Continuous assessment</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>2. Midterm</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>3. Examination</td><td>40%</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Examination and continuous assessment will constitute 70% and 30% of the overall work of the subject, respectively. The continuous assessment will be based on the coursework, assignments projects, presentations, peer-group critiques and in-class tests. Students are expected to demonstrate their understanding of the concepts and methodologies of Environmental Impact Assessment through the assignments, group projects and presentations. Students' overall understanding of the subject will be assessed in the examination, on both the principles and practical applications.</td></tr>
</table>

Student Study Effort Required	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Project work	70 Hrs.
	▪	
	Total student study effort	109 Hrs.
Reading List and References	Barbara Carroll, Trevor Turpin, Adam Boyden, Alison Carroll, and Ruth Thomas, *Environmental impact assessment handbook: a practical guide for planners, developers and communities*, London: Thomas Telford, c2009. Kevin S. Hanna, *Environmental impact assessment: practice and participation*, 2nd Edition, Don Mills, Ont. Oxford University Press, 2009. Neil Craik, *The international law of environmental impact assessment: process, substance and integration*, Cambridge; New York: Cambridge University Press, 2008. John Glasson, Riki Therivel and Andrew Chadwick, *Introduction to environmental impact assessment*, 3rd Edition, London; New York: Routledge, 2005. Stephen Tromans and Karl Fuller, *Environmental impact assessment: law and practice*, London: LexisNexis, c2003. Environmental Assessment and Noise Division, Environmental Protection Department, *The operation of Environmental Impact Assessment Ordinance in Hong Kong, April 1998--December 2001*. (Cir Coll Large Bk - TD194.68.H6 O73 2002)	

Subject Description Form

Subject Code	BRE462
Subject Title	Advanced Construction Technology
Credit Value	3
Level	4
Pre-requisite	BRE370
Objectives	1. Introduce and discuss selected topics on advanced construction technology in building construction 2. Foster guided learning and critical investigation on the cutting edge technologies in building construction 3. Appreciate the future trends, difficulties and challenges on building construction
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) grasp the selected construction technologies and conduct analysis on their application scenarios; keep students abreast with the up-to-date technologies in tall buildings construction; b) compare alternative solutions in building construction technologies (contemporary versus conventional; sustainable versus Non-sustainable; automated versus manual); c) further enhance their communication skills through drawings, oral and written presentation in a team environment; d) foster their life-long learning through independent thinking, self-study and critical reviews, in-depth investigations on some construction planning and management issues.
Subject Synopsis/ Indicative Syllabus	1. High performance concrete including high strength concrete, self-compacting concrete and concrete for 3D printing. 2. Demolition: Code of Practice and Building Regulations for demolition works. 3. Advanced Construction Technology, including Very Tall Building Construction, Modular Integrated Construction and construction 3D-printing. 4. Site layout planning: Basic principles in site layout planning, with due consideration to access, storage, accommodations, services, plants, health and safety, and related statutory requirements. 5. Visualization, sensing and tracking applications in construction process monitoring and management control. 6. Alternation and Addition Works (A & A works): Structural & Condition survey / appraisal, conversion, preservation, fulfillment of statutory requirements, project management for A & A works.

Teaching/Learning Methodology

Lectures

Lectures are designed to help the students gain basic knowledge and understanding on each selected topic.

Case studies: In-class reading and discussions

Case studies on each topic are intended to illustrate the theories and regulatory requirements. Reading materials are provided for in-class reading and discussions in the tutorial session. In case study, representative construction technologies used for buildings / projects in Hong Kong and other metropolitan areas will be highlighted. Guest speakers may be invited if appropriate.

Group Projects

There are three group projects on different focuses;

1) a presentation on topics about project case study or advanced construction technology
2) a report on site layout planning study or alternation and addition works
3) an essay report on topics about Digital Construction

Written Examination

Written examination is employed to assess student on problem solving skills individually. Questions for the examination are usually designed as case-based and/or problem-based.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Group Project 1 (Tutorial Task & Presentation)	15%	√	√	√	√		
2. Group Project 2 (Site Planning)	15%	√	√	√	√		
3. Group Project 3 (Essay on Digital Construction)	20%	√	√		√		
4. Examination	50%	√	√		√		
Total	100%						

Students must pass both the continuous assessment and the end-of-semester examination in order to pass the subject.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Group projects will require students to have good understandings on related construction technologies. Extensive reading and/or critical review are required. Project report will require the students to demonstrate their collective work as a team with contributions from each team member through effective communications.

Students are encouraged to use Artificial Intelligence (AI) tools to assist in the development of the topic areas, identify related contents to be included and to conduct initial evaluation on different options and solutions. Students will be required to document the adoption of AI tools in the coursework as an integral part of the

	submission for assessment. Written examination is used to demonstrate students' ability in analyzing issues and problems and to suggest solutions on an individual basis.	
Student Study Effort Required	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Reading and writing assignments	40 Hrs.
	▪ Group project	40 Hrs.
	Total student study effort	119 Hrs.
Reading List and References	Buildings Department (2016). Code of Practice for Precast Concrete Construction, Buildings Department, Hong Kong SAR Government Buildings Department (2004), Code of Practice for Demolition of Buildings, Buildings Department, Hong Kong SAR Government Caldarone M. (2009). High Strength Concrete: a Practical Guide. Taylor & Francis. Raton B. (2003). The Civil Engineering Handbook, 2nd edition, CRC Press. Chudley R. and Greeno R. (2012). Advanced Construction Technology, 5th edition, Pearson. Chudley R. and Greeno R. (2016). Building Construction Handbook, 11th Edition. Routledge. Chew M. Y. L. (2017). Construction Technology for Tall Buildings, 5th edition, World Scientific. Parker D., Wood A. (2013). The Tall Buildings Reference Book, Routledge (ebook). Cooke, R (2007), Building in the 21st Century, Blackwell. Watt D. (2007), Building Pathology: Principles and Practice, 2nd edition, Blackwell. Macdonald S (ed.) (2003), Concrete: Building Pathology, Blackwell Science. Crotty (2012), The impact of Building Information Modelling: Transforming Practices, Spon. Development Bureau, (2018), Constriction 2.0 – Time to Change, Development Bureau, Hong Kong SAR Government.	

