THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

POSTGRADUATE SCHEME

IN

INDUSTRIAL AND SYSTEMS ENGINEERING

Scheme Code : 45100

Leading to the awards of

MSc in Knowledge and Technology Management
Programme Code: 45100-MT/MTT
and
MSc in Industrial and Logistics Systems
Programme Code: 45100-ML/MLS

PROGRAMME REQUIREMENT DOCUMENT

(For 2020/21 intake)

September 2020

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This Scheme Handbook is applicable for 2020/21 intake. It is subject to review and changes which the Department can carry out from time to time. Students will be informed of the changes as and when appropriate.

1 General Information

1.1 Programme Title

Postgraduate Scheme in Industrial and Systems Engineering

1.2 Programme Code

45100

1.3 Mode of Study

Mixed-Mode

This programme of study provides an option for students to engage in a full-time (9 credits or more per semester) or part-time study load (less than 9 credits per semester). Full-time students normally take 5 subjects in a semester, and part-time students usually take 2 subjects. Students may have their study load vary from semester to semester which will accordingly affect their entitlement to University's services.

1.4 Normal Duration for completion of a programme (applicable to students admitted in or after 2020/21)

Award	*Duration*
Master of Science (MSc)	1 ~ 2.5 year
Postgraduate Diploma (PgD)	

1.4.1 Students should complete the programme within the normal duration of the programme as specified in the Programme Requirement Document. Those who exceed the normal duration of the programme will be de-registered from the programme unless prior approval has been obtained from relevant authorities. The study period of a student shall exclude deferment granted for justifiable reasons, and the semester(s) when the student has been approved to undertake internship. Any semester in which the students are allowed to take zero subject will be counted towards their total period of registration.

1.4.2 Students who have been registered for the normal duration of the programme may request extension of their studies for up to one year with the approval of the relevant Heads of Department/Deans of Independent School. Applications for extension of study period beyond one year and up to two years will require the approval from Faculty/School Board Chairman.

1.4.3 For part-time Taught Postgraduate Programmes, the Heads of Department/Deans of Independent School may approve the extension of studies up to two years, and Faculty/School Board Chairman may approve the extension of studies beyond two years and up to four years.

1.4.4 Students who have exceeded the normal duration of the programme for more than two years (four years for part-time Taught Postgraduate programme) and have been de-registered can submit an appeal to the Academic Appeals Committee to request further extension. If the appeal fails, the student shall be de-registered.

1.5 Fund Type

Self-financed

1.6 Final Awards

Two levels of award, namely Master of Science Degree (MSc) and Postgraduate Diploma (PgD) are offered to students successfully completing the required content of the respective awards. The awards can be in any of the following areas (specialisms):

- Knowledge and Technology Management
- Industrial Logistics Systems

1.7 Entrance Requirements

A Bachelor's degree or a professional qualification, or equivalent, is required. (Consideration will also be given to candidates without a degree but with other relevant qualifications supplemented by appropriate and sufficient working experiences.)

<u>English Language Requirement</u>

Applicants who are not native speakers of English, and the Bachelor's degree or equivalent qualification is awarded by institutions where the medium of instruction is not English, they are expected to fulfil the following minimum English language requirement:

(a) A Test of English as a Foreign Language (TOEFL) score of 80 for the Internet-based test or 550 for the paper-based test; OR

(b) An overall Band Score of at least 6 in the International English Language Testing System (IELTS).

Individual cases will be considered on their own merit by the departments concerned. Applicants may be required to attend interviews or tests to further demonstrate their language proficiency.

1.8 Graduation Requirements

A student would be eligible for award if he/she satisfies all the conditions listed below:

(a) Accumulation of the requisite number of credits – 30 for MSc; 18 for PgD; and

(b) Satisfying the residential requirement for at least 1/3 of the credits to be completed for the award he/she is currently enrolled, unless the professional bodies stipulate otherwise; and

(c) Satisfying all requirements as defined and/or stipulated for the respective awards and as specified by the University; and

(d) Having a Grade Point Average (GPA) of 1.7 or above all at the end of the programme; and

(e) Having successfully completed the Online Tutorial on Academic Integrity (see below).

Online Tutorial on Academic Integrity – A mandatory requirement for graduation

To help students understand the importance of academic honesty and learn ways to ensure that their work and behavior at PolyU are acceptable in this regard, students admitted to the Scheme will be required to complete an Online Tutorial on Academic Integrity on a mandatory basis. Students need to complete the Tutorial preferably by Week 5 and the latest by the end of the first semester when they are admitted to the programme. Students without completing the Tutorial successfully will not be considered for graduation.

The Online Tutorial can be accessed on LEARN@PolyU (理學網). It takes approximately two hours to complete. Details information and instructions about the tutorial are posted at "*Online Tutorial on Academic Integrity: A Student Guide*".
(URL: https://www.polyu.edu.hk/ogur/academic_integrity/Student_Guide.pdf)

1.9 Fee per Credit

HK$3,800 (local students) / $5,000 (non-local students)

1.10 Daytime and Evening Teaching

Subjects will be offered predominately in evenings and/or on weekends. Some subjects may be offered in daytime. Subject to departmental discretion, teaching may be provided in summer term. In general, each subject requires a 3-hour class per week over a 13-week semester. However, some subjects may be offered in block/intensive mode and are held in consecutive days including a weekend. You are strongly advised to consult the timetable to ascertain the delivery pattern of a subject before registering it.

2 Aims and Outcomes

2.1 University Mission

The Scheme is able to fulfil the University mission of:

2.1.1 To pursue impactful research that benefits the world;

2.1.2 To nurture critical thinkers, effective communicators, innovative problem solvers and socially responsible global citizens; and

2.1.3 To foster a University community in which all members can excel in their aspirations with a strong sense of belonging and pride.

2.2 Programme Aims

Depending on needs, a student's selected programme of study can be designed for one or more of the following:

2.2.1 an in-depth treatment of an area beyond the student's first degree level in the same area;

2.2.2 updating of the knowledge of those engaged in a field especially where the discipline at undergraduate level is subject to rapid expansion or change;

2.2.3 a re-orientation or conversion to areas new to the student (in that it is in an area not directly related to the student's first degree); and

2.2.4 a synthesis and integration of a number of disciplines or subjects, particularly if the combination cannot be pursued adequately at undergraduate level.

Each programme offered in the Pg Scheme addresses the needs of its own professions. Please refer to the respective programme entries on *P. 1-10 to 1-17* for details.

2.3 Programme Outcomes

Programme outcomes refer to the intellectual abilities, knowledge, skills and attributes that a graduate from the programme should possess. Each programme offered within the Pg Scheme has its unique learning outcomes. Please refer to the respective programme entries on *P. 1-10 to 1-17* for details.

2.4 Relationship between University Mission and Programme Aims/Outcomes

Please refer to the respective programme entries on *P. 1-10 to 1-17* for details.

2.5 Relationship between Programme Outcomes and Subjects

Please refer to the respective programme entries on *P. 1-10 to 1-17* for details.

3 Curriculum Structure

3.1 To be eligible for the award of an MSc, students need to successfully complete 30 credits. To be eligible for the award of a PgD, students need to successfully complete 18 credits.

3.2 Each award has stipulated the requisite number of *compulsory* and/or *core* subjects, as detailed on *P. 1-18*. Students may choose *Elective* subjects from those listed within and outside the Scheme. Students will be informed of their choices during the online subject registration exercise of each semester. Please refer to the respective programme entries on *P. 1-10 to 1-17* for the pool of stipulated *compulsory* and/or *core* subjects. Not all subjects as listed are offered each year. The subject offering departments have the absolute discretion in determining the offer schedule.

3.3 Subject syllabi for compulsory, core and elective subjects can be found in *Part III*.

4 Assessment Regulations

Academic regulations governing the Scheme are given in *Part II*.

5 Staff of the Scheme

Scheme Chairman	Scheme Members
Prof. CF Cheung, Professor Tel. 2766 7905 *Email: benny.cheung@polyu.edu.hk*	Prof. P Ji, Professor Tel. 2766 6631 *Email: p.ji@polyu.edu.hk* Dr PC Chen, Senior Teaching Fellow Tel. 2766 4976 *Email: pc.chen@polyu.edu.hk* Dr Ren JZ Tel. 2766 6596 *Email: jingzheng.jz.ren@polyu.edu.hk*

MSc/PgD in	Programme Leaders
Knowledge and Technology Management	Prof. CF Cheung, Professor Tel. 2766 7905 *Email: benny.cheung@polyu.edu.hk*
Industrial Logistics Systems	Prof. P Ji, Professor Tel. 2766 6631 *Email: p.ji@polyu.edu.hk*

5.1 Departmental Postgraduate Programme Committee

The Head of Department can decide on the composition of the Departmental Postgraduate Progamme Committee. The committee will exercise the overall academic and operational responsibility for the programmes and its development within defined policies, procedures and regulations.

The Committee will be specifically responsible for the following:

5.1.1 the effective delivery, organisation and development of the programme;

5.1.2 stimulation of the development of teaching methods and programme materials, through Heads of Departments, Theme Group Leaders, and the Educational Development Centre, as appropriate;

5.1.3 review of academic regulations, admission policy, assessment and examination methods;

5.1.4 formal submissions to appropriate professional bodies, normally via the Head of the host Department and in accord with the University's established procedures;

5.1.5 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);

5.1.6 definition and maintenance of the programme's academic standard;

5.1.7 ensuring that the views of students and other key stakeholders on the programme are known and taken into account;

5.1.8 evaluation of the operation, health and progress of the programme as defined in the University's programme review procedures.

5.2 Programme Leader

A Programme Leader is normally a member of the programme offering Department and is appointed by the Head of Department. The appointment is subject to the confirmation by the Chairman of the Faculty Board. In the unavoidable absence of a Programme Leader, an acting Programme Leader will be appointed by the Head of the programme offering Department. A Programme Leader is accountable for day-to-day operations; and normally holds office for a full cycle of the programme, but can then be considered for re-nomination. The Programme Leader provides the academic leadership for the programme.

5.3 Theme Group Leaders

Theme Group Leaders are senior members of academic staff appointed by the Head of Department. They are responsible for the activities and development of subjects within a theme group which are part of the curricula of the programmes offered by the Department.

5.4 Student/Staff Consultative Group

The importance of assessing student's opinion on the organisation and running of the programme on a continual basis is recognised and formal arrangements for this purpose are put in place. The Group should have equal numbers of students and staff, that student membership should include all years of study under the normal progression pattern and other major student groupings, and that staff membership should cover all the main subject areas and activities of the programme. The programme leader may chair the Group. The Group is to discuss any matters directly related to the programme, and to report or make recommendations, as deemed necessary, to the Departmental Postgraduate Scheme Committee. Meetings are usually held once per semester.

6 Student Counselling

The Postgraduate Programme Committee and Programme Leaders are the elements of a feedback system in programme management. Their responsibilities include examining the information received from the stakeholders, modifying the plan as appropriate, using appropriate measurement data to evaluate the programme outcomes as the process is implemented, and suggesting changes in the subject content, the extracurricular content or any other revisions needed to improve the programme when its performance falls short of the benchmarks. Their contact numbers and email addresses are given in section 5.

7 Programme Evaluation and Development (PED)

7.1 The PED procedures are intended to assess the:

7.1.1 extend to which the aims and objectives are met and what measures need to be taken in account to remedy any shortfalls identified; and

7.1.2 ongoing relevance of the aims and subject objectives and the ways they need to be modified to take into account of technological change and the development of Hong Kong's industries.

7.2 The programme evaluation procedures are conducted at two levels: firstly at the Departmental Postgraduate Programme Committee level continuously through the year and secondly to the Departmental Postgraduate Programme Committee / Departmental Academic Advisor level at the end of each year. The first level is described in Section 5 of this document and the others are listed below.

7.3 The Departmental Postgraduate Programme Committee holds its Annual Programme Review Meeting each year after the BoE has met as described in Part II. The issues described in Section 5 are considered, particularly as revealed by examination performance, and recommendations for action are made to remedy any deficiency identified. Following the Annual Programme Review Meeting, the Programme Leaders are required to submit the Annual Programme Reports (which is encapsulated as part of the Department's

Business Plan) to the Engineering Faculty Board each year for reporting the following issues in the previous academic year:

7.3.1 summarises the operation of the programmes;

7.3.2 lists any modifications that are deemed necessary; and

7.3.3 proposes substantial changes to the structure or content of the programmes, or for changes with significant resource implications.

7.4 The Departmental Postgraduate Programme Committee adopts a policy of continuous improvement and is continuously evaluating the effectiveness and relevance of the programmes. This policy of continuous improvement includes soliciting the view of the Department's Advisory Committee, local industrialists, graduates, and the Department Academic Advisor.

7.5 The Programmes are subject to an evaluation periodically as part of the PolyU's Departmental Assessment exercise. This is external to the Department and makes a critical appraisal of the standing, progress, and the future development of all programmes that a department operates. The policy of continuous improvement as mentioned in 7.4 attempts to render a major in-depth programme appraisal unnecessary prior to a Departmental Review.

Master of Science/Postgraduate Diploma in Knowledge and Technology Management

1 Programme Aims

The programme provides a unique and flexible opportunity for participants, with diverse backgrounds to customise their learning in areas of technology and innovation based on their professional needs. The aims of the programme are to enable participants to:

(a) Develop their competence in understanding innovation cycles and ultimately turn innovations into commercial successes;

(b) Understand the financial and strategic implications of the development, acquisition, and implementation of knowledge and technology practices in an organisation;

(c) Enhance their technical and non-technical awareness of knowledge and technological development in their chosen field of interest.

2 Relationship of Programme Aims to University Mission

The University has the following mission:

(a) To pursue impactful research that benefits the world.

(b) To nurture critical thinkers, effective communicators, innovative problem solvers and socially responsible global citizens.

(c) To foster a University community in which all members can excel in their aspirations with a strong sense of belonging and pride.

The following table illustrates the relationship between programme aims and University mission:

Programme Aims	University Mission		
	(a)	(b)	(c)
(a)	✓	✓	✓
(b)	✓	✓	
(c)	✓	✓	✓

3 Institutional Learning Outcomes

The institutional learning outcomes for taught postgraduate programmes are:

(a) **Professional competence of specialists/leaders of a discipline/profession:** Graduates of PolyU taught postgraduate programmes will possess in-depth knowledge and skills in their area of study and be able to apply their knowledge and contribute to professional leadership.

(b) **Strategic thinking:** Graduates of PolyU taught postgraduate programmes will be able to think holistically and analytically in dealing with complex problems and situations pertinent to their professional practice. They will be versatile problem solvers with good mastery of critical and creative thinking skills, who can generate practical and innovative solutions.

(c) **Lifelong learning capability:** Graduates of PolyU taught postgraduate programmes will have an enhanced capability for continual professional development through inquiry and reflection on professional practice.

4 Intended Learning Outcomes of the Programme

The programme has the following intended learning outcomes:

(a) **Professional competence of specialists/leaders of a discipline/profession:** Graduates will possess in- depth knowledge and skills in the areas within knowledge and technology management. They will be able to identify, justify, plan and lead projects in the above areas in organizations, as well measure the success and impact of knowledge and technology management projects and programmes. Moreover, they will be able to understand innovation cycles and ultimately turn innovation into commercial successes.

They will develop their professional competence in the development, acquisition, and implementation of knowledge and technology practice in an organization to meet desired needs.

(b) **Critical and creative thinking:** Graduates will be able to think holistically and/or strategically in dealing with complex problems and situations pertinent to their professional practice to the effective introduction and sustainment of managing knowledge and innovations in organisations. They will be versatile problem solvers with good mastery of critical and creative thinking skills, who can generate practical and innovative solutions to novel problems.

(c) **Lifelong learning capability:** Graduates will be able to learn how to learn and develop their reflective skills in becoming effective learners to engage in life-long learning in managing knowledge and innovation cycle in the field.

5 Relationship of Intended Learning Outcomes to Programme Aims

The following table illustrates the relationship between intended learning outcomes and programme aims:

Intended Learning Outcomes	Programme Aims		
	(a)	(b)	(c)
(a)	✓	✓	✓
(b)	✓	✓	✓
(c)	✓	✓	✓

6 Relationship of Intended Learning Outcomes of the Programme to Institutional Learning Outcomes

The following table illustrates the relationship between intended learning outcomes and institutional learning outcomes:

Intended Learning Outcomes	Institutional Learning Outcomes		
	(a)	(b)	(c)
(a)	✓		
(b)		✓	
(c)			✓

7 Curriculum Map

The curriculum map shown below indicates how each intended learning outcomes of the programme is addressed by the constituent subjects.

Compulsory/Core Subjects		**Intended Learning Outcomes**		
		(a)	**(b)**	**(c)**
ISE518	Workflow Design and Management	✓	✓	✓
ISE525	Global Operations and Logistics Management	✓	✓	✓
ISE542	Managing Knowledge	✓	✓	✓
ISE549	Management of Innovation and Technology	✓	✓	✓
ISE559	Technology Audit and Assessment	✓	✓	✓
ISE5001	Technology Transfer and Commercialisation	✓	✓	✓
ISE5002	Field Study of Technology Organisations	✓	✓	✓
ISE5021	Technology Project Management	✓	✓	✓
ISE5601	Managing and Measuring Intellectual Capital	✓	✓	✓
ISE5606	Business Intelligence and Data Mining	✓	✓	✓

8 Programme Contents

Compulsory Subjects

ISE542	Managing Knowledge
ISE549	Management of Innovation and Technology
ISE5001	Technology Transfer and Commercialisation
ISE5601	Managing and Measuring Intellectual Capital

Core Subjects

ISE518	Workflow Design and Management
ISE525	Global Operations and Logistics Management
ISE559	Technology Audit and Assessment
ISE5002*	Field Study of Technology Organisations
ISE5021	Technology Project Management
ISE5606	Business Intelligence and Data Mining

Elective Subjects

ISE5018	Intellectual Property Management and Strategies
ISE5022	Financial Decision Analysis for Technology Management
ISE5026	Technology Entrepreneurship and Innovation in Practice
ISE5605	Knowledge Communities
MM5112	Organisation and Management

* Students pursuing the MSc award must take this subject if they do not opt for the dissertation.