Subject Description Form

Subject Code	BRE463
Subject Title	Business Valuation and Accounts
Credit Value	3
Level	4
Pre-requisite	BRE337 & BRE397
Objectives	To provide students a review on the business valuation concepts; To develop knowledge in the financial and legal aspect of mergers and acquisition; and To familiarize participants with a broad spectrum of appraisal approaches and to integrate them in comprehensive project appraisals.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. calculate values of organizations b. identify and calculate the value of intangible assets c. identify and evaluate the financial and strategic implications of proposals for mergers, acquisitions, demergers and divestments; d. discuss and illustrate the impact of law and regulations on business merger and acquisition;
Subject Synopsis/ Indicative Syllabus	❑ Introduction of Investing and Valuation ❑ Cash Accounting, Accrual Accounting, and Discounted Cash Flow Valuation ❑ Accrual Accounting and Valuation: Pricing Book Values / Pricing Earnings ❑ The Analysis of the Cash Flow Statement, Balance Sheet and Income Statement ❑ The Analysis of Profitability and Sustainable Earnings ❑ The Value of Operations and the Evaluation of Enterprise ❑ Full-Information Forecasting, Valuation, and Business Strategy Analysis ❑ Listing rules and related laws
Teaching/Learning Methodology	In the first part of the subject, lectures and directed reading will be used to outline the techniques and approaches determined by international standards and practice. Visiting speakers from relevant areas will be invited to share their practical experience with the students. Coursework will be used to test understanding and application of the relevant methodologies and ability to undertake a critical appraisal of each method.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Coursework	50 %	✓	✓	✓	✓		
2. Final examination	50 %	✓	✓	✓	✓		
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Coursework includes group presentations and individual assignments.

The final examination assesses students' ability in solving and rationalizing problems gained from the subject.

Student Study Effort Required

Class contact:	
▪ Lecture	26 Hrs.
▪ Tutorial	13 Hrs.
Other student study effort:	
▪ Student centered self-study	120 Hrs.
Total student study effort	159 Hrs.

Reading List and References

Financial Statement Analysis and Security Valuation, By Stephen Penman, Third Edition, McGraw-Hill, Irwin

Investment Valuation: Tools & Techniques for Determining the Value of Any Asset, By Aswath Damodaran, Second Edition, John Wiley & Sons, Inc

Valuation: Measuring and Managing the Value of Companies, By Tim Koller, Marc Goedhart, and David Wessells (McKinsey & Company Inc), 4th Edition, John Wiley & Sons, Inc

Subject Description Form

Subject Code	BRE464
Subject Title	Urban Planning (Workshops)
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	The subject aims at providing the students with: 1. A general understanding of the theories of urban and regional planning 2. Quantitative methods of assessing the quality of urban spaces in different aspects (environmental and social) 3. Understanding on the planning system in Hong Kong
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the theories of urban and regional planning. b. Conduct environmental assessment for urban spaces with simulation tools c. Understand the human factors needed to be considered urban planning and urban design. d. Develop the necessary skills in formulating proposals for urban design and urban redevelopment projects. e. Nurture professional knowledge and social responsibility, obtain problem solving skills and critical thinking through the application of advanced information. technology and generative AI tools.
Subject Synopsis/ Indicative Syllabus	Nature of urban planning and sustainability. Urban and Regional Planning theories. Urbanization and social changes. Town planning system in Hong Kong. Planning Application. Problems associated with urban renewal. Public participation in urban planning.

Teaching/Learning Methodology

The subject is mainly conducted in the format of a series of urban planning workshops, which emphasizes on the participation of the students. Assessment is by means of coursework comprising of term paper, a urban design project and presentations in class. The students would form groups and are assigned to conduct a project on the planning and design of urban spaces. Seminars on current planning issues in Hong Kong will be conducted to provide students with the most updated knowledge in the field. In addition, planning issues in major cities will also be covered to widen students' perspective on urban problems in the international context. Professionals in the field will be invited to deliver guest seminars to the students to provide students with up-to-date knowledge in the planning and development profession.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Group Project	70%	√	√	√	√	√	
2. Term Paper	30%	√		√		√	
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students will be divided into teams to conduct one urban design project. The learning outcomes are assessed by means of group presentations and final report.

Students would discuss current planning issues in the term paper. They will comment on AI chatbots generated opinions and provide their own arguments with evidence.

Student Study Effort Required

Class contact:	
▪ workshops Group discussion/consultations	39 Hrs.
Other student study effort:	
▪ Readings	60 Hrs
▪ Self-study	60 Hrs.
Total student study effort	159 Hrs.

Reading List and References

Town Planning Board Annual Reports.

Birch, Eugenie Ladner (2009) *The Urban and Regional Planning Reader*, Routledge.

Levy, John M. (2009) *Contemporary Urban Planning*, Pearson/Prentice Hall.

Lai, Lawrence Wai-Chung (2000) *Town Planning Practice*, Hong Kong University Press.

Lai, Lawrence Wai-Chung (1996) Zoning and Property Rights: A Hong Kong Case Study, Hong Kong University Press.

Nissim, Roger (2008) *Land Administration and Practice in Hong Kong*, Hong Kong University Press.

Subject Description Form

Subject Code	BRE465
Subject Title	Asset Management
Credit Value	3
Level	4
Pre-requisite / Co-requisite / Exclusion	Nil
Objectives	To introduce the students to asset management industry where real estate as the investment asset; and to provide an insight into real-life environment in which asset managers work.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Relate investment theory and value creation to the practices of asset management firms. b. Identify different type of asset management model and investment objectives. b. Understand of analytical techniques and asset allocation strategies. c. Understand and appreciate regulatory and legal framework; the importance of corporate governance and corporate social responsibility.
Subject Synopsis/ Indicative Syllabus	*Strategic Asset Management* Model for determining Portfolio; Portfolio Optimisation; model for value creation. *Asset management industry and regulatory institutions*: the business nature and organization structure of asset management firms; the nature and size of risks in the business, who bears them and how they are financed; the alternative forms of investor protection and their associated costs and benefits.
Teaching/Learning Methodology	Lectures will be used to introduce theories and models, and seminars will be used for the discussion and understanding of the principle of asset management and its corporate environment.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Coursework	50%		√	√			
2. Examination	50%	√	√	√			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The design of the coursework emphasise on the testing the students' understandings in relating investment theories to asset management practices and regulatory controls in the industry. All intended learning outcomes will be evaluated in the examination.

Student Study Effort Required

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Readings / Coursework	80 Hrs.
Total student study effort	119 Hrs.

Reading List and References

Recommended:

Acharya, S. (2002), *Asset Management: Equities Demystified*, John Wiley & Sons, Ltd. England.

Baum, A., and Hartzell, D. (2011). Global Property Investment Strategies, Structures, Decisions. Chichester, West Sussex, Hoboken, NJ: Wiley-Blackwell.

Bosak, A., Mayer, B. and Vögel, H. (2007). *Real Estate Asset Management*. Vienna, Austria: Europe Real Estate Asset Management.

Gibson, R (2000). *Asset Allocation: Balancing Financial Risk*, McGraw Hill, New York.

Hughes, D. (2002). *Asset Management in Theory and Practice*, Financial World Publishing, U.K.

Supplemented:

Brown, K. and Reilly, F. (2009). *Analysis of Investment and Management of Portfolios (9th Edition)*, South-Western Cengage Learning, Canada.

Journal of Asset Management.
Journal of Portfolio Management.
Journal of Real Estate Portfolio Management.