Master of Science/Postgraduate Diploma in Industrial Logistics Systems

1 Programme Aims

The programme is designed for engineering graduates and professionals who are working in logistics industry and related service sectors. The specific aims are:

(a) To provide students with the use of information technology and managerial approaches in improving inbound logistics, production and outbound logistics so as to create value for the customers.

(b) To provide an opportunity for professional engineers who graduated from other engineering disciplines, to obtain additional expertise in the planning, organizing, staffing, training, assessing, reporting, monitoring, coordinating and controlling of information and other resources involved in the production of goods and services and delighting the customers.

(c) To develop a student's creative and problem solving knowledge and skills appropriate for the management of information and use of knowledge in systems engineering for logistics planning and control.

2 Relationship of Programme Aims to University Mission

The University has the following mission:

(a) To pursue impactful research that benefits the world.

(b) To nurture critical thinkers, effective communicators, innovative problem solvers and socially responsible global citizens.

(c) To foster a University community in which all members can excel in their aspirations with a strong sense of belonging and pride.

The following table illustrates the relationship between programme aims and University mission:

Programme Aims	University Mission		
	(a)	(b)	(c)
(a)	✓	✓	
(b)	✓	✓	✓
(c)	✓		✓

3 Institutional Learning Outcomes

The institutional learning outcomes for taught postgraduate programmes are:

(a) **Professional competence of specialists/leaders of a discipline/profession:** Graduates of PolyU taught postgraduate programmes will possess in-depth knowledge and skills in their area of study and be able to apply their knowledge and contribute to professional leadership.

(b) **Strategic thinking:** Graduates of PolyU taught postgraduate programmes will be able to think holistically and analytically in dealing with complex problems and situations pertinent to their professional practice. They will be versatile problem solvers with good mastery of critical and creative thinking skills, who can generate practical and innovative solutions.

(c) **Lifelong learning capability:** Graduates of PolyU taught postgraduate programmes will have an enhanced capability for continual professional development through inquiry and reflection on professional practice.

4 Intended Learning Outcomes of the Programme

The programme has the following intended learning outcomes:

(a) **Professional knowledge:** Graduates from the programme will possess professional knowledge and skills in the logistics area. They will be able to apply their professional knowledge learned from this programme to their future working areas.

(b) **Competence of specialists:** Graduates will have their professional competence in the logistics area.

(c) **Systems thinking:** Graduates will be able to think holistically in dealing with complex problems and situations pertinent to their professional practice.

(d) **Lifelong learning capability:** Graduates will be able to recognize the need for, and engage in lifelong learning.

5 Relationship of Intended Learning Outcomes to Programme Aims

The following table illustrates the relationship between intended learning outcomes and programme aims:

Intended Learning Outcomes	Programme Aims		
	(a)	(b)	(c)
(a)	✓		
(b)	✓	✓	✓
(c)			✓
(d)		✓	

6 Relationship of Intended Learning Outcomes of the Programme to Institutional Learning Outcomes

The following table illustrates the relationship between intended learning outcomes and institutional learning outcomes:

Intended Learning Outcomes	Institutional Learning Outcomes		
	(a)	(b)	(c)
(a)	✓		
(b)	✓		
(c)		✓	
(d)			✓

7 Curriculum Map

The curriculum map shown below indicates how each intended learning outcomes of the programme is addressed by the constituent subjects.

Compulsory/Core Subjects		**Intended Learning Outcomes**			
		(a)	**(b)**	**(c)**	**(d)**
ISE512	Warehousing & Material Handling Systems	✓		✓	✓
ISE518	Workflow Design and Management	✓		✓	✓
ISE525	Global Operations and Logistics Management	✓	✓	✓	✓
ISE526	Enterprise Resources Planning	✓	✓	✓	✓
ISE527	Logistics Information Systems	✓	✓	✓	
ISE544	Supply Chain Management Enabling Technologies	✓	✓	✓	
ISE548	Risk & Crisis Management	✓	✓	✓	
ISE550	Contemporary Logistics Issues in China	✓	✓	✓	✓
ISE5019	Optimization Modeling & Applications	✓	✓	✓	✓
ISE5606	Business Intelligence and Data Mining	✓	✓		✓

8 Programme Contents

Compulsory Subjects

ISE512	Warehousing & Material Handling Systems
ISE526	Enterprise Resources Planning
ISE527	Logistics Information Systems
ISE544	Supply Chain Management Enabling Technologies

Core Subjects

ISE518	Workflow Design and Management
ISE525	Global Operations and Logistics Management
ISE548	Risk and Crisis Management
ISE550*	Contemporary Logistics Issues in China
ISE5019	Optimization Modeling & Applications
ISE5606	Business Intelligence and Data Mining

Elective Subjects

ISE507	Simulation of Industrial Systems
ISE5026	Technology Entrepreneurship and Innovation in Practice
LGT5002	International Logistics Systems, Operations and Management
LGT5007	Shipping Economics and Markets
LGT5010	Port Policy and Management
LGT5013	Transport Logistics in China
LGT5017	Maritime Logistics
LGT5164	Aviation Safety Management

* Students pursuing the MSc award must take this subject if they do not opt for the dissertation.

Subjects Requirements of Individual Awards

<table>
<tr><th>Award</th><th>Dissertation option</th><th>Non-dissertation option</th></tr>
<tr><td>MSc in Knowledge and Technology Management</td><td rowspan="2">Complete SEVEN taught subjects, including FOUR compulsory and at least ONE core subject as specified for the award, and at most TWO elective subjects, and a 9-credit dissertation.</td><td>Complete TEN taught subjects, including FOUR compulsory and at least THREE core subjects (including ISE5002) specified for the award, and at most THREE elective subjects.</td></tr>
<tr><td>MSc in Industrial Logistics Systems</td><td>Complete TEN taught subjects, including FOUR compulsory and at least THREE core subjects (including ISE550) specified for the award, and at most THREE elective subjects.</td></tr>
<tr><td>PgD in Knowledge and Technology Management</td><td colspan="2" rowspan="2">Complete SIX taught subjects, including at least THREE compulsory and at least ONE core subject specified for the award, and at most TWO elective subjects.</td></tr>
<tr><td>PgD in Industrial Logistics Systems</td></tr>
</table>

GENERAL ASSESSMENT REGULATIONS

of

Postgraduate Scheme in Industrial and Systems Engineering

September 2020

CONTENT

1 The Nature of the Postgraduate Scheme Education

1.1 The Postgraduate Scheme in Industrial and Systems Engineering (hereafter called "the Scheme") has been designed to establish a structure which will meet students' needs, particular to their employment and are professionally coherent but still allow freedom to pursue interests by selecting from a wide variety of available subjects. Student's progress by accumulating credits for each subject passed. Successful completion of an acceptable programme of subjects will lead to a PolyU postgraduate award.

1.2 Depending on needs, a student's selected programme of study can be designed for one or more of the following:

1.2.1 an in-depth treatment of an area beyond the student's first degree level in the same area;

1.2.2 updating of the knowledge of those engaged in a field especially where the discipline at undergraduate level is subject to rapid expansion or change;

1.2.3 a re-orientation or conversion to areas new to the student (in that it is in an area not directly related to the student's first degree); and

1.2.4 a synthesis and integration of a number of disciplines or subjects, particularly if the combination cannot be pursued adequately at undergraduate level.

2 A Student's Programme of Study

2.1 On admission, students are normally registered on a Master's Degree. Students satisfactorily completing a set of subjects in accordance with the given regulations for a specific award will be eligible for the award of a Postgraduate Diploma (PgD) or a Master's degree with that specific award title. Students are required to accumulate 18 and 30 credits in order to be eligible for a Postgraduate Diploma and a Master's degree with a specific award title respectively. Students may be given credit transfer for appropriate study they have earlier successfully undertaken at postgraduate level (see Section 4)

2.2 Unless stated otherwise, a Master's degree consists of a dissertation component, which is normally worth 9 credits. A non-dissertation option is available to students who, instead of doing the dissertation, can take taught subjects with total credits equal to that of a dissertation.

2.3 Students enrolled on mixed-mode programmes are required to take 9 credits or more in a semester in order to retain full-time status. Otherwise, they will be given a part-time status.

2.4 A student may be allowed to interrupt his/her studies for a certain amount of time. This can be done by seeking either "deferment of study" or "zero subject enrolment". Both applications will have to be approved by the Programme Leader. Zero subject enrolment will only be considered for one semester at a time. Prior approval must be obtained. In order to gain approval for a deferment application, the student will have to provide strong justification for deferring his studies for one semester or longer. Deferment will normally

be granted for no more than 2 semesters at a time. The total period of deferment cannot exceed 4 semesters. The deferment period will not be counted towards the maximum period of registration.

2.5 Students must apply to the Programme Leader for not taking any subjects in a semester. Otherwise, they will be classified as having unofficially withdrawn from their study. Applications should be submitted before the commencement of the semester concerned or in exceptional circumstances before the end of the add/drop period. All semesters in which the students are allowed to take zero subjects will be counted towards the maximum period of registration. A fee for retention of study place will be charged.

3 Pre-requisites, Recommended Background Knowledge, Exclusions, Mutual Exclusions and Exempted without Credits

3.1 Certain subjects can be specified as "pre-requisites" for a particular subject, in which case the subject titles and code numbers of the pre-requisites will be specified in the subject description form. Students would not be allowed to take that subject unless they have completed and passed the pre-requisite subjects, or unless they have obtained express approval from the subject lecturer.

3.2 "Recommended background knowledge" may be stipulated in the subject description form of a subject and students who do not possess the recommended background knowledge should be counselled not to take the subject. However, they should not be barred from taking a subject simply on the ground that they do not have the recommended background knowledge. It is the students' responsibility to judge whether they have adequate background knowledge before registering on any subject.

3.3 A student's previous education experience may preclude his enrolment in certain elective subjects (i.e. he/she will not be allowed to take those subjects) if it was in a similar field and at a similar level, such that taking that subject will give them an unfair advantage over other students. It will be necessary for the student to take another subject in order to satisfy the credit requirement for the award. Another example that a student may be excluded from a subject is when the subject is specially designed for those with a specific professional qualification.

3.4 If a subject from which a student is excluded is a compulsory subject for the award in question, the student is considered to be exempted from that subject. The credits associated with the exempted subject are not counted towards the credit requirement for the award. An exemption fee will be charged. This exemption will be without credits.

3.5 Students wishing to be exempted from any compulsory subject must apply in writing to the subject offering Department via their Programme Leaders providing evidence of previous postgraduate study equivalent to the subject(s) from which exemption is claimed.

3.6 If there is a large degree of overlap between two subjects, the two subjects may be mutually exclusive (i.e. a student who has passed one of the subjects will not be allowed to take the other). This must be specified in the subject description forms of both subjects.

4 Credit Transfer

4.1 At a discretion of the subject offering Department and on the recommendation of the Scheme Chairman, students admitted to the Scheme may be given credit for previous postgraduate study. A fee will be charged for credits successfully transferred.

4.2 Normally, the grades achieved in subjects taken as part of a PolyU postgraduate award for which credit transfer is approved may contribute towards the students' Grade Point Average (GPA). Grades achieved for postgraduate study, which was not part of a PolyU programme, will not contribute towards the students' GPA (credit transfer without the grade carried). The credits transferred will count towards the credit requirement for the award. All credit transfers approval will take effect only in the semester for which they are approved. A student who applies for transfer of credits during the re-enrolment or add/drop period for a particular semester will only be eligible for graduation at the end of the semester, even if the granting of the credit transfer will immediately enable the students to satisfy the total credit requirement for the award.

4.3 The validity period of credits previously earned is eight years from the year of attainment.

4.4 Normally, not more than 50% of the credit requirement for award may be transferable from approved institutions outside the University. For transfer of credits from programmes offered by PolyU, normally not more than 67% of the credit requirement for award can be transferred. In cases where both types of credits are being transferred (i.e. from programmes offered by PolyU and from approved institutions outside the University), not more than 50% of the credit requirement for award may be transferred.

4.5 If a student is waived from a particular stage of study on the basis of advanced qualifications held at the time of admission, the student concerned will be required to complete fewer credits for award. For these students, the exempted 'deducted' credits at admission stage will be counted towards the maximum limit for credit transfer when students apply for further credit transfer after their admission.

4.6 For credit transfer of retaken subjects, the grade attained in the last attempt should be taken in the case of credit transfer with grade being carried over. Students applying for credit transfer for a subject taken in other institutions are required to declare that the subject grade used for claiming credit transfer was attained in the last attempt of the subject in their previous studies. If a student fails in the last attempt of a retaken subject, no credit transfer should be granted despite the fact that the student may have attained a pass grade for the subject in the earlier attempts.

4.7 Students should not be granted credit transfer for a subject which they have attempted and failed in their current study unless the subject was taken by the student as an exchange-out student in his/her current programme.

5 Subject Registration/Adding and Dropping of Subjects/Withdrawal of Subjects

5.1 In addition to programme registration, students need to register for the subjects at specified periods prior to the commencement of the semester. An add/drop period will also be scheduled for each semester/term. Students may apply for withdrawal of their registration on a subject after the add/drop period if they have a genuine need to do so. The application should be made to the department and requires to seek the approval of both the subject lecturer and the Programme Leader concerned. Applications submitted after the commencement of the examination period will not be considered. For approved applications of subject withdrawal, the status of the subject is shown in the assessment result notification and transcript of studies, but it is not counted in the calculation of the GPA.

5.2 The pre-requisite requirements of a subject must have been fulfilled before a student registers for that subject. However, the subject offering Department has the discretion to waive the pre-requisite requirements of a subject, if deemed appropriate. If the pre-requisite subject concerned forms part of the requirements for award, the subject has to be passed in order to satisfy the graduation requirements for the programme concerned, despite the waiving of the pre-requisite.

5.3 Subject to the maximum study load of 21 credits per semester and the availability of study places, students are allowed to take additional subjects on top of the prescribed credit requirement for award before they become eligible for graduation.

6 Registration/Study Load/Academic Probation/Deregistration

6.1 If a student is approved for deferring his/her study (See Section 2.4), the deferment period will not be counted towards the total period of registration (or maximum period of registration for students admitted in or before 2019/20). No extension of registration period will be granted on grounds of timetable conflict or non-availability of subjects.

6.2 For Full-time students, the normal study load is 15 credits in a semester and the maximum study load is 21 credits, unless exceptional approval is given by the Head of the programme offering Department. For such cases, students should be reminded that the study load approved should not be taken as grounds for academic appeal.

6.3 Students who have a Grade Point Average (GPA) (See Section 11) lower than 1.7 will be put on academic probation in the following semester. Once when these students are able to pull their GPA up to 1.7 or above at the end of the semester, the status of “academic probation” is lifted. The status of “academic probation” is reflected in the examination result notification, but not in the transcript of studies.

6.4 To improve the academic performance of students on academic probation, these students are required to take less number of subjects so as to reduce study load in the following semester (Summer Term excluded). The maximum number of credits to be taken by the

students varies accordingly to the policies of individual Departments and will be subject to the approval of the authorities concerned.[1]

6.5 Students will ceased to be registered for the Master's award if:

6.5.1 they exceed the maximum period of registration, as specified in the Programme Requirement Document (applicable to students admitted in or before 2019/20); or

6.5.2 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 (applicable to students admitted in or after 2020/21); or

6.5.3 their GPA is lower than 1.7 for two consecutive semesters and their Semester GPA in the second semester is also below 1.7; or

6.5.4 their GPA is lower than 1.7 in 3 consecutive semesters.

When a student falls within any of the categories as stipulated above, except for Sections 6.5.2 with approval for extension, the Board of Examiners shall de-register the student from the programme without exception.

6.6 Those students who fall into any of the categories stated in Sections 6.5 above will be awarded a PgD before being deregistrered if they have satisfied the requirements for a PgD award.

6.7 Students will cease to be registered for the award of PgD if:

6.7.1 they fall into any of the categories stated in Sections 6.5.1 to 6.5.4 above; or

6.7.2 they are granted the award of PgD.

6.8 Those students who do not fall into any of the deregistration categories stated in Section 6.5 and 6.7 will have "progressing" status.

6.9 The progression of students to the following academic year will not be affected by the GPA obtained in Summer Term, if any.

6.10 A student may be deregistered from the programme enrolled before the time frame specified in Sections 6.5.3 and 6.5.4 if his/her academic performance is poor to the extent that the Scheme Board of Examiners considers that there is not much a chance for him/her to attain a GPA of 1.7 at the end of the programme.

6.11 If the student is not satisfied with the de-registration decision of the Board of Examiners, he/she can lodge an appeal. All such appeal cases will be referred directly to Academic Appeals Committee (AAC) for final decision. Views of Department will be sought and made available to AAC for reference.

[1] *The maximum number of credits to be taken in a semester by students on academic probation will be decided by the Departments. The maximum number could be set on a departmental basis or programme basis, or even student specific, as deemed appropriate.*

7 Changing Programme of Study within the Scheme

7.1 If students wish to change the award for which they are registered, they should seek the approval of the Programme Leaders of the new award into which they would like to enter. Applications should be submitted to the Department for consideration.

7.2 The Programme Leader of the new award ensures that there is availability of places and other resources to allow the proposed changes to be made.

8 Assessment of Taught Subjects

8.1 The assessment regulations adopted by the Scheme conform to the University's General Assessment Regulations for credit-based programmes. The ultimate authority in the University for the confirmation of academic decisions is the Senate, but for practical reasons, Senate has delegated to the Faculty Boards the authority to confirm the decisions of Boards of Examiners provided these are made within the framework of the General Assessment Regulations. Recommendations from Board of Examiners which fall outside these Regulations shall be ratified by the Academic Regulations Committee and reported to Senate.

8.2 A variety of assessment methods, such as open book examinations, are used. All other forms assessment are included in the term coursework. This may include essays, seminar papers, presentations, projects, case studies, laboratory work, class tests and work done individually or in groups. Continuous Assessment assignments, which involve group work, should nevertheless include some individual components therein. The contribution made by each student in continuous assessment involving a group effort shall be determined and assessed separately, and this can result in different grades being awarded to students in the same group.

8.3 The assessment for a subject is based on one or two components, namely coursework and/or examination. The weighting of coursework and examination is shown in the individual subject description forms. The subject offering department can decide whether students are required to pass both the continuous assessment and examination components, or either component only, in order to obtain a pass. Such requirements are specified in the subject description forms.

8.5 Assessment grades shall be awarded on a criterion-referenced basis. A student's overall performance in a subject shall be graded as follows from 2020/21 onwards. For the short description of subject grades and elaboration on subject grading descriptions for 2019/20 and before, please refer to the previous editions of this handbook:

Subject Grade	***Grade Point for grades attained from 2020/21***	***Short Description***	***Elaboration on subject grading description***
A+ A A-	4.3 4.0 3.7	Excellent	Demonstrates excellent achievement of intended subject learning outcomes by being able to skillfully 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-	3.3 3.0 2.7	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-	2.3 2.0 1.7	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	1.3 1.0	Pass	Demonstrates marginal achievement of intended subject learning outcomes by being able to solve relatively simple problems. Can make basic comparisons, connections and judgments and express the ideas learnt in the subject, though there are frequent breakdowns in logic and clarity.
F	0.0	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 ('D' to 'A+') are subject passing grades. No credit will be earned if a subject is failed.

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.*

8.6 As assessment should be a matter of judgement, not merely a result of computation, the subject lecturer has the discretion to assign a grade which is considered to reflect more appropriately the overall performance of the student in a subject to override the grade derived by the computer. For example, at the discretion of the subject lecturer/Subject Assessment Review Panel, a student failing badly in one component of the subject might be given an "F" grade.

9 Retaking of Subjects

9.1 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 they maximum study load of 21 credits per semester is not exceeded.

9.2 The number of retakes of a subject should be restricted to two, i.e. a maximum of three attempts for each subject is allowed[2].

9.3 In cases where a student takes another subject to replace a failed elective subject, the fail grade is taken into account in the calculation of the GPA, despite the passing of the replacement subject.

9.4 Students need to submit a request to the Faculty/School Board for the second retake of a failed subject.

9.5 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.

9.6 In relation to 9.5 above, 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.

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

10 Exceptional Circumstances

10.1 Absence from an assessment component

10.1.1 If a student is unable to complete all the assessment components of a subject, due to illness or other circumstances which are beyond his control and considered by the subject offering Department as legitimate, the Department will determine whether the student will have to complete a late assessment and, if so, by what means. This late assessment shall take place at the earliest opportunity, and normally before the commencement of the following academic year (except that for Summer Term, which may take place within 3 weeks after the finalization of Summer Term results). If the late assessment cannot be completed before the commencement of the following academic year, the Faculty Board Chairman shall decide on an appropriate time for completion of the late assessment.

10.1.2 The student concerned is required to submit his/her application for late assessment in writing to the Head of Department offering the subject, within five working days from the date of the examination, together with any supporting documents. Approval of applications for late assessment and the means for such late assessments shall be given by the Head of Department offering the subject or the Subject teacher concerned, in consultation with the Programme Leader.

10.2 Other particular circumstances such as a student's particular circumstances may influence the procedures for assessment but not the standard of performance expected in assessment.

11 Grade Point Average (GPA)

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

$$\text{GPA} = \frac{\sum_n \text{Subject Grade Point} \times \text{Subject Credit Value}}{\sum_n \text{Subject Credit Value}}$$

where n = number of all subjects (inclusive of failed subjects) taken by the student up to and including the latest semester/term, but 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 without any grade assigned
(v) Subjects from which a student has been allowed to withdraw (i.e. those with the grade '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 point of time. GPA is an indicator of overall performance, and range from 0.00 to 4.30 from 2020/21.

11.2 For the purpose of determining the award classification, any subjects passed after the graduation requirement has been met or subjects taken on top of the prescribed credit requirements for award shall not be taken into account in the grade point calculation for award classification. However, if a student attempts more elective subjects (or optional subjects) than those required for graduation in or before the semester in, which he/she becomes eligible for award, the elective subjects or optional subjects) with a higher grade/contribution shall be included in the grade point calculation (i.e. the excessive subjects attempted with a lower grade/contribution, including failed subjects, are excluded).

11.3 Subjects offered within the Scheme contribute equally to the calculation of the GPA.

12 Eligibility for Award

12.1 A student would be eligible for award if he satisfies all the conditions listed below:

12.1.1 Accumulation of the requisite number of credits – 30 for MSc; 18 for PgD; and

12.1.2 Satisfying the residential requirement for at least 1/3 of the credits to be completed for the award he/she is currently enrolled, unless the professional bodies stipulate otherwise; and

12.1.3 Satisfying all requirements as defined for the respective awards and as specified by the University; and

12.1.4 Having a Grade Point Average (GPA) of 1.7 or above at the end of the programme[3]; and

12.1.5 Having successfully completed the Online Tutorial on Academic Integrity accessed via LEARN@PolyU (理學網).

12.2 The awards of PgD and Master's are classified as: Distinction, Credit, and Pass.

12.3 A student is required to graduate as soon as he/she satisfies all the conditions for award (see Section 12.1 above). Subject to the maximum study load of 21 credits per semester, a student may take more credits than he/she needs to graduate on top of the prescribed credit requirements for his/her award in or before the semester within which he/she becomes eligible for award.

[3] *For programmes leading to nested awards, where satisfaction of the conditions leading to the lesser award is a subset of the conditions leading to the more advanced award, and where students opt to graduate with the lesser award when failing to complete the requirements for the more advanced award, subjects taken solely for fulfilling the requirements for the more advanced award may be excluded in the GPA calculation for the purpose of satisfying this condition.*

13 Guidelines for Award Classification

13.1 In using these guidelines, the Board of Examiners shall exercise its judgement in coming to its conclusions as to the award for each student, and where appropriate, may use other relevant information.

The following GUIDELINES are used by the Scheme Board of Examiners to recommend the classification of the award:

Guidelines

Distinction	The student's performance/ attainment is **outstanding**, and identifies him as **exceptionally able** in the field covered by the programme in question.
Credit	The student has reached a standard of performance which is **more than satisfactory** but **less than outstanding**.
Pass	The student has reached a standard of performance/attainment ranging from **just adequate to just satisfactory.**

13.2 The following are the award GPA ranges for the Board of Examiners in determining award classifications:

Award Classification	Weighted GPA
Distinction	3.60 to 4.30
Credit	3.00 to 3.59
Pass	1.70 to 2.99

13.3 In awarding a distinction, the Scheme Board of Examiners would also take into consideration the amount of credit transfers earned by the student. To be considered for a distinction, the student should normally have no more than 40% of the credits earned by credit transfer [i.e. 4 taught subjects (12 credits) for MSc; 2 (6 credits) for PgD].

13.4 There is no requirement for the Scheme Board of Examiners to produce award lists which conform to the guidelines in above but this ruling is subject to further review and hence could be modified.

13.5 Students who have committed academic dishonesty or non-compliance with examination regulations will be subject to the penalty of the lowering of award classification by one level. The minimum of downgraded overall result will be kept at a Pass. In rare circumstances where both the Student Discipline Committee and Board of Examiners of a Department consider that there are strong justifications showing the offence be less serious, the requirement for lowering the award classification can be waived.

14 Appeal Against Assessment Results/De-registration Decisions by the Board of Examiners

A student may appeal against the decision of the Board of Examiners within a stipulated period after the public announcement of the examination results (this refers to the date when results are announced to students via the web). Students should refer to the Student Handbook for details on the appeal procedures.

15 Recording of Disciplinary Actions in Students' Records

15.1 Students who are found guilty of academic dishonesty or non-compliance with examination regulations will be subject to the penalty of having the subject concerned disqualified and be given a failure grade with a remark denoting 'Disqualification of result due to academic dishonesty / non-compliance with examination regulations'. The remark will be shown in the students' record as well as the assessment result notification and transcript of studies, until their leaving the University.

15.2 Students who have committed disciplinary offences (covering both academic and non-academic related matters) are put on 'disciplinary probation'. The status of 'disciplinary probation' are shown in the students' record as well as the assessment result notification, transcript of studies and testimonial during the probation period, until their leaving the University. The disciplinary probation is normally one year unless otherwise decided by the Student Discipline Committee.

15.3 The University reserves the right to withhold the issuance of any certificate of study and an award parchment to a student/graduand who has unsettled matters with the University, or subject to disciplinary action.

16 Graduation

16.1 A student should be awarded a Postgraduate Diploma award without having to submit an application for graduation under the following conditions:

16.1.1 the Scheme Board of Examiners agrees that he/she is eligible for a Postgraduate Diploma award and he/she cannot be eligible for the Master's award (even though the Master's was the student's intended award).

16.2 A student, however, will not be granted the same PgD award (in the same area) for the second time despite his/her satisfying the above conditions, if he/she has been granted the award before.

16.3 A student should be granted a Master's award without having to submit an application for graduation if he/she has fulfilled all the requirements for a Master's award.

16.4 Conditions 16.1.1 and 16.3 apply only when the student has a valid registration status. If a student's registration status has been set to "Study ended" due to non-compliance with PolyU regulations, for example, failure to pay fees, he/she will not be eligible for the award unless his/her registration status has been reinstated.

~ END ~

SUBJECT DESCRIPTION FORMS

Syllabi for subjects offered by the Department of Industrial and Systems Engineering are listed below. The subject coordinators for each subject will be updated regularly, please access the departmental website https://www.polyu.edu.hk/ise/programmes/info/1 for further information.

The wide list of elective subjects offer by other departments will be available at the time of subject registration.

Subject Code	ISE507
Subject Title	Simulation of Industrial Systems
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil but bear basic statistical knowledge
Objectives	This subject provides students with 1. the knowledge to identify where and how simulation can be beneficial to an organization; 2. the knowledge to successfully plan and manage a simulation project; 3. the knowledge of applying simulation technique to assist in designing an industrial system.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the basic concepts and how simulation works; b. understand the benefits and limitations of applying computer simulation in industry; c. use simulation software to examine the performance of a system.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Simulation</u> How simulation works; discrete event simulation; benefits and limitations of using simulation. 2. <u>Methodology and Modelling</u> Problem formulation; statistical tools in simulation; simulation project management; model design; alternative approaches to computer modelling. 3. <u>Simulation Languages</u> Overview of discrete event simulation languages and packages; graphical animation and interface design; operations of basic simulation process modules. 4. <u>Design and Development of Simulation Models</u> Simulation model design; experimental information collection; data distribution models; importing and exporting data; interpretation of simulation results.

Teaching/Learning Methodology

A mixture of lectures/tutorials (ILOa and ILOb), laboratory exercises, and project/case study (ILOc) are used to deliver the topics covered in this subject. The course also includes hands-on practice and demonstration sessions using a commercial simulation package(s) (ILOc). Students gain experience of the simulation process from design, model construction, testing and debugging, model validating, results generating, to maintaining the model. This is achieved by having students to use a commercially available simulation package for their projects.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed		
	a	b	c
Lecture / tutorial	✓	✓	
Laboratory exercises			✓
Project/case studies			✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
1. Test	30%	✓	✓				
2. Assignments	20%	✓	✓				
3. Laboratory exercises	20%			✓			
4. Project/case study	30%			✓			
Total	100%						

The assignments and test are set to reinforce the knowledge learnt in classes. The laboratory exercises and a mini-project/case study are designed to enable students to apply their knowledge under close to realistic conditions.

In this connection, the intended learning outcomes (a) and (b) are assessed via test and assignments. ILO (c) is assessed via laboratory exercises and project work/case study.

Student Study Effort Expected

Class contact:		
▪ Lectures/Seminars/Tutorials	3 hours/week for 7 weeks	21 Hrs.
▪ Laboratory work	3 hours/week for 6 weeks	18 Hrs.
Other student study effort:		

	▪ Assignments/Project	40 Hrs.
	▪ Self-study/Preparation work	33 Hrs.
	Total student study effort	112 Hrs.
Reading List and References	1. Kelton, W.D. and Law, A.M., *Simulation Modelling and Analysis*, McGraw-Hall (most updated edition) 2. Kelton, W.D. Sadowski, R.P. and Swets, N.B., *Simulation Modelling with Arena*, McGraw-Hall (most updated edition) 3. Banks, J., Handbook of Simulation, Wiley (most updated edition) 4. Pidd, M., *Computer Modelling for Discrete Simulation*, Wiley (most updated edition) 5. Altiok, T. and Melamed B., *Simulation Modeling and Analysis with ARENA*, Academic Press (most updated edition) 6. Shannon, R.E., *Systems Simulations - The Art and Science*, Prentice-Hall, Inc. (most updated edition) 7. Harrington, H.J. and Tumay, K., *Simulation Modeling Methods*, McGraw-Hill (most updated edition) 8. Askin, R.G. and Standridge, C.R., *Modeling and Analysis of Manufacturing Systems*, John Wiley & Sons, Inc. (most updated edition) 9. Bank, J., Carson, J.S. and Nelosn, B.L., *Discrete-Event System Simuylation*, Prentice Hall International, Inc. (most updated edition)	

Subject Code	ISE512
Subject Title	Warehousing and Material Handling Systems
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. a basic understanding of material handling facilities and the fundamental principles of material handling; 2. quantitative techniques for designing warehouse and material handling systems and an understanding of their limitations; 3. an understanding of safety issues and regulations in warehouse and material handling.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. select appropriate equipment for material handling and understand the basic roles of the different equipment; b. apply appropriate techniques for improving existing material handling systems; c. recognize the importance of safety and applicatons of optimization techniques to warehousing and material handling.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Basic Material Handling Equipment and Principles</u> Performance of physical work: conveyers, power trucks, cranes and hoists, robots, automated guided vehicles (AGVs), automated storage/retrieval systems. Assistance in material flow management: barcode systems, radio frequency identification (RFID), shelves, containers. Twenty principles of material handling from the College-Industry Council on Material Handling Education (CICMHE). 2. <u>Quantitative Techniques in Material Handling</u> Equipment selection: present value calculation, estimation of fixed and variable costs, calculation of the upper and lower bounds for equipment selection. Order picking and routing policies at warehouses. Warehouse layout design, methods of assigning dedicated storage. 3. <u>Material Transportation Optimization</u> AGV routing techniques. Behaviors of dynamic shortest paths with known events. Transportation and transshipment models. Vehicle-routing problems: traveling distance, customer demand, limited/unlimited capacity. 4. <u>Regulations and Safety Issues</u>

	Health and safety aspects of warehouse and material handling systems. Types of legal liability and contributory negligence. Duty of care, breach of duty, causation and remoteness, damages, statutory duty, and employer liability.
Teaching/Learning Methodology	A mixture of lectures, tutorials, and laboratory exercises are used in this subject. External speakers may also be invited to broaden students' knowledge. Group works such as mini-projects, laboratory work, or case studies in the related areas are employed to enhance students' problem-solving ability and team spirit. Tests and individual assignments are also designed to assess the student performance.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed		
	a	b	c
Lecture	✓	✓	✓
Assignment/Laboratory	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
1. Tests	50%	✓	✓	✓			
2. Assignments	20%	✓	✓	✓			
3. Laboratory exercises	30%	✓	✓				
Total	100%						

Laboratory exercises are designed to assess learning outcomes "a" and "b", and tests and assignments cover all of the intended outcomes of this subject.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures/Seminars/Tutorials 3 hours/week for 9 weeks	27 Hrs.
	▪ Laboratory work 3 hours/week for 2 weeks plus 6 hours/week for 1 week	12 Hrs.
	Other student study effort:	
	▪ Assignments	40 Hrs.
	▪ Self-study/Preparation work	40 Hrs.
	Total student study effort	119 Hrs.

Reading List and References	1. Askin RG and Standridge CS 1993, *Modeling and Analysis of Manufacturing System*, New York, Wiley 2. McCormik EJ and Sanders M 1993, *Human Factors in Engineering and Design*, New York, McGraw-Hill 3. Bozer YA, Chapter 56: *Material Handling Systems, Handbook of Industrial Engineering: Technology and Operations Management*, 3nd edition, New York: John Wiley & Sons 4. Smith JD, Chapter 57: *Storage and Warehousing, Handbook of Industrial Engineering: Technology and Operations Management*, 3nd edition, New York: John Wiley & Sons 5. Francis RL and White JA 1998, *Facility Layout and Location: An analytical Approach, Englewood Cliffs*, NJ, Prentice-Hall 6. Muther R and Wheeler JD 1994, *Simplified Systematic Layout Planning*, Kansas City, MO, Management and Industrial Publication 7. Stanks J 1994, *Management Systems for Safety*, Financial Times, Pitman Publishing 8. Ridley J 2008, *Safety at work*, Routledge. 9. Konz A 1999, *Work Design: Industrial Ergonomics*, Holcomb Hathaway Pubs. 10. Alberto Garcia-diaz, J. Macgregor Smith 2007, *Facilities Planning and Design*, Prentice Hall 11. Edward Frazelle 2004, *World-class Warehousing and Material Handling*, McGraw Hill 12. Matthew P. Stephens, Fred E. Meyers 2013, *Manufacturing Facilities Design and Material Handling*, Prentice Hall

Subject Code	ISE518
Subject Title	Workflow Design and Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	No prerequisite but some background knowledge on workflow and management is preferred.
Objectives	This subject provides students with 1. the knowledge to analyze and redesign existing systems, and to design new work systems in various industrial and commercial environments in order to improve productivity; 2. the knowledge to apply relevant techniques and problem-solving methodologies so as to enable them to manage projects concerned with productivity improvement successfully; 3. the knowledge and techniques to analyze a new or existing layout in order to achieve improvement; 4. the ability to recognize the need for, and problems associated with, change in organizations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. examine and measure productivity in a typical manufacturing or service organization in order to improve it; b. identify the differences between cause and effect in problem solving and apply suitable problem-solving techniques using both analytical and creative (or lateral) thinking; c. examine an existing work situation and conduct a work improvement program in a manufacturing or service organization in order to identify low productivity; d. recognize the objectives of facility location and layout planning in both manufacturing and service organizations to evaluate different locations, the effectiveness of different layouts, and use suitable techniques for improvement; e. understand the need for change in organizations and be able to apply appropriate strategies to affect change in an appropriate manner.
Subject Synopsis/ Indicative Syllabus	1. <u>Productivity</u> The importance of productivity and its measurement; Productivity measures in organizations; Total and partial productivity measures, their advantages and limitations; Causes of low productivity in organizations; Types of productivity improvement programs and how to select them. 2. <u>Problem Solving</u> General problem-solving skills; Recognizing and defining problems; Use and applications of analytical and creative thinking; Barriers to creativity; Methods

<table>
<tr><td></td><td>of stimulating creative thinking, such as attribute listing, analogy, brainstorming, etc.