Subject Description Form

Subject Code	BRE466
Subject Title	Capstone Project
Credit Value	6
Level	4
Pre-requisite	BRE366
Objectives	The aim of the Capstone Project is to provide students with the opportunity of demonstrating research competence by providing them with a vehicle through which they can reveal a full understanding and evaluation of an issue or a topic that they choose to investigate. The Project is in the form of a final year Dissertation, or any other format to be decided by the Scheme Committee from time to time. In the case of a Dissertation, the issue or the topic should be based on their programme, award or major, in studies relevant to the construction and real estate industry and of particular concern to Hong Kong and its neighbouring environments. The study might include an extensive literature review; the discovery, development or enhancement of a research model; the development of a measurement instrument, such as a questionnaire; or the comparison of statistical models for the evaluation of existing data. Where appropriate, students might join a departmental research group where they would be able to assist staff by working in a particular field of study. In cases other than the Dissertation, the format of the Project will be announced prior to its commencement.
Intended Learning Outcomes	Upon completion of the subject, students will be able to complete a capstone project. They should be able to: Generally a) display a culminating set of personal, academic and professional experiences/learning; b) synthesize, integrate and/or apply previous knowledge instead of solely acquiring new knowledge/skills; c) apply general education principles; d) engage in an interdisciplinary inquiry of at least two or more disciplines; Specifically in the case of a final year Dissertation e) produce a research proposal related to a topic in the field of construction and real estate; f) apply an appropriate research methodology to the chosen topic; g) conduct a critical and comprehensive literature review; h) analyse data and evaluate findings; i) communicate their ideas in a clear, concise and precise manner; and j) produce a dissertation that is based on their research and written in good English.
Subject Synopsis/ Indicative Syllabus	In the case of a final year Dissertation: (i) **Property Management and Surveying students** will identify a topic in the field of construction and real estate to study in depth in the final year. The Dissertations are grouped into a number of study areas

	within the research theme of the Department such as real estate investment and finance, land and construction economics, construction management and construction technology and science, and property and facilities management. (ii) **BEM students** will be advised to identify a topic in the field of Building Engineering and Management. The topic should be engineering-oriented or engineering related area in construction. The Dissertations are grouped into a number of study areas within the research themes of the Department such as construction technology and science, production engineering, production and contract management, engineering economics, construction quality in engineering works, application of information technology in the building industry, engineering materials, etc. Occasionally, if a student proposes a topic which is not within the context of engineering orientation, consideration and prior approval need to be sought from the BEM Programme Management Team.
Teaching/Learning Methodology	Academic leadership is provided by the Capstone Project Committee comprising Capstone Project Co-ordinators and Scheme Chair. The Committee is assisted by the supervisors who are BRE academic staff with research experience. In the case of final year Dissertation, each student will work under the guidance of a supervisor and, if necessary, a second supervisor may be appointed to assist in project supervision. The project supervision is timetabled for one hour per two weeks over the whole dissertation study period, but students are expected to devote about a day per week of their own time to carry out study and research work. Students are encouraged to formulate a testable hypothesis with theoretical model or justifications; carry out an empirical test on the hypothesis; and draw inference(s) on research and practical implications from the findings.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks in the case of final year Dissertation	% weighting					Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f	g	h	i	j
1. Final Proposal	10 %	✓	✓			✓	✓	✓			
2. Progress and Efforts	10 %		✓				✓	✓	✓		
3. Reflective Journal	10%	✓	✓								
4. Completed Dissertation	70 %			✓	✓		✓	✓	✓	✓	✓
Total	100 %										

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The assessment of each of the four tasks (Final Proposal, Progress and Efforts, Reflective journal and Completed Dissertations) will be made based on "Assessment Rubrics" that will be adopted and approved by the Dissertation Committee. The "Assessment Rubrics" will be made available for reference by both students and supervisors on the Dissertation Guide web-pages. The main criteria are underlined as listed below.

Final Proposal

The Final Proposal should include a problem statement, a preliminary literature review, the study's aim and objectives, an outline of the research methodology, means of data analysis, and a reference list.

(1) Problem Statement A concise and precise explanation of the problem that the research intends to address and an outline of the scope of study. This in effect provides the purpose of the study.

(2) Literature Review A summary of the relevant theories, research evidence, and descriptive materials bearing on the proposed research, including all information, published or otherwise, that aids in understanding and helps to explain the background to the research.

(3) Aim and Objectives Linking of the problem statement and literature review should be made through a precise statement of a research aim and a number of specific objectives. If a testable question (hypothesis) is to be used then this should be clearly stated. This section is a critical part of the research proposal because the aim and objectives need to be consistent with the purpose of the study.

(4) Research Methodology A statement describing the research design and data collection techniques must be provided. The description must be sufficiently detailed to permit an understanding of the proposed study without discussion with the student. If a questionnaire survey is to be conducted, a provisional questionnaire should be included. Sources of data and sampling technique should be identified along with any restrictions on confidentially and possible problems in data collection. The time

required for phases of the study should be specified.

(5) Data Analysis The way in which the data will be analyzed, including any statistical analysis, should be outlined. If a non-standard form of data analysis is to be used, justification should be given. If computer programs are to be used, they should be identified.

(6) Reference and Bibliographic List Students are recommended to use the Harvard referencing system. Alternatively, students can refer to the Student Handbook for other referencing systems, provided that consistency is adhered to.

Progress and Efforts

During the progress of the research, the student and Supervisor will meet for consultation. It is the responsibility of students to arrange meetings with their supervisors in order that they may report and discuss their progress. It is expected that students devote sufficient time to the Dissertation bearing in mind the requirements outlined in the subject syllabus.

Discussions with Supervisors are essential to explore the challenges faced by the student as they learn about the research topic through the research process. Thus, students are required to produce evidence of their work at their meetings with their Supervisors, so that the problems encountered can be shared and solved together.

Reflective Journal

A reflective journal is a means for students to express their ideas, personal thoughts, perspectives and experiences gained in the learning process of completing the capstone project. Through the self-reflection, it intends to enhance the development of deep and critical thinking skills when they relate their knowledge to real world issues. Students are expected to demonstrate the developmental learning process and their personal growth.

Assessment Pro-forma for "Proposal, Progress and efforts and Reflective Journal" (weighted 30% towards the overall grade)

Element	Criteria	Weighting
Final Proposal	Adequacy, structure, clarity, originality, length	10%
Progress Report	Consultations, diligence, enthusiasm, planning	10%
Reflective Journal	Comprehensiveness, criticality, demonstration of self-learning experience	10%
	Total	**30%**

Completed Dissertation

The Dissertation should include a declaration, an abstract, an introduction, aim and objectives, methodology, literature review, data collection, analysis, and conclusions.

For the purpose of criterion-based assessment, the assessment of the completed Dissertation is divided into six elements, i.e. presentation, aim and objectives, research methodology, literature review, data collection and analysis, conclusions and findings, with a corresponding weighting.

(1) Aim and Objectives A re-statement of the aim and objectives in the Final Proposal (may be included in the Introduction).

(2) Methodology A clear statement of the planned research methods, as well as reporting of any ways in which the original methodology was modified as a result of constraints imposed in actually conducting the research. Some writers included this in the Introduction.