3. <u>Work Improvement</u>

Analysis and improvement of work methods, systems, and procedures; Selecting areas appropriate for work improvement; Choosing areas for improvement, recording the facts, examining, and developing improvements; Issues of implementation, and continuous improvement; Application to the analysis and improvement of work systems; An appreciation of Business Process Re-engineering (BPR) and continuous improvement, as approaches to improving work systems in organizations.

4. <u>Location and Facility Planning</u>

Factors affecting the choice of location and the evaluation of alternatives; Types of layouts, including an appreciation of the systematic layout planning approach; Use of computers in layout planning; Types of flow lines, and line balancing issues.

5. <u>Management of Change</u>

Introduction to managing changes in organizations; Problems associated with change and the effects that change has on the management and personnel concerned; Organizing for change and overcoming resistance to change.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Emphasis is placed on a student-centered learning approach through a variety of case studies taken from realistic industrial and commercial situations. These case studies are often used to deliver the subject material in a scenario of problem-based learning that will integrate topics contained in the syllabus so as to make the subject material more interesting and meaningful to students.

<u>Typical Case Studies</u>

• Measuring productivity in an engineering company
• Selecting areas for methods improvement in a small batch manufacturing company
• Designing a flow-line to assemble a typical consumer product
• Developing a home delivery service for a supermarket chain
• Locating a centralized processing plant for a fast-food operation
• Creating a layout of a manufacturing department that integrates both production equipment and office accommodation
• Managing change in a commercial enterprise

<table>
<tr><td rowspan="2">Teaching/Learning Methodologies</td><td colspan="5">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></tr>
<tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Tutorial</td><td></td><td>✓</td><td></td><td>✓</td><td>✓</td></tr>
</table>
</td></tr>
</table>

Project/case studies	✓	✓	✓	✓	✓

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
Exercises (two, each accounts to 10%)	20%			✓	✓	✓
Case studies (two, each accounts to 10%)	60%	✓	✓	✓		
Test	60%	✓		✓	✓	✓
Total	100%					

Continuous assessment is comprised of case studies with individual and group components. Note: Assessment of Intended Learning Outcomes (ILOs) may vary from year to year in terms of whether they are by continuous assessment or by examination. However, all ILOs are covered each year. Moreover, all assessment components require students to apply what they have learned to realistic work applications that often integrate the various topics covered.

Student Study Effort Expected

Class contact:		
▪ Lecture	3 hours/week for 7 weeks	21 Hrs.
▪ Tutorial/case study	3 hours/week for 4 weeks	12 Hrs.
▪ Laboratory	3 hours/week for 2 weeks	6 Hrs.
Other student study effort:		
▪ Studying and self learning		40 Hrs.
▪ Case studies and report writing		26 Hrs.
Total student study effort		105 Hrs.

Reading List and References

1. Adedeji B. Badiru and Olufemi A. Omitaomu 2011, *Handbook on Industrial Engineering equations, formulas and calculations*, CRC Press
2. Tristan Boutros and Tim Purdie 2014, *The Process Improvement Handbook: a Blueprint for Managing Change and Increasing Organizational Performance*, McGraw-Hill Education
3. Layna Fischer 2005, *Workflow Handbook 2005*, Future Strategies

	4. Imre Hegedus 2012, *Business Process Management: Strategies to Improve Performance*, Ark Group 5. Ricky W. Griffin 2013, *Management*, South-Western/Cengage Learning 6. James A. Tompkins, John A. White, Yavuz A. Bozer and J.M.A. Tanchoco 2010, *Facilities Planning*, 4th, Wiley 7. Alberto Garcia-Diaz and J. MacGregor Smith 2008, *Facilities Planning and Design*, Pearson/Prentice Hall 8. Gavriel Salvendy 2007, Handbook of Industrial Engineering, John Wiley & Sons, Third Edition Published Online 9. Raybould, E, R and Minter, A, L. 1992, Problem Solving for Management, Institute of Management Services, Latest Edition 10. Tomkins, White, Bozer, Frazelle, Tanchoo, Trevino. 2010, Facilities Planning, 4th edn, John Wiley & Sons Inc. 11. International Labour Office 1992, Introduction to Work Study, 4th edn 12. Lawrence, P (Editor) 1997, Workflow Handbook, John Wiley & Son, Chichester 13. Stefan Joablonski and Christoph Bussler 1996, Workflow Management - Modeling Concepts, Architecture and Implementation, International Thomson Computer Press 14. Poyssick, G and Hannaford, S. 1996, Workflow Reengineering, Adobe Press, Mountain View, California

Subject Code	ISE525
Subject Title	Global Operations and Logistics Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the concept of global logistics operations and a comprehensive framework to tackle typical logistics problems; 2. techniques to achieve the target of supplying the right goods at the right time at the minimum cost; 3. an in-depth knowledge of operations and logistics management and relevant techniques to optimise trade-offs.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the concept of global operations and design a logistics system within a global environment; b. apply relevant techniques to solve global logistics problems; c. optimise operations parameters to achieve trade-offs.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Global Operations and Logistics Management</u> Logistics strategies and planning, logistics organisation, management, and control. Designing the supply base and selecting suppliers and integrated logistics support. Cost modelling in the supply chain. Supply chain relationships. Analysing supply chain performance. Supplier/vendor rating, development, and continuous improvement. Selection and use of supply chain software. 2. <u>Introduction to the Elements of Logistics</u> The system life cycle and the need for logistics management. Developing a logistics strategy, and understanding the consequences of that strategy. The impact of information technology on logistics management. 3. <u>Measures of Logistics</u> Understanding factors including reliability, maintainability, supply, support, transportation, packaging, and handling. Economic considerations. 4. <u>Phases of Logistics</u> Design and development, production/construction, utilisation and support, system retirement and material recycling/disposal. 5. <u>Global Operations Management</u>

<table>
<tr><td></td><td>The just-in-time philosophy, operations planning and control, the management of capacity, techniques for achieving delivery performance, the use of computers, distribution networks and the measurement and control of logistics performance, mathematical modelling of distribution in the supply chain, stochastic optimisation for logistics planning, network distribution.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, project and case studies is used to deliver the various topics in this subject. Some material is covered using a case-based format where this enhances the learning objectives. Other material is covered through directed study to enhance the students' "learning to learn" ability. Topics are introduced in the lectures. The tutorials are conducted in groups to reinforce the material covered in the lectures. Students also have to do some projects to stimulate their critical thinking on solving typical logistics problems.
<table>
<tr><td rowspan="2">Teaching/Learning Methodologies</td><td colspan="3">Intended Subject Learning Outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Lectures</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Projects</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Case studies</td><td>✓</td><td>✓</td><td></td></tr>
</table></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></td><td></td><td></td></tr>
<tr><td>1. Project (individual) and Project presentation</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Individual assignments</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Case study/Group project</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>4. Test</td><td>30%</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>
The projects and individual assignments are designed to assess students' understanding of the taught techniques to solve global logistics problems. The case study and projects are designed to appraise students' ability to apply relevant techniques to achieve process optimisation. The test is designed to measure the students' depth of knowledge in the area of global operations and logistics management.</td></tr>
</table>

Student Study Effort Expected	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Case study	12 Hrs.
	▪ Projects	6 Hrs.
	Other student study effort:	
	▪ Case study preparation and report writing	45 Hrs.
	▪ Test preparation	28 Hrs.
	Total student study effort	112 Hrs.
Reading List and References	1. Dmitry Ivanov, Alexander Tsipoulanidis and Jörn Schönberger 2019, *Global Supply Chain and Operations Management: A Decision-Oriented Introduction to the Creation of Value*, Springer 2. Branch, AE. 2009, *Global Supply Chain Management and International Logistics*, Routledge, New York/London 3. Gattorna, J & Friends. 2009, *Dynamic Supply Chain Alignment: A New Business Model for Peak Performance in Enterprise Supply Chains Across All Geographies*, Gower Pub., Burlington, VT/Farnham, England 4. Blanchard, BS. 2004, *Logistics Engineering and Management*, 6th edn, Prentice Hall, Inc., Upper Saddle River, N.J. 5. Christopher, M. 2000, *Logistics and Supply Chain Management: Strategies for Reducing Cost and Improving Service*, 2nd edn, Prentice Hall	

Subject Code	ISE526
Subject Title	Enterprise Resources Planning
Credit Value	3
Level	5
Pre-requisite/~~Co-requisite/Exclusion~~	Fundamental knowledge on Manufacturing Processes, Production and Operations Management is required.
Objectives	This subject provides students with 1. the basic concepts of ERP systems for manufacturing or service companies, and the differences among MRP, MRP II, and ERP systems; 2. thinking in ERP systems: the principles of ERP systems, their major components, and the relationships among these components; 3. in-depth knowledge of major ERP components, including material requirements planning, master production scheduling, and capacity requirements planning; 4. knowledge of typical ERP systems, and the advantages and limitations of implementing such systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components; b. understand production planning in an ERP system, and systematically develop plans for an enterprise; c. use methods to determine the correct purchasing quantity and right time to buy an item, and apply these methods to material management; d. understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Concept of ERP, brief history of ERP systems, major components of ERP systems and their functions. Basic differences between manufacturing and services. 2. <u>Production Planning</u> Master production scheduling (MPS), rough-cut capacity planning, capacity requirements planning. 3. <u>Material Requirements Planning (MRP)</u> Concept, product structure, and bill of materials (BOM), MRP logic, lot-sizing and capacity considerations.

4. Manufacturing Execution Systems (MES)

Shop floor control, job shop scheduling and priority rules, flow shop scheduling.

5. Operation of an ERP system

The relationships among different ERP modules, available-to-promise (ATP), time bucket.

6. Inventory Management

Benefit and cost considerations in inventory management, basic models and their assumptions.

Teaching/Learning Methodology

A mixture of lectures, exercises, laboratories, and case studies is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance students' "learning to learn" ability. Some case studies, largely based on consultancy experience, are used to integrate these topics and demonstrate to students how the various techniques are interrelated and can be applied in real-life situations.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed			
	a	b	c	d
Lecture	✓	✓	✓	✓
Seminars	✓	✓	✓	✓
Project/case studies	✓	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Exercises	20%	✓	✓				
2. Project report	15%	✓	✓	✓	✓		
3. Oral presentation	10%	✓	✓	✓	✓		
4. Lab work and report	25%		✓	✓			
5. Test	30%	✓	✓	✓	✓		
Total	100%						

	Continuous assessment comprises tasks with individual and group components, usually several exercises, a mini-project with an oral presentation and written report, laboratory work, and a test. All assessment components require students to apply and demonstrate what they have learnt in the course to address issues related to enterprise resource planning.	
Student Study Effort Expected	Class contact:	
	▪ Lectures	27 Hrs.
	▪ Laboratories, Presentation, Test	12 Hrs.
	Other student study effort:	
	▪ Preparation and review, Self-study	63 Hrs.
	▪ Report writing	18 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	1. Monk, E. F., Wagner, B. J. 2009, *Concepts in Enterprise Resource Planning*, 3rd edn, Course Technology Cengage Learning 2. Sumner, M. 2005, *Enterprise Resource Planning*, Pearson Education, Inc. 3. Vollmann, T. E., Berry, W. L. and Whybark, D. C. 1992, *Manufacturing Planning and Control Systems*, 3rd edn, Irwin 4. Plossl, G. W. 1985, *Production and Inventory Control: Principles and Techniques*, 2nd edn, Prentice Hall 5. Wallace, T. F., Kremzar, M. H. 2001, *ERP: Making It Happen*, John Wiley 6. Ferran, C., and Salim, R. 2008, *Enterprise Resource Planning for Global Economics: Managerial Issues and Challenges*, Information Science References 7. Shtub, A. 1999, *Enterprise Resource Planning (ERP): the Dynamics of Operations Management*, Kluwer Academic Publishers	

Subject Code	ISE527
Subject Title	Logistics Information Systems
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with the ability to 1. understand the theory, principles, and applications of logistics information systems (LISs); 2. describe the concepts of operations research for solving logistics optimisation problems; 3. identify the relationship between data warehousing and online analytical processing (OLAP) in logistics operations; 4. apply artificial intelligence techniques for distribution planning and logistics operation improvement.
Intended Learning Outcomes	Upon completion of the subject, students will be able to 1. demonstrate their understanding of LISs and how such systems can be used in existing work situations to identify how the dispersed operations of a supply chain network can be configured; 2. examine the concepts of data preprocessing and OLAP in logistics operations; 3. apply the concepts of operations research to physical distribution planning and logistics operation improvement; 4. select appropriate LISs to achieve logistics intelligence.
Subject Synopsis/ Indicative Syllabus	The syllabus includes the following topics 1. <u>Introduction to Logistics Information Systems</u> LIS concepts and architecture for knowledge discovery in databases. Issues related to the use of database management systems in data mining and operations carried out during data preprocessing. Relationships among data warehousing, OLAP, and data processing. 2. <u>Applications of Logistics Information Systems</u> Linear programming for optimisation and transportation carrier operations. Genetic algorithms and simulated annealing for distribution planning. Artificial intelligence techniques for logistics operations. 3. <u>Strategies for Implementing Data Mining to Enhance Logistics Intelligence</u> Articulating data mining problems with logistics problems or objectives. Handling the critical steps required for success in logistics knowledge

discovery tasks. Evaluating logistics operations and enhancing the efficiency of logistics operations using suitable tools.

4. Case Studies

Application of logistics operation control systems; vehicle scheduling and routing.

Teaching/Learning Methodology

A mixture of lectures, tutorial exercises, and laboratory exercises is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through case studies to enhance students' "learning to learn" ability. Some case examples, largely based on consultancy experience, are used to integrate these topics and demonstrate to students how the various techniques are interrelated and applied in logistics operations.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed			
	a	b	c	d
Lecture	✓			✓
Tutorial		✓	✓	
Seminars			✓	✓
Project/case studies	✓	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Assignments	40%	✓	✓		✓		
2. Lab exercises	10%	✓					
3. Test	30%	✓			✓		
4. Projects	20%			✓	✓		
Total	100%						

The assignments are designed to assess students' ability to apply their knowledge of LISs and OLAP.

The laboratory exercises are designed to assess students' understanding of LISs.

The projects involve case studies through which students' understanding of the working principles, design concepts, and selection of LISs can be assessed.

	The test is designed to assess students' understanding of the topics and whether they can present the concepts clearly.	
Student Study Effort Expected	Class contact:	
	▪ Lectures 3 hours/week for 6 weeks	18 Hrs.
	▪ Tutorials 3 hours/week for 3 weeks	9 Hrs.
	▪ Laboratories 3 hours/week for 4 weeks	12 Hrs.
	Other student study effort:	
	▪ Assignment preparation	40 Hrs.
	▪ Presentation preparation and report writing	30 Hrs.
	▪ Test preparation	20 Hrs.
	Total student study effort	129 Hrs.
Reading List and References	1. Harrison, A. 2008, *Logistics Management and Strategy: competing Through the Supply Chain*, Harlow: Financial Times/Prentice Hall 2. *Logistics Management and Environmental Aspects: Special Innovative Conferences on Intelligent Transportation Systems and Telemetrics, Marketing, Vehicle Finance and Leasing. Croydon,* England: ISATA Düsseldorf Trade Fair, 1998 3. Dror, M. 2000, *Arc Routing: Theory, Solutions, and Applications*, Boston, MA: Kluwer Academic 4. Roiger, R. 2003, *Data Mining: A Tutorial-based Primer Boston*, Addison Wesley 5. *International Journal of Logistics: Research and Applications*, vol. 2 no. 3, Nov 1999.	

Subject Code	ISE542
Subject Title	Managing Knowledge
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	Mutual Exclusion of ISE531 Principles of Knowledge Engineering and Management and ISE458 Introduction to Knowledge Management
Objectives	The aims of the subject are to: 1. Introduce the students the foundations of KM. 2. Provide the students with an insight and introductory working knowledge to allow them to effectively apply KM in organizations to achieve their objectives and lead and promulgate KM efforts for business effectiveness and success. 3. Equip the students with the practitioner understanding and proficiency to initiate, assess, operate, disseminate, and manage KM practices, projects, programs, and other KM efforts with an enterprise.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. understand the concepts and ethical issues in KM b. select and devise KM strategies, programmes and actions to provide effective business support c. conduct knowledge audit and use of various knowledge audit methods for analyzing and reporting findings for KM related planning d. To conduct a feasibility study on the implementation of knowledge management projects in an organization.
Subject Synopsis/ Indicative Syllabus	The subject aims to introduce the students to the foundations of KM. It is designed to provide the students with KM practitioner understanding of how KM fits into, and supports business operations with the further understanding of how KM is conducted from a system approach. Some of the key topics covered in this subject include: *Knowledge Management Essentials* Evolution of knowledge, theory and concepts of KM, Type of knowledge, nature of knowledge work *Managing Knowledge Processes* Various knowledge processes and their applications, methods and tools for

	managing knowledge processes *Knowledge Auditing* Role and importance of knowledge audit, knowledge audit process and practices , methods and tools for conducting knowledge auditing, analysis and reporting the results of a knowledge audit *Knowledge Management Related Strategies* KM strategy and how to manage culture aspects, and initiatives of KM, People-centric and IT-based KM from business perspectives based on understanding that business performance results from knowledgeable (competent), motivated, and accountable human actions, in part supported by IT capabilities. *Knowledge Management Practices* KM practices in different industries, the management of KM projects, ethical issues in KM, case studies
Teaching/Learning Methodology	This subject is offered in a blended mode of e-learning and face-to-face teaching is used to facilitate the students to learn. A mixture of e-learning, instructor-lead tutorials and workshops, and case studies will be used to deliver the topics in this subject. Case studies, largely based on real case will be used to demonstrate to students how the latest techniques can be applied to improve the real life situations. The students can access the Blackboard e-learning platform which contains interactive online materials for the lessons. Each of the lessons may incorporate designated reading (chapters, sections, pages) in the textbook and recommended readings in the form of separate articles and papers which are available online or at the library. In all lessons, animations and interactive games have been added in appropriate locations to facilitate and strengthen learning and understanding. A number of self-assessment exercises are also included to enable participants to monitor their personal progress. In addition, the Blackboard platform supports peer-to-peer activities in form of online chat forums and bulletin boards. This peer-to-peer interaction not only enhances knowledge sharing and learning from peers but also helps strengthen or clarify concepts delivered in lecture materials. Participants are strongly encouraged to make effective use of all learning tools available to optimise their learning in this subject. To facilitate the students to learn, the students are also expected to participate in instructor led face-to-face or on-line teaching activities which include workshop, tutorials, seminars, etc. The students will also get in touch with the facilitators through the bulletin board discussions.

<table>
<tr><td></td><td>Some of the teaching activities will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". Mini-project will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged.</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.Individual assignment</td><td>15%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Presentation</td><td>8%</td><td></td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Group assignment</td><td>12%</td><td></td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3.Perosnal Learning Environment and Network (PLE&N)</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>4. Open Book Examination</td><td>55%</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>
Basically, the assessment method of the subject is composed of coursework and examination. The coursework assessment includes individual assignment, personal learning environment and network (PLE&N) board, presentation and report for KM strategy workshop. Written examination will be arranged at the end of the semester. All assessment components will require students to apply what they have learnt to realistic work applications.
A student is expected to perform satisfactorily in BOTH the coursework and the examination. The subject coordinator can exercise discretion to alter the final subject result should there exists significant variation in a participant's performance in these 2 components.
The individual assignment facilitates the students to reflect what they learn in learning outcomes (a) and (b). The presentation and group assignment for KM strategy workshop provide a team work environment for facilitates the students to apply the concepts, theory and skills learnt in the subject for a real life scenario (e.g. Learning Outcomes (c) and (d)).
Every student is required to set up a personal learning environment and network (PLE&N) and contributes to discussions and learning in this environment during the semester and beyond (Learning outcomes (a) to (d)).
</td></tr>
</table>

	An open book examination is held at the end-of-semester which aims at assessing students' understanding of the theory, concepts and knowledge necessary for achieving the learning outcomes (a) to (d) for the subject.	
Student Study Effort Required	Class contact:	
	On-line Lectures/Seminars 3 hours x 2 weeks, 2 hours x 1 week	8 Hrs.
	Face-to-face Lectures/Presentations/Tutorial/Workshop 3 hours x 9 weeks	27 Hrs.
	Wiki/Bulletin Board contributions 1 hour per week x 7 weeks	7 Hrs.
	Other student study effort:	
	Study and self learning including workshop	28 Hrs.
	Preparation and revision	20 Hrs.
	Assignment and report writing	28 Hrs.
	Total student study effort	118 Hrs.
Reading List and References	**Recommended Reading** 1. Davenport, T.H. and Prusak, L., *Working Knowledge: How Organisation Manage What They Know*, Harvard Business School Press, 1997. 2. Despres, C. and Chauvel, D. (Editors), *Knowledge Horizons: The Present and the Promise of Knowledge Management*, Butterworth-Heinemann, Boston, 2000. 3. Filemon A. Uriarte, Jr. Introduction to Knowledge Management, ASEAN Foundation, Jakarta, Indonesia, 2008. 4. Kimiz Dalkir, 2005, Knowledge Management in Theory and Practice, Elsevier Butterworth–Heinemann., UK, 2005. 5. Klein, G., *Sources of Power: How People Make Decisions*, MIT Press, Cambridge, 1998. 6. Liebowitz, J. (Editors), *Knowledge Management Handbook*, CRC Press, Boca Raton, 1999. 7. Stewart. T.A., *Intellectual Capital: The New Wealth of Organizations*, Currency Doubleday, New York, 1997. 8. Sveiby, K.E., *The New Organizational Wealth: Managing & Measuring Knowledge-based Assets*, Berrett-Koehler, San Francisco, 1997 9. Tiwana, A., *Knowledge Management Toolkit*, Prentice hall, 2nd Edition, 2002. 10. Wiig, Karl, People-Focused Knowledge Management: How Effective Decision Making Leads to Corporate Success, Butterworth-Heinemann, 2004. **In Addition**	

11. Cheung, C.F., Lee, W.B., Wang, W.M., Chu, K.F. and To, S. “A Multi-perspective Knowledge-based System for Customer Service Management”, *Expert Systems with Applications*, Vol. 24, No.4, p.457-470 (2003).
12. Cheung, C.F., Lee, W.B., Wang, W.M., Wang, Y. and Yeung, W.M. “A Multi-faceted and Automatic Knowledge Elicitation System (MAKES) for Managing Unstructured Information”, *Expert Systems with Applicat*ions, Vol. 38, No. 5, 5245–5258 (2011).
13. Cheung, C.F., Li, M.L., Shek, W.Y., Lee, W.B. and Tsang, T.S. “A Systematic Approach for Knowledge Auditing: A Case Study in Transportation Sector”, *Journal of Knowledge Management*, Vol. 11, No. 4, p. 140-158 (2007).
14. Cheung, C.F., Ko, K.C., Chu, K.F. and Lee, W.B. “Systemic Knowledge Auditing with Applications”, *Journal of Knowledge Management Practice*, August, http://www.tlainc.com/articl97.htm, 2005.
15. Cheung, C.F., Wang, W.M. and Leung, C.S. "A Pilot Study on a Knowledge-based Case Library to Support Suicide Risk Assessment, *International Social Work*, Vol. 56, No. 2, p.208-227 (2013).
16. Choy, S.Y., Lee, W.B. and Cheung, C.F. “A Systematic Approach for Knowledge Audit Analysis: Integration of Knowledge Inventory, Mapping and Knowledge Flow Analysis,” *Journal of Universal Computer Science*, Vol. 10, No.6, p.674-682 (2004).
17. Choy, S.Y., Lee, W.B., Cheung, C.F. and Geoffrey Shim “Development of a Knowledge Management Culture Assessment Tool (KMCAT) with Applications in Aviation Industry”, *Journal of Information and Knowledge Management*, Vol. 4, No. 3, p.179-189, 2005.
18. *Harvard Business Review on Knowledge Management*, Harvard Business Review Series, 1998.
19. Leung Zeno, Cheung, C.F., Chan, K.T. and Lo, H.K. “Effectiveness of Knowledge Management System in Social Services - Food Assistance Project as an Example”, *Administration in Social Work*, Vol. 36, p.302–313 (2012).
20. Nonoka, I. and Takeuchi, H., *The Knowledge-Creating Company*, Oxford University Press, 1995
21. Ruggles, R.L.E., *Knowledge Management Tools: Resources for the Knowledge-Based Economy*, Butterworth-Heinemann, Boston, 1997
22. Shek, W.Y, Lee, W.B., Cheung, C.F. and Chong, Y.Y. “Systematic Knowledge Auditing: A Case Study in a Power Utility Company”, Journal of Information and Knowledge Management, Vol.6, No. 4, p.231-239 (2007).
23. Skyrme, D.J., *Measuring the Value of Knowledge: Metrics for the Knowledge-Based Business*, Business Intelligence, London, 1998.
24. Wiig, K.M., *Knowledge Management Foundations: Thinking about Thinking – How People and Organisations Create, Represent, and Use Knowledge*, Schema Press, Arlington, 1993.
25. Wiig, K.M., Knowledge management: The Central Management Focus for Intelligent-Acting Organisations, Schema Press, Arlington 1994.
26. Yeung, C.L., Cheung, C.F., Wang, W.M. and Tsui, Eric “A Knowledge Extraction and Representation System for Narrative Analysis in the Construction Industry”, *Expert Systems with Applications*, Vol. 41, No. 13, p.5710-5722 (2014).
27. Zeno Leung, C.S., Cheung, C.F., Chu, K.F., Lee, W.B. and Wong, Y.W. “Assessing Knowledge Assets - Knowledge Audit of a Social Service Organization in Hong Kong”, *Administration in Social Work*, Vol. 34, No. 4, p.361-383 (2010).

Subject Code	ISE544
Subject Title	Supply Chain Management Enabling Technologies
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. a basic understanding of the concept of supply chain systems and how to apply relevant techniques to solve traditional logistics and supply chain process problems; 2. knowledge in applying the latest business technology for logistics and supply chain systems in the running of business activities to enable efficient information capturing, processing, and exchange among various business entities in today's supply chain and logistics environment; 3. working knowledge of the latest information and communication technology and an interactive environment in which to learn and practice their skills in supply chain applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply appropriate business technology for logistics and supply chain systems and data capturing techniques to improve data exchange and information flow; b. analyse existing logistics operations and design process improvement procedures in various supply chain areas; c. identify the advantages and limitations of business technology in various areas; d. integrate business technology into existing logistics infrastructures to form more effective systems.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction and Innovative Supply Chain Technology</u> Identification techniques (RFID/barcode technology); containerisation/material handling; mobile technology; collaborative commerce; data mining. 2. <u>Supply Chain Information Systems</u> Material requirements planning; enterprise resource planning; production data management; point-of-sale; supplier relationship management; customer relationship management; business intelligence. 3. <u>Standards, Best Practices, and Benchmarking</u> Supply chain operations reference (SCOR) model; supply chain process mapping and benchmarking; best practices in supply chain management; standardisation of supply chain management; latest EPC and RFID developments and applications.

<table>
<tr><td></td><td>4. <u>Case Studies and Implementation Strategies</u>

Supplier and workflow management; vendor managed inventory (VMI); efficient consumer response (ECR); asset management; collaborative planning, forecasting, and replenishment (CPFR); third party logistics/fourth party logistics (3PL/4PL).</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorials, laboratories, and small group discussions is used to deliver the various topics in this subject. Students are also required to read specified monographs and journal publications. Coursework is assessed based on literature reviews, individual and group assignments and reports, and presentations. Mini-projects are done by groups of students basing on real supply chain management cases. Both individual reports and group presentations contribute to the overall grade.
<table>
<tr><td rowspan="2">Teaching/Learning Methodologies</td><td colspan="4">Intended Subject Learning Outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Laboratory</td><td>✓</td><td></td><td>✓</td><td></td></tr>
<tr><td>Group Discussion</td><td></td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Project</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table></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. Laboratory exercises</td><td>10%</td><td>✓</td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Assignments</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Mini-project report</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>4. Test</td><td>30%</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>
Laboratory exercises allow students to practice the supply chain management enabling technologies learnt in the lectures. The individual and group assignments and reports give students the opportunity to share their ideas and apply their supply chain management knowledge in problem solving. The test is used to measure the students' individual performance in this subject.</td></tr>
<tr><td></td><td>Class contact:</td><td></td></tr>
</table>

Student Study Effort Expected	▪ Lectures/Seminars 3 hours/week for 9 weeks	27 Hrs.
	▪ Laboratories/Tutorials 3 hours/week for 4 weeks	12 Hrs.
	Other student study effort:	
	▪ Self-study/Group discussions	38 Hrs.
	▪ Preparation for the mini-project presentation; writing up assignments	25 Hrs.
	▪ Preparation for the final examination	15 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	1. Fiddis, C. 1998, *Managing Knowledge in the Supply Chain: The Key to Competitive Advantage*, Financial Times Retail & Consumer, London 2. Doz, Y.L. and Hamel, G. 1998, *Alliance Advantage: the Art of Creating Value through Partnering*, Harvard Business School Press, Boston, Mass 3. Miguel Fernandez-Ranada, F. Xavier Gurrola-Gal, Enrique Lopez-Tello 2000, *3C: A Proven Alternative to MRPII for Optimizing Supply Chain Performance*, St. Lucie Press, Boca Raton, FL 4. Ptak, C. A. 2004, *ERP: Tools, T*e*chniques, and Applications for Integrating the Supply Chain*, St. Lucie Press, Boca Raton, FL 5. Buchel, A., Schonsleben, P. 1998, *Organizing the Extended Enterprise: IFIP TC5 / WG5.7 International Working Conference on Organizing the Extended Enterprise*, Chapman & Hall, Dordrecht; Norwell, Mass 6. Rankl, W. and Effing, W. 2003, *Smart Card handbook*, Wiley, Chichester; Hoboken, N.J. 7. Sadeh, N. 2002, *M-Commerce: Technologies, Services and Business Models*, Wiley, New York 8. Hedgepeth, W. O. 2007, *RFID Metrics: Decision Making Tools for Today's Supply Chains*, CRC Press/Talyor & Francis, Boca Raton, FL	

Subject Code	ISE548
Subject Title	Risk and Crisis Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil. However, knowledge of elementary business statistics and probability, as well as information systems for supply chain management, is preferred.
Objectives	This subject enables students to 1. master quantitative and qualitative skills necessary to strike a balance between risk and opportunity in tailoring risk mitigation for logistics systems; 2. appreciate the importance of injecting a risk culture into the organization and of identifying critical factors for implementing an organization-wide risk and crisis management strategy; 3. advocate a customer-centric Business Continuity Plan (BCP) as a marketing tool and align it with contemporary risk mitigation strategy; 4. apply and embed best practices of information system security into logistics information systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a apply risk modeling assignment methods to evaluate the level of risk of the logistics systems; b identify how logistics systems should be configured to balance risk/reward; c implement the BCP in a practical situation to mitigate risk; d apply the skills in articulating the requirement of process and procedures for building enterprise-wide risk management.
Subject Synopsis/ Indicative Syllabus	1. <u>Risk Modeling and Management</u> Step-by-step approach in building qualitative and/or quantitative model for analysis, design, and evaluation of logistics system for mitigating risk; Application of hierarchical holographic modeling (HHM) for risk identification; Partition risk impact to select the best risk mitigation strategy based on multi-objective risk impact analysis. 2. <u>Crisis Management and Risk Audit</u> Logistics project risk management; Tracking and identifying the patterns and sources of risk; Principle of balancing risk/reward relationships; Establishing processes for emergency response, escalation, and preventive measures. 3. <u>Business Continuity Planning</u> Strategic issues and case studies drawn from logistics service providers to highlight various topics on outsourcing and quality management issues;

<table>
<tr><td></td><td>Disaster recovery planning; Information security management practices, including planning and audit of information systems.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, case studies, and assignments are used to deliver the concept and application of risk and crisis management, with an emphasis on risk mitigation and balancing risk/reward. Lectures are the primary vehicle used to deliver the concept of risk and crisis management, and to teach the various quantitative and qualitative risk analysis methods. Case studies are used to integrate theories in practice and review contemporary issues and best practices of customer-centric BCP.
<table>
<tr><td rowspan="2">Teaching/Learning Methodologies</td><td colspan="4">Intended Subject Learning Outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>Lecture</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Case Study</td><td>✓</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>Project</td><td>✓</td><td></td><td>✓</td><td>✓</td></tr>
</table></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. Test</td><td>30%</td><td>✓</td><td>✓</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Project</td><td>30%</td><td>✓</td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Assignment</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>
The test is designed to assess students’ understanding of the topics and whether or not they can present the concepts clearly.

The project is designed to assess students’ skills in applying different risk models, implementing BCP, and articulating the requirement of process and procedures for building enterprise-wide risk management through different case studies and group projects.