(3) Literature Review The literature search should be fully described showing the keywords and scientific databases used. A strong emphasis should be placed on refereed journal papers which can provide evidence of existing knowledge of the selected topic, obtained through scientific methods. The review should not only describe relevant theories, previous research, and descriptive material that have a bearing on the study, but also evaluate its worth. Evidence of independent analysis of the available literature should also be demonstrated. A basis for the chosen research topic should be established.

(4) Data Collection This section should provide a clear and objective picture of the way in which the data was collected, including identification of any problems encountered and an explanation of the outcome obtained. The data should be summarized and presented in an appropriate form, such as tables and graphs, and not be evaluated or interpreted. Although some writers include analysis of the data in this section, others prefer to cover it separately.

(5) Analysis This section should include the analysis and interpretation of the results of the research. The discussion should explain the degree to which the research objectives were achieved, the possible reasons for non-attainment of some objectives, the ways in which the theories did or did not help to examine the problem, and an evaluation of the research results. In many reports, this section is the most important and often the longest in terms of words.

(6) Conclusions The conclusions or outcomes of the study should be presented in this section. Included should be the major results that the study has achieved, identification of unanswered questions and directions for further study, speculation about the importance of the findings to the body of knowledge in the construction and real estate fields and any other related items that the student wishes to emphasize.

Assessment Pro-forma for "Completed Dissertation" (weighted 70% towards the overall grade)

Element	Criteria	Weighting
Presentation	Syntax, clarity, conciseness, preciseness, structure, aesthetics, graphics, length	10%
Aim and Objectives	Appropriateness and accomplishment of stated aim and objectives, accuracy of application	5%
Research Methodology	Appropriateness, achievability, planning of research design, comprehensiveness, description	15%
Literature Review	Relevant parameters, adequate depth and breadth, accuracy, citations and references	15%
Data Collection and Analysis	Relevancy, accuracy, adequacy, coherence of data analysis, logicality of interpretation	15%

Conclusions and Findings	Validity, logicality, substantiveness, originality, degree of critique, new ideas or models	10%
	Total	**70%**

Academic integrity of assessment tasks

The materials submitted for all the assessment tasks must be the student's own work. The submitted work may not be accepted for the purpose of assessment if its authenticity is questionable. Submitting GenAI-generated materials as students' own work or part of their work is an act of academic dishonesty. Students who are found committing academic dishonesty will face disciplinary actions.

Students shall acknowledge PolyU's stance and follow the guidelines for using GenAI in this assessment: (https://www.polyu.edu.hk/ar/docdrive/polyu-students/Student-guide-on-the-use-GenAI.pdf).

Student Study Effort Required	Class contact:	
	▪ Guided study	10 Hrs.
	Other student study effort:	
	▪ Independent study	260 Hrs.
	Total student study effort	270 Hrs.

Reading List and References

Essential:

HKPolyU Building and Real Estate Department. *Dissertation Guide*. Continuously updated.

Recommended:

Bell, J. (1993) *Doing Your Research Project*, Open University Press.

Blaikie, N (2000) *Designing Social Research: The Logic of Anticipation*. Cambridge: Polity.

Booth, W.C., Colomb, G.G. and Williams, J.M. (2003) *The Craft of Research*, 2nd ed. Chicago: The University of Chicago Press.

Chau K.W., Raftery J. and Walker A. (1998) The Baby and the Bathwater: Research Methods in Construction Management. *Construction Management and Economics*, 16:1, 99-104

Ewing, Reid H., and Park, Keunhyun (2020) *Basic quantitative research methods for urban planners*, New York, NY : Routledge.

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Harris R. and Cundell I. (1995) Changing the Property Mindset by Making Research Relevant. *Journal of Property Research*, 12, 75-78.

Holt G. (1998) *A Guide to Successful Dissertation Study for Students of the Built Environment, 2nd edition*. The Built Environment Research Unit, University of Wolverhampton.

Hussey, J. and Hussey, R. (2003) *Business Research: A Practical Guide for Undergraduate and Postgraduate Students, 2nd Edition*. Basingstoke: Palgrave Macmillian, England.

Kennedy, P. (2003) *A Guide to Econometrics, 5th Edition*, USA: Blackwell Publishing.

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Kumar R. (1996) *Research Methodology: A Step-by-Step Guide for Beginners*. Addison Wesley Longman.

Levitt, R.E. (2007) CEM Research for the Next 50 Years: Maximizing Economic, Environmental, and Societal Value of the Built Environment. *Journal of Construction Engineering and Management*, 133:9, 619-28.

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Lizieri C. (1995) Comment: Relevant Research and Quality Research: the Researcher's Role in the Property Market. *Journal of Property Research*, 12, 163-66.

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Pindyck, R.S. and Rubinfeld, D.L. (1998) *Econometric Models and Economic Forecasts, 4th Edition*, Boston: McGraw-Hill International Editions.

Raftery J., McGeorge D. and Walters M. (1997) Breaking Up Methodological Monopolies: A Multiparadigm Approach to Construction Management Research. *Construction Management and Economics*, 15:3, 291-97.

Render, B. and Stair, R.M. Jr (2000) *Quantitative Analysis for Management, 7th Edition*. Prentice Hall, New Jersey.

Tan, W. (2002) *Practical Research Methods*. Pearson Education Asia Pte Ltd., Singapore.

Walliman, N. (2018) *Research methods: the basics*, Abingdon, Oxon : Routledge; Second edition.

Subject Description Form

Subject Code	BRE4661
Subject Title	Integrated Capstone Project
Credit Value	6
Level	4
Pre-requisite / Co-requisite / Exclusion	Pre-requisite: BRE366 (Analytical Skills and Methods) Exclusion: Any other equivalent capstone project, e.g. BRE466 (Capstone Project)
Objectives	The primary aim of the Integrated Capstone Project is to provide students with the opportunity of demonstrating research competence by providing them with a vehicle through which they can reveal a full understanding and evaluation of an issue or a topic that they choose to investigate. The Project is in the form of a final year Dissertation, and the issue or the topic should be based on the chosen programme major (i.e. Building Engineering and Management), together with the Artificial Intelligence and Data Analytics (AIDA) scheme as their Secondary Major, relevant to the construction industry with particular concerns to Hong Kong and its neighbouring environments. The specific objectives of this subject are to: • provide a student with the opportunity to apply and integrate the knowledge of artificial intelligence and data analytics (AIDA) to his/her chosen discipline of Building Engineering and Management; • develop the capabilities of a student in analyzing and solving complex and possibly real-life problems using AIDA knowledge and skills; and • Train students with skills on systematic development and documentation of a significant piece of work. The study might include an extensive literature review; the discovery, development or enhancement of a research model; the development of a measurement instrument, such as a questionnaire; or the comparison of statistical models for the evaluation of existing data. Where appropriate, students might join a departmental research group with AIDA expertise where they would be able to assist staff by working in a particular field of study.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: <u>Generally</u> a) display a culminating set of personal, academic and professional experiences/ learning; b) synthesize, integrate and/or apply previous knowledge instead of solely acquiring new knowledge/skills; c) apply general education principles; and d) engage in an interdisciplinary inquiry of at least two or more disciplines; <u>Specifically through academic / professional knowledge and skills</u>