Assignments are designed to assess students’ ability in identifying how the logistics systems should be configured to balance risk/reward and to implement the BCP in a practical situation for risk mitigation.</td></tr>
<tr><td></td><td>Class contact:</td><td></td></tr>
<tr><td></td><td>▪ Lecture/Seminars</td><td>30 Hrs.</td></tr>
</table>

Student Study Effort Expected	▪ Tutorial/Case studies	9 Hrs.
	Other student study effort:	
	▪ Self learning and practice for project	27 Hrs.
	▪ Assignment and report writing	40 Hrs.
	Total student study effort	106 Hrs.
Reading List and References	Textbook: Haimes, Y, Y. 2011, *Risk Modeling, Assessment, and Management*, Wiley, New York Indicative Reading: 1. Bastrom, N and Cirkovic, M, M. 2008, *Global Catastrophic Risks*, Oxford University Press, Oxford 2. Fraser, J and Simkins, B. 2009, *Enterprise Risk Management: Today's Leading Research and Best Practices for Tomorrow's Executives*, Wiley, New York 3. Snedaker, S. 2011, *Business Continuity and Disaster Recovery Planning for IT Professionals*, Butterworth-Heinemann	

Subject Code	ISE549
Subject Title	Management of Innovation and Technology
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This course starts with the assumption that technology always evolves. It is often observed that when technology changes, some firms dominate the market, while many others lose their market share; some deteriorate to the point where they totally exit the market. This course is designed to provide an understanding of the relationships between technology evolution and firm strategies and their influence on firm/market performance. In particular, this course focuses on the analysis of technology evolution, industry evolution, and attempts to provide insights on firm strategies. Students will learn about a variety of tools and concepts to address firm strategies in the face of technology evolution, and to approach them from industry-level perspectives. Through readings, lectures, class discussions, and individual/group projects, students will learn to apply the tools and concepts to decisions related to technology, and will develop an understanding of their potentials and limitations in various contexts.
Intended Learning Outcomes	Upon successful completion of the subject, students will be able to a. comprehend and analyse the fundamental issues and challenges of technology management, new product development, and innovation management within an organisational context; b. follow an organisational process model for managing technology, and new product or innovation management; c. possess the insights necessary to function as an effective general manager in managing the innovation process and avoid common errors and misperceptions; d. link technology and innovation decisions to a company's strategic planning and operational management processes; e. identify and formulate managerial strategies applicable to new venture projects that involve technology and innovation.
Subject Synopsis/ Indicative Syllabus	1. <u>Importance of Technology and Innovation in Economic and Social Development</u> Risks and rewards of technological innovation; role of government policy in promoting technology and innovation; role of firm-level strategy in the global market 2. <u>Importance of Technological Evolution</u> Lessons regarding the evolution of technology; the main concept of competition changes in accordance with the technological evolution 3. <u>Importance of Innovation Diffusion and Innovation Types</u>

Understanding on factors affecting innovation adoption; Diverse types of innovations; the heterogeneous impact of diverse innovations on firm performance

4. Compatibility and Network Effects

Understanding on the origin of network effects; Characteristics of in study showing strong network effects; firm strategies to survival in the network-effect markets

5. Firm Boundary Decisions

Understanding on firm boundary; the impact of firm boundary decisions on performance; key reasons that firms change their boundaries; relationship between firm boundary decision and firm capability; relationship between firm boundary decision and industry structure

6. Technology Adoption Timing

Understanding on differences between early vs. late adoption and its performance heterogeneity

7. Organizational Learning

Understanding why firms show heterogeneous learning processes and routines in dealing with new innovations; why some firms are faster than others in learning new innovations

Teaching/Learning Methodology

A mixture of lectures, tutorial exercises, and case studies is used to deliver the various topics. Some material is covered using a problem-based format where this advances the learning objectives. Case discussion and project activities take place against a background of conceptual materials, which include selected readings and brief lectures pertaining to the theme of each session.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed				
	a	b	c	d	e
Group Presentation			✓		
Individual Presentation		✓			
Individual Report				✓	✓
Test	✓				

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	--
1. Literature Critique (Group Assessment)	20%		✓	✓			
2. Individual Report	40%				✓	✓	
3. Test I and II	40%	✓					

	Total	100%	

Assessment comprises individual and group assignments, tests, and a group project. The individual tests are designed to assess students' understanding of the lecture materials and application of the knowledge learnt. Individual participation in class discussions is used to evaluate the students' course preparation work. This also helps students to develop analytical and organisational communication skills in technology and innovation management. Interactive case analyses, group-based exercises, and assignments are used to develop and assess the students' group problem-solving process and work collaboration skills. The field project components require students to apply what they have learnt to realistic work scenarios.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Tutorials/Seminars/Case studies	18 Hrs.
	Other student study effort:	
	▪ Conducting projects and project discussions	20 Hrs.
	▪ Studying the materials covered by lectures for tests	30 Hrs.
	▪ Preparation for seminars/case studies	21 Hrs.
	▪ Preparation for project presentations and report writing	20 Hrs.
	Total student study effort	130 Hrs.

Reading List and References

1. Burgelman, Robert, Christensen Clayton and Wheelwright Steven, *Strategic Management of Technology and Innovation*, McGraw-Hill/Irwin (ISBN: 0-07-2536950), latest edition
2. Chesbrough, Henry, *Open Innovation*, Harvard Business Press, latest edition
3. Christensen, Clayton, *Innovation and the General Manager*, Irwin/McGraw Hill, latest edition
4. Tushman, Michael and Anderson, Philip, *Managing Strategic Innovation and Change*, Oxford Press, latest edition
5. Utterback, James, *Mastering the Dynamics of Innovation*, Harvard Business Press, Boston, MA, latest edition
6. Schilling, Melissa, *Strategic Management of Technological Innovation*, McGraw Hill, latest edition

Subject Code	ISE550
Subject Title	Contemporary Logistics Issues in China
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the latest social, technical, and economic issues of the logistics industry in China; 2. the essential factors in building a contemporary logistics system. 3. the environment to perform a competitive benchmark evaluation and put into practice the key concepts and frameworks in formulating contemporary logistics systems in China.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the latest social, technical, and economic issues of the logistics industry in China; b. identify essential components in building a contemporary logistics system; c. conduct a logistics systems portfolio analysis.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Contemporary issues on the development of logistics in Mainland China; Various logistics operations and logistics information management system; Logistics and custom in China. 2. <u>Contemporary Logistics Issues</u> Infrastructure, law, organization, business practice, logistics network and operations; Logistics management in China; Business logistics and human resource management; Operations research and logistics; Relationship between logistics and business law in China. 3. <u>Comparison of Logistics Practices</u> Comparative study of logistics practices between Hong Kong and China; Logistics in large enterprise; Planning of logistics services in China.
Teaching/Learning Methodology	A mixture of lectures, case studies, and site visits in China is used to deliver the various topics in this subject, some of which are covered in a problem-based format where learning objectives are enhanced. Other topics are covered through directed study to enhance students' "learning to learn" ability. Some case studies based on on-site case studies are used to integrate these topics and thus demonstrate to students how various issues are interrelated and how they apply in real-life situations. The students are required to formulate a study plan to focus on achieving

the goal of the field trip. Desktop research is required to gather information about the organizations to be visited, its competitors, and the markets concerned.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed		
	a	b	c
Lecture	✓	✓	
Seminars	✓	✓	✓
Case studies		✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
1. Individual write-up of background knowledge	10%	✓	✓	✓			
2. Individual literature review report	20%	✓	✓	✓			
3. Individual research report	30%	✓	✓	✓			
4. Final group field project report	30%	✓	✓	✓			
5. Oral presentation of findings	10%	✓	✓	✓			
Total	100%						

Individual assignments are designed to appraise students' recommendations in building a contemporary logistics system. The project report and presentation are designed to reflect students' understanding on the theories taught. The quiz is designed to measure students' depth of knowledge in the latest social, technical, and economic issues of the logistics industry in China.

Student Study Effort Expected	Class contact:	
	▪ Lectures	9 Hrs.
	▪ Tutorial/Seminar/Case studies	6 Hrs.
	▪ Site visits	24 Hrs.

	Other student study effort:	
	▪ Preparation for visits and information gathering	26 Hrs.
	▪ Preparation for the project presentation and report writing	60 Hrs.
	Total student study effort	125 Hrs.
Reading List and References	1. Donald Waters, 2010, *Global logistics: new directions in supply chain management*, London ; Philadelphia : Kogan Page, c2010 2. Beijing Shi : Dang dai Zhongguo chu ban she ; Xianggang : Xianggang zu guo chu ban she, 2009, *Contemporary China. Armed forces logistics*, 北京市 : 當代中國出版社 ; 香港 : 香港祖国出版社 3. John Gattorna, 2009, *Dynamic supply chain alignment: a new business model for peak performance in enterprise supply chains across all geographies*, Farnham, England ; Burlington, VT : Gower Pub. 4. Cheng Jin, 2007, *Maritime policy in China after WTO : legal & economic approach*, Hong Kong : Dept. of Logistics, The Hong Kong Polytechnic University 5. Lee, Tae-Woo, 2002, *Shipping in China*, Aldershot; Burlington, VT : Ashgate, c2002 6. Koh, S. C. L.; Tan, Z., 2005, *Using e-commerce to gain a competitive advantage in 3PL enterprises in China*, International Journal of Logistics Systems and Management, 9 January 2005,, Vol. 1, No. 2-3, pp. 187-210 7. *China logistics directory*, 2008, Hong Kong : SinoMedia Ltd., 8. *Logistics in China*, 2008, New York ; London : Datamonitor Plc	

Subject Code	ISE559
Subject Title	Technology Audit and Assessment
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	One of: ISE549 Management of Innovation and Technology, ISE5001 Technology Transfer and Commercialisation or ISE5602 Management of Innovation and Technology
Objectives	This subject provides students with the opportunity to 1. understand the importance of technology audit and assessment in corporate strategic planning; 2. understand the critical elements needed to conduct a comprehensive technology audit and assessment; 3. develop the skills needed to carry out a technology audit and assessment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. recognise the practical role of technology audit and assessment and their benefits to organisations; b. understand the methodologies and tools required for technology audit and assessment; c. apply the proper tools and techniques to conduct a technology audit and assessment.
Subject Synopsis/ Indicative Syllabus	1. <u>The Technology Audit</u> Understanding the technology portfolio; technology fitness audit; audit process. 2. <u>Implementing and Sharing Technology Audit Results</u> Sharing audit results; assessing technology gaps. 3. <u>Technology Assessment and Technology Intelligence</u> Technology assessment process; assessing the present technology base; performance measurement tools; technology strategy and intelligence. 4. <u>Technology Forecasting and Technology Roadmapping</u> Mapping the produce-market technology linkage; forecasting tools for technological decision making; technology road-mapping tools.
Teaching/Learning Methodology	A mixture of lectures, tutorials, and case studies is used to deliver the various topics in this subject. The lectures supplemented with interactive questions and answers which are aligned with subject learning outcomes *a* and *b* are used to introduce students with the knowledge of technology audit and assessment. Whereas tutorials and case studies which are aligned with subject learning outcome *c* are used to develop students' ability to apply what they have learnt to realistic work scenario s.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
1. In-class individual tests	25%	✓	✓				
2. Individual assignments	40%		✓	✓			
3. Individual final project presentation	8%			✓			
4. Final field project report	27%			✓			
Total	100%						

Assessment comprises assignments, tests, and a group project. The tests are designed to assess the understanding of students of the concepts, methodologies, and tools of technology audit and assessment. Whereas, the assignment and group project are designed to assess the ability of students in applying the knowledge they have learnt in real situations.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures	21 Hrs.
	▪ Tutorials/Case studies	18 Hrs.
	Other student study effort:	
	▪ Revision and preparation for assignments and the group project	81 Hrs.
	Total student study effort	120 Hrs.

Reading List and References	There is no recommended textbook for this course. A number of reference books and journal articles are used to provide the necessary background materials of relevance to this course. Potential references include, but are not limited to: 1. Lindsay, J. 1998, *The Technology management Audit,* Cambridge Strategy Publications Ltd. 2. Angelis, D. 2002, *An Optimal Model for R&D Valuation*, Int. J of Technology Management, vol. 24, no. 1, pp. 44-56 3. Barrel, R, Mason, G and O'Mahony, M. 2000, *Productivity, Innovation and Economic Performance,* Cambridge University Press 4. Gregory, MJ, Probert DR and Cowell DR 1996, *Auditing Technology Management Processes,* Int. J. of Technology management, vol. 12, no. 3, pp. 3-6-319 5. Phaal, R, Farrukh CJP and Probert DR 2001, *Technology Management Process Assessment: A Case Study*, Int. J. of Operations & Production Management, vol. 21, no. 8, pp. 1116-1132 6. Lester Richard 1998, *The Productive Edge – How U.S. Industries are Pointing the Way to a New Era of Economic Growth*, New York, W.W. Norton & Company, Inc.

Subject Code	ISE5001
Subject Title	Technology Transfer and Commercialization
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	none
Objectives	This subject is aimed to provide the students with: 1. the theory and practice of technology transfer and commercialization. 2. working knowledge and skills to plan and implement technology assessment, market assessment, alignment of technology in technology transfer and transmission process. 3. understanding on issues concerning roles of various intellectual property rights, patent search, sustainability and competitive advantage, science and technology policy, start-up, and licensing and spin-off companies.
Intended Learning Outcomes	Upon completion of the subject, students will be able: a. to apply appropriate mechanisms of technology transfer and commercialization b. to understand and assess customer-needs driven technology specifications, technology alignment, and technology transfer process c. to assess technology licensing agreement and to evaluate start-up and spin-off companies d. to recognise the importance and role of intellectual property rights, government, research institutes and commercial institutions in technology transfer and commercialization
Subject Synopsis/ Indicative Syllabus	The topics to be covered include: <u>1. Theory and practice</u> Technology Entrepreneurship and Innovation; Technology Transfer & Transmission Process; Technology Commercialization Process; Role of Intellectual Property in Protecting Innovation <u>2. Technology and Market Assessment</u> Customer Needs Driven Product Specifications; Negotiating the Deal and Marketing the Innovation; Financial Plan and Selection of Innovation Projects; Innovation and

<table>
<tr><td></td><td>Risk Management; Technology Valuation and Impact Analysis; Market Assessment and Alignment of Technology.

3. Commercialization Strategy

Coming Full Circle in the Commercialization Loop; Business Plan Science and Technology Policy; Negotiating and Monitoring the Licensing Agreement; Start-Up and Spin-Off Companies; Joint Venture.

4. Case Studies

Case studies drawn from commercial, industrial and research applications.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>This subject is offered in block mode format on weekends, usually spread over a month. A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of the topics will be covered in a problem-based format where this enhances the learning objectives. Others will be run as project-based, whereby students will learn and apply the knowledge and techniques to solving real problems. The subject also emphases experiential learning offered by industrial leaders.</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. Individual Assignment</td><td>15 %</td><td></td><td>✓</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>2. In-class exercises</td><td>30 %</td><td>✓</td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Quiz and Test</td><td>45 %</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>4. Reflection on the learning</td><td>10 %</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>
</table>

This is a 100% continuous assessment subject which is comprised of assignments with individual and group components, mini-project and usually two tests. All assessment components will require students to apply what they have learnt to realistic work applications.</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">The individual assignment allows the students to reflect their understanding of the topics expected in learning outcome (b) and (d).

The in-class exercises allow the students to give quick feedback on applying and practicing the techniques learnt in the classes for learning outcomes (a) and (c).

There are a quiz and a test which aim to assess the overall understanding of the student for the concepts and knowledge necessary for achieving learning outcomes (a) to (d)</td></tr>
<tr><td rowspan="7">Student Study Effort Required</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ In-class activities/Tutorial</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Study and self learning including mini-project and preparation for mini-project presentation</td><td>38 Hrs.</td></tr>
<tr><td>▪ Assignment and report writing</td><td>25 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>102 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">1. Clifford, M. Gross and Joseph P. Allen, (2003) “Technology Transfer for Entrepreneurs – A Guide to Commercializing Federal Laboratory Innovation”, Praeger Publishers, USA.
2. Cohen, M. W., “Patents and Appropriation_ Concerns and Evidence”, Journal of Technology Transfer, 30(1&2): 57-71, 2005.
3. Cooke, I. and Mayes, P. (1996), Introduction to Innovation and Technology Transfer, Norwood: Artech House.
4. Dorf, R.C. (1999), The Technology Management Handbook, Boca Raton, Fla.: CRC Press.
5. Eskelin, A. (2001), Technology Acquisition: Buying the Future of your Business, Boston, Mass.: Addison-Wesley.
6. Farris, G.F., “Research in Innovation Management and Technology Transfer in China”, The Journal of Technology Transfer, 32(1-2) 123-126, April 2007.
7. Iansiti, M. (1998), Technology Integration: Making Critical Choices in a Dynamic World, Mass.: Harvard Business School.
8. Inzelt, A. and Hilton, J. (1999), Technology Transfer: From Invention to Innovation, Kluwer Academic, Norwell.
9. Jolly, V.K (1997), Commercialisation of New Technologies, Greeting from Mind to Market, Boston, Mass.: Harvard Business School Press.
10. Melissa, A. Schilling (2008), Strategic Management of Technology Innovation, Micraw-Hill International Edition, 2nd Edition, Singapore.
11. Muir, A.E. (1997), The Technology Transfer System, New York: Latham Book Publishing.
12. Parr, R.L. and Sullivan, P.H. (1996), Technology Licensing: Corporate Strategies for Maximizing Value, New York: John Wiley & Sons.
13. Paulson, E. (2001), The Technology M&A Guidebook, New York: John Wiley & Sons.
14. Megantz, R.C. (2002), Technology Management: Developing and Implementing Effective Licensing Programs, New York: John Wiley & Sons.
15. Spencer, R.H. (2003), Technology Best Practices, New York: John Wiley &</td></tr>
</table>

	Sons. 16. Timmons, J.A. (2003), New Venture Creation, Sixth edition, Chicago: Irwin. 17. Protecting Innovations by Utility Models (http://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm). 18. NASA's Technology Transfer Spin-Out Process (http://ipp.gsfc.nasa.gov/resources-ttprocess2.html). 19. Ramsey. W.S., "Financing a New Venture", http://www.williamramseylaw.com/pages/Pfinancing.html

Subject Code	ISE5002
Subject Title	Field Study of Technology Organizations
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students must have completed any two of the following three compulsory subjects: ISE549 Management of Innovation and Technology, ISE559 Technology Audit and Assessment, and ISE5001 Technology Transfer and Commercialization.
Objectives	This subject will provide students with the opportunity to 1. Study and conduct real case studies of technology organizations in China, Taiwan or overseas, which is participating in the field study; 2. Perform a competitive benchmark evaluation and put into practice some of the key concepts and frameworks that they have learnt in two of the three compulsory subjects, namely, ISE549, ISE559, and ISE5001; 3. Understand the implementation issues of proposed solutions to specific technological problems in organizations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. Conduct a technology portfolio analysis; b. Identify the technology gaps in an organization; c. Devise a road map for solutions to specific problems facing technology organizations; d. Integrate technology into a company's business strategy.
Subject Synopsis/ Indicative Syllabus	1. <u>Review of Basic Concepts Important to the Field Trips</u> Technology and economic performance; science and technology infrastructure; industrial research and development; technology development and geographical considerations; technology and education/training; government's roles in IP and technology commercialization. 2. <u>Technology Field Trip Study</u> Observations of and reporting of study visits to technology organizations in China, Taiwan or overseas. 3. <u>Problem-Solving Skills</u> Observations and reporting; mapping solutions.
Teaching/Learning Methodology	This subject includes lectures, case studies, and experiential learning based on best practices. The students are required to formulate a study plan to focus on achieving the goal of the field trip. Desktop research is required to gather information about the organization to be visited, its competitors, and the markets concerned. Through direct observation and interviews with organizational members, students have the opportunity to conduct real-life studies of technological issues facing companies and put into practice the knowledge that they have gained in other subjects offered in this programme. These activities allow students to achieve the learning outcomes of the

<table>
<tr><td></td><td>subject. This subject is offered in block mode format. Two lectures are arranged by (i) local government officials or distinguished industrial association member or (ii) a partner university, to cover relevant innovation strategy topics related to the industries of the location to be visited.</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. Individual write-up of background knowledge</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Individual research report</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Individual reflective journal</td><td>10%</td><td></td><td></td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>4. Oral presentation</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>5. Group study plan & project report</td><td>30%</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>
Reports and presentation are used to assess the knowledge acquired by the students and their ability to apply such knowledge to achieve the learning outcomes of the subject.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>6 Hrs.</td></tr>
<tr><td>▪ Tutorials/Seminars/Case studies</td><td>12 Hrs.</td></tr>
<tr><td>▪ Site visits</td><td>21 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Preparation for visits and information gathering</td><td>20 Hrs.</td></tr>
<tr><td>▪ Preparation for the project presentation and report writing</td><td>63 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>122 Hrs.</td></tr>
</table>
</td></tr>
</table>

Reading List and References	There is no recommended textbook for this subject. A number of books and journals include materials of some relevance to this subject as referenced in ISE549, ISE559, and ISE5001. The web-based material includes numerous references to online journal articles and websites that provide an abundance of relevant, detailed, and current information supporting the content. Potential readings include, but are not limited to: 1. Robert Grant, 2013, *Contemporary Strategy Analysis*, 8th edition, John Wiley & Sons, UK 2. Melissa Schilling, 2012, *Strategic Management of Technological Innovation*, 4th edition, McGraw-Hill, New York 3. Burgelman, Christensen, and Wheelwright, 2008 *Strategic Management of Technology and Innovation*, 5th edition, McGraw-Hill, New York 4. Angelis, Diana 2002, *An Optimal Model for R&D Valuation*, Int. J of Technology management, Vo. 24, No. 1, pp. 44-56 5. Barrel, Ray, Geoff Mason and Mary O'Mahony 2000, *Productivity, Innovation and Economic Performance*, Cambridge University Press 6. Gregory, M.J., D.R. Probert and D.R. Cowell 1996, *Auditing Technology Management Processes*, Int. J. of Technology management, Vo. 12, No. 3, pp. 3-6-319 7. Phaal, R., C.J.P. Farrukh and D.R. Probert 2001, *Technology Management Process Assessment: A Case Study*, Int. J. of Operations & Production Management, Vol. 21, No. 8, pp. 1116-1132 8. New Venture Tools at: http://www.newventuretools.net 9. Lester, Richard 1998, *The Productive Edge – How U.S. Industries are Pointing the Way to a New Era of Economic Growth*, Norton, New York

Subject Code	ISE5018
Subject Title	Intellectual Property Management and Strategies
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	none
Objectives	The subject aims to provide an overview of methods and approaches to manage intellectual property as strategic resources for enhancing the competitiveness for organizations. Upon completion of this subject, students should be able to accomplish the following objectives: 1. Understanding, defining and differentiating different types of intellectual properties (IPs) and their roles in contributing to organizational competitiveness 2. Understanding the Framework of Strategic Management of Intellectual Property (IP). 3. Appreciating and appraising different IP management (IPM) approaches and describing how pioneering firms initiate, implement and manage IPM programs, 4. Explaining how to derive value from IP and leverage its value in new product and service development 5. Exposing to the Legal management of IP and understanding of real life practice of IPM.
Intended Learning Outcomes	Upon completion of the subject, students will be able to : a. identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP b. recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development c. identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken to prevent infringement of proprietary rights in products and technology development d. Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.

Subject Synopsis/ Indicative Syllabus	The subject shows the critical important of various IP management activities and approaches to leverage the value of the IP for organization success. The following topics are covered; <u>Basic Concepts of IPs</u> Types of Intellectual Properties (IPs), the right of ownership and scope of protection, Value creation and value extraction for IPs, Legal Aspect of IP: Application, Appropriation, Infringement & Design Around, Licensing <u>IP Management Strategies and Implementation</u> Overview of IP Management & Strategy, IP Management Audit, Patent Portfolio & Patent Intelligence, Technology Strategy & Patent Analysis, Patent Dispute Management & Strategy, Co-opetition & IP Strategy IP Strategy & Open Business Model, IP Valuation, Royalty & Damage <u>Case Studies</u> Case Studies are drawn from commercial, industrial, legal and technological aspects for product and technology development

Teaching/Learning Methodology

As shown in Table 1, this subject is offered in block mode format on weekends, usually spread over a month. A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of which will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". A mini-project will be used to integrate these topics and the students will demonstrate how to apply various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged.

Table 1

Teaching/Learning Methodology	Intended subject learning outcomes				
	a	b	c	d	
1. Lectures/Guest lecture	√	√	√	√	
2. In-class activities	√	√	√		
3. Laboratory				√	
4. Case studies	√	√	√		
5. Mini-project	√	√	√	√	

Assessment Methods in Alignment with Intended Learning Outcomes

As shown in Table 2, this is a 100% continuous assessment subject which is comprised of assignments with individual and group assignments, mini-project, a short quiz and an open-book test. All assessment components will require students to apply what they have learnt to realistic work applications.

To reflect what the student's learning for topics in learning outcomes (c) and (d), an individual assignment is provided which allows the students to apply the theory and concepts in IPM to address real life problems.

The group assignment aims to allow the students to prepare for a proposal for the mini-project through the identification of the IPs and IP management problems in organizations (Learning Outcome (a)) and develop their skill to formulate a plan to address the problems (Learning Outcome (d)). The short quiz aims to assess the understanding of the students for the topics in learning outcomes (a) and (b).

The students are required to present the results and write a report for their mini-project which allow the students to integrate and apply the concept, theory, methods and approaches to manage intellectual property as strategic resources for enhancing the competitiveness for organizations. (learning outcomes (a) to (d)),

There is an open book test which aims to assess the students' capability for applying the theory and concepts learnt in the class for analyzing and solving problems related to related to the subject (learning outcomes (a) to (d)).

Table 1 Summary of Assessment Components

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Individual assignment	25%			✓	✓		
2. Group Assignment	10%		✓		✓		
3. Presentation for mini-project	10%	✓	✓	✓	✓		
4.Written report for mini-project	15%	✓	✓	✓	✓		
5. Short Quiz	15%	✓	✓				
6.Open-book Test	25%	✓	✓	✓			
Total	100 %						

Student Study Effort Required	Class contact:	
	▪ Lectures	26 Hrs.
	▪ In-class activities/Tutorial/ Laboratory	13 Hrs.
	Other student study effort:	
	▪ Study and self learning including mini-project and preparation for mini-project presentation	38 Hrs.
	▪ Assignment and report writing	25 Hrs.
	Total student study effort	102 Hrs.

Reading List and References

1. Cheung, C.F., Wang, W.M., Tse, Y.L. and Ma Ricky "Knowledge-based Intellectual Property Management for Technology Development Industry", *Journal of Knowledge Management Practice*, Vol. 14, No. 2, http://www.tlainc.com/articl335.htm (2013).
2. Cheung, C.F., Wang, W.M., Xu, X. and Willoughby, Kelvin W. "A Knowledge-Based System for Assessing and Managing Intellectual Property Managerial Risks for Small-and-Medium Sized Technological Enterprises", *International Journal of Intellectual Property Management*, Vol. 7, No. 1/2, p.57-83 (2014).
3. Cornish, William Rodolph & Llewelyn, David. Intellectual property: patents, copyright, trade marks and allied rights. Sweet & Maxwell, 8/e, 2013.
4. Cornish, William Rodolph. Cases and materials on intellectual property. Sweet & Maxwell, 5/e, 2006.
5. Lo, Jack and Pressman, David. How to make patent drawings: a patent it yourself companion. Nolo, 5/e 2007.

	6. Gruner, Richard S., Ghosh,Shubha and Kesan, Jay P. Intellectual Property in Business Organizations: Cases and Materials 2006 http://www.lexisnexis.com/store/catalog/productdetail.jsp?pageName=relatedProducts&catId=&prodId =58918 7. Sullivan, P.H., Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value. John Wiley & Sons, Inc., Hoboken, New Jersey, 2000. 8. Kieff, F. Scott, Newman, Pauline, Schwartz, Herbert F. and Smith, Henry E., Principles of Patent Law, 6th ed., Foundation Press, 2013. 9. Merges, Robert Patrick and Duffy John Fitzgerald, Patent Law and Policy: Cases and Materials, LEXISNEXIS, 2013. 10. Ventose, Eddy, Medical Patent Law - The Challenges of Medical Treatment, Edward Elgar, 2011. 11. Grubb, Philip W. and Thomsen, Peter L., Patents for Chemicals, Pharmaceuticals and Biotechnology: Fundamentals of Global Law, Practice and Strategy, Peter L. Thomsen, 2010. 12. Wang, W.M. and Cheung, C.F. "A Semantic-based Intellectual Property Management System (SIPMS) for Supporting Patent Analysis", Engineering Applications of Artificial Intelligence, Vol. 24, No. 8, p.1510-1520 (2011).

Subject Code	ISE5019
Subject Title	Optimization Modeling and Applications
Credit Value	3
Level	5
Pre-requisite/~~Co-requisite/Exclusion~~	Fundamental knowledge on linear algebra and linear programming is required.
Objectives	This subject provides students with 1. the value of optimization and mathematical modeling in real life; 2. basic modeling techniques to formulate a real problem into a mathematical model; 3. various techniques and tools to solve mathematical models; 4. the ability to apply various optimization models, such as linear programming and other mathematical programming, to solve practical problems, especially, logistics problems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. analyze real-life problems, especially, logistics problems, through the use of mathematical modeling techniques; b. gain familiarity with various modeling techniques to build mathematical models for real problems; c. employ some optimization methods and techniques and apply them to some practical problems.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Introduction to optimization and mathematical modeling: concepts, modeling, various mathematical models. 2. <u>Modeling Techniques</u> Techniques in building mathematical models; Various methods to interpret a real-world problem in mathematical terms and formats. 3. <u>Solution Methods</u> Methods to solve mathematical models: linear programming, integer programming, and network models. 4. <u>Applications</u> Applications of optimization models and methods: the traveling salesman problem, the vehicle routing problem, and others.
Teaching/Learning Methodology	A mixture of lectures, tutorial exercises, and laboratories are used to deliver the various topics in this subject, some of which are covered in a problem-based format where the learning objectives are enhanced. Others are covered through directed

study to enhance the students' "learning to learn" ability. Some case examples, largely based on consultancy experience, are used to integrate these topics and thus demonstrate to students how the various techniques are interrelated and how they can be applied to real-life situations or logistics operations.

Teaching/Learning Methodologies	Intended Subject Learning Outcomes to be assessed		
	a	b	c
Lecture	✓	✓	✓
Seminars	✓	✓	✓
Project/case studies	✓	✓	✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
1. Exercises	30%	✓	✓	✓			
2. Project report	10%	✓	✓	✓			
3. Presentation	10%	✓	✓	✓			
4. Lab and report	20%	✓	✓	✓			
5. Test	30%	✓	✓	✓			
Total	100%						

Continuous assessment comprises of tasks with individual and group components, usually several exercises, a mini-project with oral presentation and written report, a laboratory, and a test. All assessment components require students to apply and demonstrate what they have learned from the subject to address issues related to optimization modeling and applications.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures	30 Hrs.
	▪ Laboratory, presentation, test	9 Hrs.
	Other student study effort:	
	▪ Preparation and review, self-study	63 Hrs.
	▪ Project report writing	18 Hrs.

	Total student study effort	120 Hrs.
Reading List and References	1. Williams, H, P. 1993, *Model Building in Mathematical Programming*, John Wiley & Sons 2. Schrage, L. 1997, *Optimization Modeling with Lindo*, 5th edn, Thomson 3. Rardin, R. 2000, *Optimization in Operations Research*, Prentice Hall 4. Nash, S and Sofer, A. 1996, *Linear and Nonlinear Programming*, McGraw-Hill 5. Nemhauser, G and Wolsey, L, A. 1999, *Integer and Combinatorial Optimization*, John Wiley & Sons 6. Griva, I, Nash, S, G and Sofer, A. 2009, *Linear and Nonlinear Optimization*, Society of Industrial and Applied Mathematics 7. Alba, E. 2009, *Optimization Techniques for Solving Complex Problems*, John Wiley 8. Floudas, C, A and Pardalos, P, M. 2009, *Encyclopedia of Optimization*, Springer	

Subject Code	ISE5021
Subject Title	Technology Project Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students who have taken Project Management or equivalent are not advised to take this subject.
Objectives	This subject aims to equip the students with 1. theory and practices of leaderships in Project Management in different industrial areas and the methods and skills for applying project management tools; 2. working knowledge of the Project Management in industry in terms of time-cost relationships, resources, processes and risks to the projects and the ability to select the essential elements and practices needed to develop and implement projects using system approach; 3. the ability to carry out analysis and evaluation of the best practices of projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply advanced project management tools in managing technology projects; b. apply the working knowledge of the project methodologies to the projects; c. select the essential elements and practices needed to develop and implement projects using system approach; d. evaluate of the best practices in managing technology projects.
Subject Synopsis/ Indicative Syllabus	1. <u>Project management fundamentals</u> Project concepts, scope, objectives, agreements and the relationship with other stakeholders; Project management and people skills; Project formulation and implementation strategy; Projects in Organizations 2. <u>Project time/cost management</u> The methodology in terms of work breakdown structure (WBS), organizational breakdown structure (OBS), controlling and managing of time, cost and resources; Overall project scheduling, budgeting, resource planning and monitoring; Software tools (e,g. MS Project); Project life cycle; Providing service monitoring and performance indicators. 3. <u>Control and Evaluation</u> Fundamental purposes of control; control process and systems; Control projects according to plan; evaluating a project and project audit.

<table>
<tr><td></td><td>Essentials of Audit and Evaluation
4. <u>Project Risk management</u>
Risk identification, response development and control; emergency change response and control.
5. <u>Case study and management report</u></td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject for the attainment of learning outcomes. Cross fertilization of ideas and experiences of subject lecturers and students in project strategy through class discussions and presentations will be highly encouraged and should form an important component in the teaching/learning process of this subject.
Two major portions:
Lectures will cover the direct study of the various topics in this subject to enhance students' "ability to learn".
Problem-based Learning approach will be applied to the case studies and tutorial exercises and include industrial technology applications.
An integrated group project will be conducted and presented by students to demonstrate the ability to integrate various techniques of project management in industry, and how they can be applied in real life situations.</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. Group project and report</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Individual assignment</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Quiz and tests</td><td>30 %</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>4. Project presentation</td><td>10 %</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></tr>
</table>
The coursework of this subject involves students to work as individual and in groups (role play) to study cases that mimic the realities of project management situations in industry (Learning outcomes; a, b, c, and d). Through such exercises and tests (Learning outcomes: b, c, and d), students' ability to apply and synthesize acquired knowledge can be assessed on the basis of their performance (role play) in group discussion, oral presentations (Learning outcomes: c, and d), and the quality of their written reports on these case studies.</td></tr>
<tr><td></td><td>Class contact:</td><td></td></tr>
</table>

Student Study Effort Expected	▪ Lectures and discussion	27 Hrs.
	▪ Tutorial and case study	12 Hrs.
	Other student study effort:	
	▪ Research and preparation	60 Hrs.
	▪ Report writing	17 Hrs.
	Total student study effort	116 Hrs.
Reading List and References	1. Garton, C. 2005, *Fundamentals of Technology Project Management*, MC Press 2. Ghattas, R.G. & McKee S. L 2001, *Practical Project Management*, Prentice Hall 3. Gray, C. & Larson, E. 2003, *Project Management*, McGraw-Hill 4. Heizer, J. & Render, B. 1993, *Production and Operations Management – Strategies and Tactics*, 6th edn, Allyn and Bacon 5. Kerzner, H. 2009, *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, John Wiley & Sons Inc 6. Morse, L. et al. 2006, *Managing Engineering and Technology*, Prentice Hall 7. Project Management Institute 2013, *A Guide to the Project Management Body of Knowledge*, 5th ed., Project Management Institute (PMI) 8. Smith, N.J. 2008, *Engineering Project Management*, Oxford: Blackwell Science	

Subject Code	ISE5022
Subject Title	Financial Decision Analysis for Technology Management
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Background in Accounting
Objectives	This subject aims to provide students with 1. an understanding of the criticalness of financial analysis for decision making in technology management and the fundamentals of financial planning and resource allocation in technology-based companies; 2. the ability to apply the knowledge of financing technological innovation, related entrepreneurial ventures and techniques in performing business and financial analysis in support of management decisions and in the growth and development of technology-based companies or projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apprehend the fundamentals of financing technological innovation and the decision making process in assessing investments in technology-based projects; b. perform business and financial analysis in order to evaluate overall strategic business performance and financial position of a firm driven by technological innovation; c. perform financial modeling for planning and analysis and hence to develop financial plan for technology-based companies or projects; d. identify various sources of finances in the growth and development of technology-based companies or projects; e. apprehend the application of real options for evaluation of technology ventures and other valuation techniques.
Subject Synopsis/ Indicative Syllabus	1. <u>Process of Financing Technological Innovation</u> Introduction to entrepreneurial finance and venture capital in the context of technology management. 2. <u>Fundamentals of Business Finance</u> Financial statements interpretation and analysis. Sources of finance. Types of financial capital. Working capital management. 3. <u>Challenges in Management Decisions for Financing Technological Innovation</u> Feasibility studies and financial analysis of technology-based projects. Projection of future cash flow. Cost of capital. 4. <u>Business Valuation Methods</u>

<table>
<tr><td></td><td>Real options approach; staging of investment and investment decisions; choice of financing; financial planning; risk and return analysis.
5. <u>Resources allocation</u>
Resources allocation into R&D and other intangible assets. Business performance measurement in early-stage and expansion-stage. Incentive issues.
6. <u>Business Plan Development</u>
Business plan development and related financial analysis. Capital raising. Case studies.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, computer lab and case studies will be used to deliver the various topics in this subject for the attainment of learning outcomes. Some of which will be covered in a problem-based format where this enhances the learning objectives. Others will be covered through directed study in order to enhance the students' ability of "learning to learn". Case studies will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations. Cross fertilization of ideas and experiences of students in financing technological innovation through class discussions and presentations will be highly encouraged and should form an important component in the teaching/learning process of this subject.</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>f</td></tr>
<tr><td>1. Project presentation</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>2. Computer Laboratory & Assignments</td><td>20%</td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Quiz and Test</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>4. Group project</td><td>30%</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>

The case studies and presentation in a group setting facilitate students to synthesize and apply the concepts and skills learnt in analyzing and solving problems related to the subject to provide a competitive edge in financing technological innovation and other functions in a company with an awareness of its internal and external environmental factors that may affect the industry and the company.