	e) produce a research proposal related to a topic in the field of Building Engineering and Management with the identified problems to be solved using AIDA knowledge and skills; f) apply an appropriate research methodology to the chosen topic; g) conduct a critical and comprehensive literature review; h) identify specific problems, analyse data via AIDA knowledge and skills, evaluate findings and provide solutions via AIDA analytical results; i) communicate their ideas in a clear, concise and precise manner; and j) produce a study report that is based on their research and written in good English.
Subject Synopsis/ Indicative Syllabus	For those students choosing the Building Engineering and Management (BEM) programme as their Major and also opting for AIDA scheme as their Secondary Major, they are expected to identify a project topic in the field of Building Engineering and Management with the identified problems to be solved using AIDA knowledge and skills under the supervision of a supervisor with research expertise in artificial intelligence and data analytics. The topic should be engineering-oriented or engineering related area in construction. The Capstone Projects are grouped into a number of study areas within the research themes of the Department such as construction technology and science, production engineering, production and contract management, engineering economics, construction quality in engineering works, application of information or digital technology in the building industry, engineering materials, etc. Occasionally, if a student proposes a topic which is not within the context of engineering orientation, consideration and prior approval need to be sought from the BEM Programme Management Team. Students need to demonstrate their knowledge in both their chosen discipline (BEM) and AIDA in the project, receiving advice from the allocated supervisors. The project should represent requisite efforts in analysing and interpreting the data/information obtained, using the principles and techniques learned from various related subjects. Students are also expected to demonstrate significant analytical and, preferably, research ability in the chosen application domain of AIDA.
Teaching/Learning Methodology	Academic leadership is provided by the Departmental Capstone Project Committee comprising the BRE Undergraduate Scheme Chair and all the Programme Capstone Project Co-ordinators. The Committee is assisted by the supervisors who are BRE academic staff with research experience. The Integrated Capstone Project spans across the final year of study for two consecutive semesters (i.e. first semester and second semester). The teaching/learning activities include regular project meetings with the supervisors, guided study of project materials, independent project development work and other project management tasks. Each student will work under the guidance of a supervisor. The project supervision is timetabled for one hour per two weeks over the whole project study period, but students are expected to devote about a day per week of their own time to carry out study and research work. Students are encouraged to formulate a testable hypothesis with theoretical model or justifications; carry out an empirical test on the hypothesis; and draw inference(s) on research and practical implications from the findings.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (please tick as appropriate)									
		a	b	c	d	e	f	g	h	i	j
1. Final Proposal	15 %	✓	✓			✓	✓	✓			
2. Progress and Effort Report	15 %		✓				✓	✓	✓		
3. Final Report	70 %			✓	✓		✓	✓	✓	✓	✓
Total	100 %										

Explanation of the appropriateness of the assessment methods in assessing the intended subject learning outcomes:

Integrated Capstone Project should be problem-oriented and there are no restrictions on the nature of the problem except that it should be relevant to the student's chosen discipline (BEM) and AIDA. The project could be practical, academic or a hybrid in which the student is encouraged but not constrained to have some original contributions. Each student has to submit a Final Proposal, a Progress and Effort Report and a Final Report. The Final Proposal must be approved by the supervisor before the student can proceed with the Integrated Capstone Project. A mid-term progress and effort report may also be required for proper continuous assessment.

The assessment of each of the three tasks (Final Proposal, Progress and Effort Report, and Final Report) will be made based on the established "Assessment Rubrics" that will be adopted and approved by the Capstone Project Committee. The "Assessment Rubrics" will be made available for reference by both students and supervisors on the Dissertation Guide mounted up to the blackboard subject website. The main assessment criteria are underlined below for reference.

Final Proposal

The Final Proposal should include a problem statement, a preliminary literature review, the study's research aim and objectives, an outline of the research methodology, means of data analysis, a reference list, and an outline schedule of work.

(1) Problem Statement: A concise and precise explanation of the problem that the research intends to address and an outline of the scope of study. This in effect provides the purpose of the study.

(2) Literature Review: A summary of the relevant theories, research evidence, and descriptive materials bearing on the proposed research, including all information, published or otherwise, that aids in understanding and helps to explain the background to the research.

(3) Research Aim and Objectives: Linking of the problem statement and literature review should be made through a precise statement of a research aim and a number of specific objectives. If a testable question (hypothesis) is to be used then this should be clearly stated. This section is a critical part of the research proposal because the aim and objectives need to be consistent with the purpose of the study.

(4) Research Methodology: A statement describing the research design and data collection techniques must be provided. The description must be sufficiently detailed to permit an understanding of the proposed study without discussion with the student. If a questionnaire survey is to be conducted, a provisional questionnaire should be included. Sources of data and sampling technique should be identified along with any restrictions on confidentially and possible problems in data collection. The time required for phases of the study should be specified.

(5) Data Analysis: The way in which the data will be analyzed, including any statistical analysis, should be outlined. If a non-standard form of data analysis is to be used, justification should be given. If computer programs are to be used, they should be identified.

(6) Reference and Bibliographic List: All works cited in the text of the Proposal must be listed under a section entitled References at the end of the Proposal immediately before the appendices. References are necessary in order to provide the reader with adequate information for locating cited materials. Students are recommended to use the **Harvard referencing system**, details of which can be found on websites such as: "https://elc.polyu.edu.hk/Referencing/harvard.aspx". Alternatively, students can refer to the Student Handbook for other referencing systems, provided that consistency is adhered to.

(7) Outline Schedule of Work: Students should include an outline programme in the form of a bar chart showing how they intend to perform the major activities and various tasks in order to meet the key milestone date requirements from inception to completion of their dissertation research, taking into account such intervening disruptions as examinations, study tours and public holidays.

Progress and Effort Report

During the progress of the research, the student and Supervisor will meet for consultation. It is the responsibility of students to arrange meetings with their supervisors in order that they may report and discuss their progress. It is expected that students devote sufficient time to the capstone project bearing in mind the requirements outlined in the subject description form.

Discussions with Supervisors are essential to explore the challenges faced by the student as they learn about the research topic through the whole research process. Thus, students are required to produce evidence of their work at their meetings with their Supervisors, so that the problems encountered can be shared and solved together.

Assessment Proforma for "Final Proposal and Progress Report" (weighted 30% towards the overall grade)

Assessment Components	Assessment Criteria	Weightings
Final Proposal	Adequacy, structure, clarity, originality, length	15%
Progress Report	Consultations, diligence, enthusiasm, planning of work, progress management	15%
Total		**30%**

Final Report

The Final Report should not normally exceed 10,000 words and is expected to include the following items: a declaration, an abstract, an introduction, research aim and objectives, literature review, research methodology, data collection, data analysis, and conclusions.

For the purpose of criterion-based assessment, the assessment of the completed Final Report is divided into six main elements, i.e. overall presentation, research aim and objectives, research methodology, literature review, data collection and analysis, conclusions and findings, with their corresponding weightings.

(1) Declaration: Each student shall print the statement identical to the one shown on Form BREDF4 (Completion Statement) on a fresh page, sign and incorporate in the submitted dissertation report as the first inside page.

(2) Abstract: A brief summary (200-400 words) of the research, normally including the main research objectives, the problems studied and the relevant theories, the methods of enquiry, and the most important results.

(3) Introduction: A description of the problems, along with detailed coverage of the theories and published research related to the research. This section often includes the reasons why the research merits study.

(4) Research Aim and Objectives: A re-statement of the research aim and objectives in the Final Dissertation Proposal (may be included in the Introduction).

(5) Literature Review: The literature search should be fully described showing the keywords and scientific databases used. A strong emphasis should be placed on refereed journal papers which can provide evidence of existing knowledge of the selected topic, obtained through scientific methods. The review should not only describe relevant theories, previous research, and descriptive material that have a bearing on the study, but also evaluate its worth. Evidence of independent analysis of the available literature should also be demonstrated. A basis for the chosen research topic should be established.

(6) Research Methodology: A clear statement of the planned research methods, as well as reporting of any ways in which the original methodology was modified as a result of constraints imposed in actually conducting the research. Some writers included this in the Introduction.

(7) Data Collection: This section should provide a clear and objective picture of the way in which the data was collected, including identification of any problems encountered and an explanation of the outcomes obtained. The data should be summarized and presented in an appropriate form, such as tables and diagrams, and not be evaluated or interpreted. Although some writers include analysis of the data in this section, others prefer to cover it separately.

(8) Data Analysis: This section should include the analysis and interpretation of the results of the research. The discussion should explain the degree to which the research objectives were achieved, the possible reasons for non-attainment of some research objectives, the ways in which the theories did or did not help to examine the problems, and an evaluation of the research results. In many reports, this section is the most important and often the longest in terms of words.

(9) Conclusions: The conclusions or outcomes of the study should be presented in this section. Included should be the major results that the study has achieved,

identification of unanswered questions and directions for further study, speculation about the importance of the findings to the body of knowledge in the construction and real estate fields and any other related items that the student wishes to emphasize.

(10) Reference and Bibliographic Lists: The Reference list should include full details of all publications cited in the Dissertation Report (see Item 4.6 for details), whereas the Bibliographic list (optional) contains details of all publications that have been used in the preparation.

(11) Appendices: The appendices should include copies of survey questionnaires, lengthy tables, graphs and lists not considered appropriate for inclusion within the main body of the Dissertation Report. Students should see the completed Dissertation Report as a holistic piece of scholarly work. The focus of the study topic should be clearly shown in the title, and throughout each chapter. The student should try to show the linkage between the various stages of the research process. Thus there should be 'signposting' throughout the written contents to explain how the chapters each contribute to the research objectives. For example, the literature review should link to the research objectives; the research objectives should link to the research methods; the research methods to the data analysis and explanation of the results; the results to the interpretation and discussion of implications; and finally to the conclusions.

Assessment Proforma for "Final Report" (weighted 70% towards the overall grade)

Assessment Items	Assessment Criteria	Weightings
Overall Presentation	Syntax, clarity, conciseness, preciseness, structure, aesthetics, graphics, length	10%
Research Aim and Objectives	Appropriateness and accomplishment of stated aim and objectives, accuracy of application	5%
Literature Review	Relevant parameters, adequate depth and breadth, accuracy, citations and references	15%
Research Methodology	Appropriateness, achievability, planning of research design, comprehensiveness, description	15%
Data Collection and Analysis	Relevancy, accuracy, adequacy, coherence of data analysis, logicality of interpretation	15%
Conclusions and Findings	Validity, logicality, substantiveness, originality, degree of critique, new ideas or models	10%
	Total	**70%**

Student Study Effort Required	Class contact:	
	▪ Guided study	10 Hrs.
	Other student study effort:	
	▪ Independent study	260 Hrs.
	Total student study effort	270 Hrs.

Reading List and References

Essential:

Department of Building and Real Estate of PolyU. *Dissertation Guide.* (continuously updated).

Recommended (General Research Methods and Skills):

Bell, J. (1993). *Doing Your Research Project*, Open University Press.

Blaikie, N. (2000). *Designing Social Research: The Logic of Anticipation*. Cambridge: Polity.

Booth, W.C., Colomb, G.G. and Williams, J.M. (2003). *The Craft of Research*, 2nd ed. Chicago: The University of Chicago Press.

Chau, K.W., Raftery, J. and Walker, A. (1998). The baby and the bathwater: Research methods in construction management. *Construction Management and Economics*, *16*(1), 99-104.

Fellows, R.F. and Liu, A.M.M. (2015). *Research Methods for Construction*, 4th edition, Blackwell Science.

Harris, R. and Cundell, I. (1995). Changing the property mindset by making research relevant. *Journal of Property Research*, *12*, 75-78.

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Render, B. and Stair, R.M. Jr (2000). *Quantitative Analysis for Management, 7th Edition*. Prentice Hall, New Jersey.

Tan, W. (2002). *Practical Research Methods*. Pearson Education Asia Pte Ltd., Singapore.

Recommended (Artificial Intelligence and Data Analytics / AIDA):

Bock, T. and Linner, T. (2016). Construction Robots Elementary Technologies and Single-Task Construction Robots. In *Construction Robots: Elementary Technologies and Single-Task Construction Robots* (p. I). Cambridge: Cambridge University Press.

Darko, A., Chan, A.P.C., Adabre, M.A., Edwards, D.J., Hosseini, M.R. and Ameyaw, E.E. (2020). Artificial intelligence in the AEC industry: Scientometric analysis and visualization of research activities. *Automation in Construction, 112*, 103081.

Fan, H. and Li, H. (2013). Retrieving similar cases for alternative dispute resolution in construction accidents using text mining techniques. *Automation in Construction, 34*, 85-91.

Fan, H., Xue, F. and Li H. (2015). Project-based as-needed information retrieval from unstructured AEC documents. *Journal of Management in Engineering*, January, *31*(1).

Guo, B.H.W., Zou, Y., Fang, Y., Goh, Y.M. and Zou, P.X.W. (2021). Computer vision technologies for safety science and management in construction: A critical review and future research directions. *Safety Science, 135*, 105130. https://doi.org/10.1016/j.ssci.2020.105130

Hou, L., Wu, S., Zhang, G. (Kevin), Tan, Y. and Wang, X. (2020). Literature review of digital twins applications in construction workforce safety. *Applied Sciences*, *11*(1), 339. https://doi.org/10.3390/app11010339

Rafael Sacks, Chuck Eastman, Ghang Lee and Paul Teicholz (2018). *BIM Handbook: A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers*, 3rd Edition. Wiley.

Shen, L., Yan, H., Fan, H., Wu, Y. and Zhang, Y. (2017). An integrated system of text mining technique and case-based reasoning (TM-CBR) for supporting green building design. *Building and Environment*, *124*, 388-401.

Wang, D., Dai, F. and Ning, X. (2015). Risk assessment of work-related musculoskeletal disorders in construction: State-of-the-art review. *Journal of Construction Engineering and Management*, *141*(6), 04015008. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000979

Wang, Q. and Kim, M.K. (2019). Applications of 3D point cloud data in the construction industry: A fifteen-year review from 2004 to 2018. *Advanced Engineering Informatics*, *39*, 306-319. https://doi.org/10.1016/j.aei.2019.02.007

Yan, H., Yang, N., Peng, Y. and Ren, Y. (2020). Data mining in the construction industry: Present status, opportunities, and future trends. *Automation in Construction*, *119*, 103331.

Zacharias, Voulgaris and Yunus, Emrah Bulut (2018). AI for Data Science: Artificial Intelligence Frameworks and Functionality for Deep Learning, Optimization, and Beyond. First Edition, Technics Publications.

Machine Learning: https://www.coursera.org/learn/machine-learning/home/welcome

MathWorks: https://www.mathworks.com/solutions.html?s_tid=gn_sol

Subject Description Form

Subject Code	BRE469
Subject Title	Integrated Professional Workshop III
Credit Value	3
Level	4
Pre-requisite	BRE369
Objectives	*This subject is intended to:* • Encourage the critical investigation, analysis and synthesis in solving problems in a multi-disciplinary surveying professional context • Provide a platform for the students in different surveying disciplines to comprehend the essential knowledge of their partnering surveying disciplines • Promote the students' understanding of the interdisciplinary nature of the surveying professions and enhance knowledge integration across different surveying disciplines • Cultivate social responsibility, professional ethics and the awareness of trends and opportunities in the surveying professions. • Facilitate the students to develop lifelong learning skills for professional and personal development.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Understand how to integrate subject content and apply it to practical scenarios b) Be aware of the value of teamwork as an approach to tackle a project and solve problems c) Apply knowledge and skills of different surveying professions to solve problems in a multi-disciplinary professional context d) Be aware of issues, policies and trends relating to the broader professional practice and the society e) Identify needs for self-learning and use lifelong learning skills for learning autonomously
Subject Synopsis/ Indicative Syllabus	BRE269, BRE369 and BRE469 are integrated with different levels of complexities. They are provided as a means to let the surveying students to learn and apply knowledge covering the five surveying disciplines (BS, GP, PDD, FPM and QS). Students will be equipped with the essential core knowledge of surveying disciplines, other than the one they shall choose to specialize in. The course will be delivered through a mix of seminars, project work and student-centered learning. **Multi-discipline Seminars** A series of seminars will be set to bridge across the professional knowledge of students in different surveying disciplines so as to give them an all-round training in the surveying profession. They will be given problem-based assignments and asked to attend seminars so as to equip themselves with the knowledge base and professional

skills to identify and solve the problems. Practitioners in the surveying-related professions may be invited to deliver up-front professional knowledge to the students.

Multi-discipline Project work

A series of construction and property related project scenarios will be set to integrate the knowledge of different surveying disciplines. The project will be designed to link as many of the individual subjects as possible into a common theme. They will study and undertake project work as a surveyor trainee under supervision in the surveying profession. The projects will also provide a team work opportunity for the students to simulate the actual work environment in a multi-disciplinary professional or industrial setting. The projects will be delivered by a team of lecturers drawn from the surveying profession so as to ensure the students can have an all-round training in the surveying profession.

Student-centered learning

A set of assignments will be delivered to the students to undergo research on specific subject areas that enhance their learning abilities in different surveying disciplines. In addition to seminars, students are expected to undertake guided study through web-based self-learning. They will be required and encouraged to take extra efforts to study subjects beyond their chosen surveying disciplines to acquire the minimum core competence of the five surveying disciplines.

Teaching/Learning Methodology

The project component "P" adopts a holistic approach. Students will form interdisciplinary team to share, integrate and apply knowledge. The seminars and student centred learning component "S" is designed for students to acquire the core competence for surveying disciplines in addition to their own choice of discipline.

The core competence areas related to different surveying disciplines are listed in the first column. Students are grouped accordingly to their choice of progression pattern. The second column "QS" shows that a QS student will acquire the core competence of GP, PDD and PFM. Similar interpretations will apply in the cases of BS, GP and PDD students.

	Student Group Base on the choice of discipline			
QS				
Construction economics	P	P	P/S	P/S
Contract documentation, measurement & estimating	P	P	P/S	P/S
Construction contract law & administration	P	P	P/S	P/S
Construction technology & structure	P	P	P/S	P/S
Cost & value management	P	P/S	P/S	P/S
Dispute resolution	P	P/S	P/S	P/S
BS				
Maintenance technology & management	P	P	P	P
Building ordinance and related legal aspects	P	P	P	P
Construction technology & structure	P	P	P/S	P/S
Building economics and contract administration	P	P	P/S	P/S
Facility management	P/S	P	P/S	P/S
Design, adaptation and conversion	P/S	P	P/S	P/S
GP				
Property valuation	P/S	P/S	P	P
Property investment and finance	P/S	P/S	P	P/S
Property management and accountancy	P/S	P/S	P	P
Legal Studies: Sales and lettings of land and buildings	P/S	PS	P	P
Urban economics and real estate development	P/S	P/S	P	P/S
Business appraisal and asset management	P/S	P/S	P	P/S
Planning and development (PDD)				
Urban planning	P/S	P/S	P/S	P

Property investment and finance	P/S	P/S	P	P
Property development appraisal	P/S	P/S	P/S	P
Business appraisal and accountancy	P/S	P/S	P	P
Urban economics and real estate development	P/S	P/S	P	P
Transportation and environmental impact and assessment	P/S	P/S	P/S	P/S
Property and facility management (PFM)				
Property asset management	P/S	P/S	P	P
Corporate real estate	P/S	P/S	P	P
Project management	P	P	P	P
Property management	P/S	P	P	P

Note:
P: Professional Projects
S: Seminars / Student centre-learning activities

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
Coursework	100 %	√	√	√	√	√	
Total	100 %						

Student Study Effort Required	Class contact:	**Student Study Effort Required**
	▪ Lecture	2 Hrs.
	▪ Tutorials	13 Hrs.
	Other student study effort:	
	▪ Project	75 Hrs.
	▪ Independent Self-study	65 Hrs.
	Total student study effort	155 Hrs.

Reading List and References	To be assigned by participating lecturers of various subjects under the BRE Scheme.

Subject Description Form

Subject Code	BRE471
Subject Title	Advanced Property Management
Credit Value	3
Level	4
Pre-requisite	BRE341 or BRE371 or its equivalent
Objectives	1. To stimulate the students in tackling practical property management issues. 2. To enhance the abilities of the students in the interpretation of relevant legislations and guidelines that related to property management. 3. To analyze property management standards of selected regions.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Evaluate the concepts, tools and techniques of property management operations. b. Apply current legislative measures which affect property management in maintenance, usage and taxation cases. c. Apply the techniques of property management to solve complex management problems in both private and public sectors. d. Explore the sources of conflicts between different types of stakeholders within the economic and social environment and their remedies. e. Possess knowledge of contemporary issues.
Subject Synopsis/ Indicative Syllabus	Legal framework of property management: Building Management Ordinance, Landlord and Tenant (Consolidation) Ordinance and Deed of Mutual Covenant. Financial framework of maintenance and capital expenditure for different types of building works, service and management charge implementation and analysis. Application of conflict management and human resources management to property management tasks and the development of property performance measurement systems. Wherever possible, case studies will be used to illustrate how management principles can be applied into property management practice.
Teaching/Learning Methodology	Teaching will utilize problem based learning approach. Lectures will provide basic concepts to enhance students in future research. Tutorial sessions will be used to underpin and develop the learning established in the lecture by workshops on practical issues and seminars on key themes. Outside speakers will be invited to give talks on current property management practices in Hong Kong as well as other countries.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Coursework	30 %	✓	✓	✓	✓	✓	
2. Examinations	70 %	✓	✓	✓	✓	✓	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Students will be assessed through both coursework and examination.
Coursework will consist of 1 term paper and problem solving assignments.

Both examination and coursework assess learning outcome a to e.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Self-studies	81 Hrs.
▪	Hrs.
Total student study effort	120 Hrs.

Reading List and References

Reading List:

Recommended:

Buildings Department (2002), “Building Maintenance Guidebook”, Hong Kong SAR Government

Chiu, L.H.R. (2006), Professional Housing Management in Hong Kong, Hong Kong University Press

Dunlap N. (2018) Principle of Real Estate Management, Institute of Real Estate Management, Chicago, IL, Seventeenth edition.

Goo, S.H., and Lee, A., (2003) Land Law in Hong Kong, Butterworths

Malcolm Merry (2003), “Hong Kong Tenancy Law”, Butterworths

Mau, S.D., (2006), Hong Kong Legal Principles: Important Topics for Students and Professionals, Hong Kong University Press

Paul Kent, Malcolm Merry and Megan Walters (2002), “Building Management in Hong Kong”, Butterworths

	Robert C. Kyle (2000), “Property Management”, 6e, Dearborn Financial Publishing Sihombing, J., and Wilkinson, M., (2002) A Student’s Guide to Hong Kong Conveyancing, Butterworths **Essential:** "Chapter 626 of the Laws of Hong Kong". Hong Kong e-Legilsation. Retrieved 15 April 2020. “Deed of Mutual Covenant and Owners' Corporation". The Community Legal Information Centre operated by the Law & Technology Centre of the University of Hong Kong. Retrieved 15 April 2020. "Licensing Regime Consultation". Property Management Services Authority. Retrieved 15 April 2020. **Supplementary:** Geltner, D and Miller, N. G. (2001), “ Commercial Real Estate Analysis and Investment”, Prentice Hall Joseph W. DeCarlo, (1997), “Property Management”, Prentice Hall. Corgel, John B. (2001), “Real Estate Perspectives: An Introduction to Real Estate”, 4e, McGraw-Hill David Flux, (2005), “Hong Kong Taxation: Law & Practice (2008-09 Edition)”, The Chinese University Press

Subject Description Form

Subject Code	BRE472
Subject Title	Information Technology and Building Information Modelling for Construction Management
Credit Value	3
Level	4
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject is intended to develop an understanding of the practical application of computer systems and packages in building life cycle process and the application of building information modelling (BIM) in construction.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. understand and demonstrate knowledge of building life cycle process. b. understand and demonstrate knowledge of the application of computer systems, BIM, Artificial Intelligence (AI), and Big Data analytics in various procurement stages of a building project. c. appraise commercially available and tailor-made computer packages and BIM application in building life cycle process.
Subject Synopsis/ Indicative Syllabus	The process of building life cycle. Identifying the benefits of construction IT/ BIM applications. Understanding core values of BIM, and its applicability in construction practice. The appraisal of IT/BIM systems in design, cost planning, procuring, project management and facility management. Understanding the fundamental theories behind AI and Big Data analytics, and existing tools. Exploring the use of AI and Big Data analytics in various construction applications. Exploring the extended use of BIM by combining it with AI and Big Data analytics.

Teaching/Learning Methodology	Lectures and tutorials will be run throughout the semester period. A lecture schedule outlining the topics to be covered will be distributed to students in the first lecture of the semester. During the tutorials, students will be required to assess and use various IT/BIM tools (e.g., Revit, Navisworks, AI/Big Data analytics packages) and to prepare group assignments.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Individual Assignments (Tutorials)	20%	√	√	√			
2. Focus Study Report (Group project)	30%	√	√	√			
2. Examination	50%	√	√	√			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Coursework and examination will each constitute 50% of the overall assessment for the subject. The coursework mark will be based on the individual assignments and one group project (i.e., a focus study on potential applications of IT systems, BIM, AI, and Big Data analytics to solve existing practical problems during the life cycle of the building projects).

The examination will be based on a 2 hours examination gearing towards the materials covered in the lecture periods and background readings. Coursework by assignment and group projects will be set to assess the students' abilities and skills required in this subject.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Tutorials / Laboratory sessions	13 Hrs.
	Other student study effort:	
	▪ Self learning and recommended reading	90 Hrs.
	Total student study effort	129 Hrs.

Reading List and References	ASCE Journal of Computing in Civil Engineering (http://*www.asce.org).* *Automation in Construction.* An International Research Journal. (http://*www.elsevier.com/locate/autocon).* Bryde, D., Broquetas, M. and Volm, J.M. (2013). *The Project Benefits of Building Information Modelling (BIM),* International Journal of Project Management, Volume 31, Number 7, pp. 971-980. Construction Industry Council (2014/15), Roadmap / Standard for Building Information Modelling in Hong Kong's Construction Industry. Eastman, C., Eastman, C.M., Teicholz, P., Sacks, R. and Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors, John Wiley & Sons. Electronic Journal of Information Technology in Construction (http://*www.itcon.org).* Azhar, S. (2011). Building information modeling (BIM): Trends, benefits, risks, and challenges for the AEC industry. Leadership and management in engineering, 11(3), 241-252. Gu, N., & London, K. (2010). Understanding and facilitating BIM adoption in the AEC industry. Automation in construction, 19(8), 988-999. Darko, A., Chan, A. P., Adabre, M. A., Edwards, D. J., Hosseini, M. R., & Ameyaw, E. E. (2020). Artificial intelligence in the AEC industry: Scientometric analysis and visualization of research activities. Automation in Construction, 112, 103081. Bilal, M., Oyedele, L. O., Qadir, J., Munir, K., Ajayi, S. O., Akinade, O. O., ... & Pasha, M. (2016). Big Data in the construction industry: A review of present status, opportunities, and future trends. Advanced engineering informatics, 30(3), 500-521.