The laboratory facilitates students to practice the techniques in tacking simulated problem scenarios in real life related to the exercise of financing technological innovation.</td></tr>
</table>

	There will be a quiz and a written test which are aimed to assess students' understanding of the concepts and knowledge necessary for analyzing and solving problems related to the subject.	
Student Study Effort Required	Class contact:	
	▪ Lecture	25 Hrs.
	▪ Tutorial/ Case study/ Laboratory	14 Hrs.
	Other student study effort:	
	▪ Study and self learning	60 Hrs.
	▪ Assignment and report writing	19 Hrs.
	Total student study effort	118 Hrs.
Reading List and References	1. Leach, J.C. and Melicher., R.W. 2012. *Entrepreneurial Finance*, 4th ed. Cengage. 2. Brigham, E.F. and Houston, J.F. 2011. *Fundamentals of Financial Management*, 7th ed. Cengage 3. Schilling, M. A. 2013. *Strategic Management of Technological Innovation*. McGraw-Hill/Irwin 4. Rogers, S. 2009. *Entrepreneurial Finance: Finance and Business Strategies for the Serious Entrepreneur*, 2nd ed. McGraw Hill 5. Metrick, A. 2007. *Venture Capital and the Finance of Innovation*, Wiley 6. Huisman, K.J.M. 2001. *Technology investment: a game theoretic real options approach*, Kluwer Academics 7. Nesheim, J.L. 2000. *Hi-tech Start-up*, Free Press 8. Drucker, P.F. 1993. *Innovation and Entrepreneurship*, First Harper Business 9. Grove, A. S. 1996. *Only the Paranoid Survive*, Doubleday 10. Entrepreneurship Theory and Practice 11. International Entrepreneurship and Management Journal 12. Journal of Business Venturing 13. Journal of Intellectual Capital 14. Harvard Business Review	

Subject Code	ISE5026
Subject Title	Technology Entrepreneurship and Innovation in Practice
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	None
Objectives	The subject aims to provide an analysis of the relationship of scientific research, innovation and technology entrepreneurship in their role as driver of the knowledge-based economy. It will analyze the methods and approaches to nurture innovation and pursue technology entrepreneurship. It will highlight the role and interaction of players of the innovation system in a region or nation aspiring to establishing an economy based on knowledge. Upon completion of this subject, students should be able to accomplish the following : 1. Understanding the concept of innovation and technology entrepreneurship and the components of an effective innovation system 2. Having the ability to appraise different models of developing innovation for companies engaged in commercialization of products and services 3. Understanding the fundamental elements of an effective eco- system of innovation 4. Gaining an insight on implementation of a technology entrepreneurship and the essence of management of change 5. Keeping abreast with the best practices and role models of successful entrepreneurship in the Asia Pacific Region

Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Understand the concepts and salient aspects of innovation and technology entrepreneurship b. recognize the crucial role of national innovation system and the modes of operation under different social-political environment c. nurture the culture of entrepreneurship and the essence of management of change d. familiarize with global best practices for innovation and technology entrepreneurship
Subject Synopsis/ Indicative Syllabus	The subject shows the importance of critical activities and approaches to manage the challenges on innovation and technology entrepreneurship. The following topics are covered; <u>Basic Concepts of Innovation and Technology Entrepreneurship</u> Drivers of economic growth, concept of innovation and innovation process, technology entrepreneurship, different models of developing innovation, the process of commercialization of research results, business model and business plan <u>The National Innovation System</u> The roles of the University, business, government and the technology institute, the different modes of interaction of these players, eco-environmental factors of an effective innovation system <u>Culture of Entrepreneurship and Management of Change</u> The concepts of Laozi and Confucius related to Innovation and technology entrepreneurship, management of change, the method for building and nurturing the spirit of entrepreneurship <u>Role Models Best Practices</u> The legacy of the four most successful global innovator groups are examined: Silicon Valley, ITRI/Hsin-Chu, Shenzhen and Singapore. Stories and case studies of very successful technology entrepreneurship are discussed.

<table>
<tr>
<td>Teaching/Learning Methodology</td>
<td>As shown in Table 1, this subject is offered in block mode format on weekends, usually spread over a period of4-6 weeks. A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of which will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". A mini-project will be used to integrate related topics and the students will demonstrate how to apply various techniques in real life situations. Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged.

Table 1:

<table>
<tr><td>Teaching/ Learning Methodology</td><td colspan="4">Intended subject learning outcomes</td></tr>
<tr><td></td><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1.Lectures</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. In-class activities</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>3. Case studies</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>4. Mini-project</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
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</table>

Assessment Methods in Alignment with Intended Learning Outcomes

As shown in Table 2, this is a 100% continuous assessment subject which is comprised of assignments with individual and group, mini-project, short quiz and an open-book test. All assessment components will require students to apply what they have learnt to realistic work applications.

To reflect what the student's learning for topics in learning outcomes (c) and (d), an individual assignment is provided which allows the students to apply the theory and concepts to address real life problems.

The group assignment aims to allow the students to prepare for a proposal for the mini-project in organizations (Learning Outcome (a)) and develop their skill to formulate a plan to address the problems (Learning Outcome (d)). The short quiz aims to assess the understanding of the students for the topics in learning outcomes (a) and (b).

The students are required to present the results and write a report for their mini-project which allow the students to integrate and apply the concept, theory, methods and approaches to innovation and entrepreneurship as strategic resources for enhancing the competitiveness for organizations. (learning outcomes (a) to (d)),

There is an open book test which aims to assess the students' capability for applying the theory and concepts learnt in the class for analyzing and solving problems related to related to the subject (learning outcomes (a) to (d)).

Table2. Assessment

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Group Projects	25 %	✓	✓	✓			
3. Presentation	10%		✓		✓		
3. Individual assignments	25 %			✓	✓		
4. In-class activities	15 %	✓	✓				
5. open-book test	25 %	✓	✓	✓			
Total	100%						

Student Study Effort Required	Class contact:	
	▪ Lectures	26 Hrs.

	▪ In-cls activities/Tutorial/ Laboratory	13 Hrs.
	Other student study effort:	
	▪ Study and self-learning including mini-project and preparation for mini-project presentation	38 Hrs.
	▪ Assignment and report writing	30 Hrs.
	Total student study effort	107 Hrs.

Reading List and References	**Textbooks-** 1.Otto C C Lin, " Innovation and Entrepreneurship: Choice and Challenge". World Scientific Publishers, February, 2018 (in press) 2. Frederick Betz, "Managing Technology Innovation: Competitive Advantage from Change,". John Wiley and Sons, 2nd Edition, 2003. **Reading List** 1.Chong moon Lee, William F. MIller, Marguerite Gong Hancock, Henry S Rowen., “the Silicon Valley Edge: a Habitat for Innovation and Entrepreneurship., Stanford University Press, Stanford, 2000 2.Dan Breznits and Michael Murphree, "Run of the Red Queen: Government, Innovation, Globalization and Economic Growth in China," Yale University Press, 2011. 3.Walter Isaacson, "Steve Jobs." New York, Simon and Schuyler, 2011. 4.David McCullough," The Wright Brothers, " New York, Simon and Schuyler, 2015. 5.Thomas L. Freeman, " The World is Flat: a brief history of the twenty-first century,". Farrar, Strauss and Giroux, New York, 2005. 6. James C Collins, " Good to Great: Some Companies make the leap..and others don't " Harper Business, 2001. 7."Pearl River Delta Super zone: Tapping into world's fastest growing economy," South China Morning Post, 2003 8.林垂宙，“創新四重奏：從实验室到市场”，上海交通大学出版社，2014 9.吴曉波，”腾訊傳：1998-2016中國互聯網公司進化論"，浙江大學出版社，2016 10. 陳偉，"這就是馬雲"浙江人民出版社，2015 11. 薛瀾、梁正、柳卸林、穆榮平等譯箸”中国創新政策研究報告”，2011.

Subject Code	ISE5601
Subject Title	Managing and Measuring Intellectual Capital
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	None
Objectives	This subject aims to provide students with: 1. Working knowledge of different elements of intellectual capital and deriving values from intellectual capital 2. The theory and practice for the strategic management of intellectual capital and its life cycle of implementation 3. Understanding with different approaches for measuring and reporting value of intellectual capital
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. identify and differentiate fundamental elements of intellectual capital and intellectual capital management b. familiarize with the value chain of intellectual capital and activities for deriving values from intellectual capital c. apply, justify and implement appropriate approach for the management of intellectual capital as a strategic resource d. apply appropriate approaches for measuring and reporting value of intellectual capital
Subject Synopsis/ Indicative Syllabus	This subject is to provide an overview of methods and approaches to manage and measure knowledge-based assets, and show the critical importance of various intellectual capital and intangible assets management approaches to the success of knowledge management initiatives and strategies. The following topics are covered: *Intellectual capital management foundations* • Evolution of intellectual capital and its business value

	• Definitions and conceptual differences of intangible assets, knowledge-based assets and intellectual capital • Legal management of intellectual capital *Converting Intellectual Capital to Value* • Value chain of intellectual capital • Value creation and value extraction activities for converting intellectual capital to value • Major types of intellectual capital management activities that facilitate value creation and extraction *Measuring and Reporting Intellectual Capital* • Established models for measuring intellectual capital and corporate performance e.g. Balanced Score Cards, intellectual capital statement, intangible asset monitor, Skandia Navigator, etc. • Methods and tools for reporting intellectual capital in organizations *Implementation of Intellectual Capital Management Programme* • Intellectual capital implementation approaches with emphasis on Comprehensive Intellectual Capital Management (CICM) model and its implementation • Case studies
Teaching/Learning Methodology	As shown in Table 1, this subject is offered in a blended mode of online learning and face-to-face teaching. A mixture of e-learning, instructor-lead tutorials and workshops, and case studies will be used to deliver the topics in this subject. Case studies, largely based on real case will be used to demonstrate to students how the latest techniques can be applied to improve the real life situations. The students can access the e-learning platform which contains interactive online materials for the lessons. Participants are strongly encouraged to make effective use of all learning tools available to optimise their learning in this subject. To facilitate the students to learn, the students are also expected to participate instructor lead face-to-face teaching activities which include workshop, tutorials, etc. Some of the teaching activities will be covered in a problem-based format where this enhances the learning objectives. Others will be delivered directly through directed study in order to enhance the students' ability of "learning to learn". Mini-project will be used to integrate these topics and thus demonstrate to students how the various techniques are inter-related and how they apply in real life situations.

Cross fertilization of ideas and experiences of students through discussions and presentations are highly encouraged.

Table 1

Teaching/Learning Methodology	Intended subject learning outcomes				
	a	b	c	d	
2. Lectures/Online Guest Lecture	√	√	√	√	
2. Interactive Online Materials	√	√	√	√	
3. Workshops	√			√	
4.In-class Case Studies and Tutorials	√	√		√	
5.Mini-project	√	√	√	√	

Assessment Methods in Alignment with Intended Learning Outcomes

As shown in Table 2, the assessment method of the subject is composed of coursework and examination. The coursework assessment includes, workshop assignment and group mini-project. Written examination will be arranged at the end of the semester. All assessment components will require students to apply what they have learnt to realistic work applications.

The workshop assignment is provided to assess the technical competency and skills of the students to use and practice the methods and tools learnt during the workshop and classes which reflect their learning outcomes (a), (c) and (d). The group mini-project provides a team work environment for facilitates the students to apply the concepts, theory and skills learnt in analyzing and solving problems in managing and measuring IC for a real life scenario (e.g. Learning Outcomes (a) to (d)).

A participant is expected to perform satisfactorily in BOTH the coursework and the examination. The subject coordinator can exercise discretion to alter the final subject result should there exists significant variation in a participant's performance in these 2 components.

Table 2

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1.Workshop assignment	15%	✓		✓	✓		
2. Presentation of mini-project	10%	✓	✓	✓	✓		
3. Written report for mini-project	15%	✓	✓	✓	✓		

<table>
<tr><td></td><td>
<table>
<tr><td>4.Open book 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="6"></td></tr>
</table>
</td></tr>
<tr><td rowspan="7">Student Study Effort Required</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Face-to-face Lectures/ Tutorials/Workshops/Presentations
3 hours x 13 weeks</td><td>39 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Individual Assignment and Workshop Assignment</td><td>30 Hrs.</td></tr>
<tr><td>▪ Study and self learning</td><td>22 Hrs.</td></tr>
<tr><td>▪ Mini-project and assignments</td><td>24 Hrs</td></tr>
<tr><td>Total student study effort</td><td>115 Hrs</td></tr>
<tr><td>Reading List and References</td><td colspan="2">

1. Al-Ali, N. (2003) Comprehensive Intellectual Capital Management: Step-by-Step. John Wiley & Sons, Inc., Hoboken, New Jersey.
2. Andriessen, D. & Stam, C. (2004). The Intellectual Capital of the European Union. Measuring the Lisbon Agenda Centre for Research in Intellectual Capital, Inholland University.
3. Andriessen, D. (2003). Making Sense of Intellectual Capital. Designing a Method for the Valuation of Intangibles. Butterworth Heinemann.
4. Andriessen, D. and Boom, M. van den (2006). Asia and Europe, knowledge economies in encounter. INA Magazine, Vol.XVII, 15-18.
5. Andriessen, D. G. and Boom, M. van den (2007). East is East, and West is West, and (n)ever its intellectual capital shall meet. Journal of Intellectual Capital, 8.
6. Cai, Linlin, Tsui, Eric and Cheung, Chi Fai “An Exploratory Study on an Intellectual Capital Eco-system”, *Proceedings of IFKAD 2014-International Forum on Knowledge Asset Dynamics*, June 11- June 13, Matera, Italy, p.2952-2966 (2014).
7. Cai, Linlin, Tsui, Eric and Cheung, Benny “A Critical Analysis of Intellectual Capital Reports in Banking Industry from 1994 to 2011”, *Proceedings of 10th International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM2013)*, October 23- October 25, Washington, DC, USA, pp.667-673 (2013).
8. Cai, L, Tsui, E, Cheung, C.F. “A Taxonomic Approach to the Identification of Intellectual Capital from Company Reports”, *Proceedings of IEEE International Conference on Software Engineering and System Science*, May 23- May 25, Beijing, China, pp.338-341 (2013).
9. Cheung, C.F., Lee, W.B., Eric Tsui and Chan, W.K. “Auditing Intellectual Capital: A Case Study in a Supply Chain Integrator”, *Proceedings of 3rd*

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</table>

International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM 2006), October 19-20, Pontificia Universidad Católica de Chile, Santiago, Chile, p.99-105 (2006).
10. Tsui, E., Wang, W.M., Cai, L.L. and Cheung C.F., and Lee, W.B. "Knowledge-based Extraction of Intellectual Capital-related Information From Unstructured Data, *Expert Systems with Applications*, Vol. 41, No. 4, p.1315-1325 (2014).
11. Intellectual Property Department, The Government of the Hong Kong SAR. (2009). Intellectual Capital Statement (2009), http://www.ipd.gov.hk/eng/pub_press/publications/IC_Statement.pdf.
12. Intellectual Property Department, The Government of the Hong Kong SAR (2009). Intellectual Capital Statements of Organisations in Hong Kong in 2009, http://www.ipd.gov.hk/eng/ICM/intellectual_capital_statements_09.htm.
13. Intellectual Property Department, The Government of the Hong Kong SAR. (2010). Intellectual Capital Statements of Organisations in Hong Kong in 2010, http://www.ipd.gov.hk/eng/ICM/intellectual_capital_statements_10.htm.
14. Stam, C. D. (2007). Knowledge productivity. Designing and testing a method to diagnose knowledge productivity and plan for enhancement.
15. Sullivan, P. H. (2000). Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value. John Wiley & Sons, Inc., Hoboken, New Jersey
16. Sveiby, K. E. (1997). The New Organizational Wealth: Managing & Measuring Knowledge-Based Assets. Berrett-Koehler Publishers, San Francisco.
17. Edvinsson, L. and Malone, M.S. (1997). Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower, Harper, New York.
18. Low, J. and Kalafut, P.C. (2002). Invisible advantage: How Intangibles are Driving Business Performance, Perseus Publishing, Cambridge
19. Stewart, T.A. (1998). Intellectual Capital: The New Wealth of Organizations, Nicholas Brealey, London.
20. Tissen, R. and Andriessen, D. and Deprez, F.L. (2000). The Knowledge Dividend: Creating High-Performance Companies through Value-Based Knowledge Management, Financial Times Prentice Hall, London.

Subject Code	ISE5605
Subject Title	Knowledge Communities
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Pre-requisite: ISE542 Managing Knowledge
Objectives	This subject aims to provide students the opportunity to 1. understand the various types and purposes of knowledge communities; 2. appreciate the power of knowledge communities in knowledge creation, retention, and sharing; 3. understand the various types of tools and technologies that support different stages of an online community; 4. learn about various models for assessing the maturity and value of a community; 5. gain in-depth appreciation of some real-world successful private and public online communities; 6. learn about strategies for development, sustainment, and change management in support of online communities.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. define, identify, and justify the role of communities in an organizational context; b. define criteria to evaluate and measure the ongoing success of an online community; c. critically examine the various ways to introduce, sustain, and resurrect a knowledge community; d. deal with the common threats that occur in every stage of a community's life cycle.
Subject Synopsis/ Indicative Syllabus	This subject introduces students to the concept of knowledge communities. In particular, this course critically examines various types and models of communities (e.g., project communities, communities of interest, community of practice, knowledge and know-how networks, and personal/social networks). Emphasis is on the formation, evolution, and governance of communities, as well as the tools and technologies to support the operation and growth of communities at different stages of its lifespan. Impact of digitalization and communities' role in a networked economy will also be discussed. Through a balanced mix of theories and practical case studies, by the end of the module, students are expected to have a strong mastery of the various types of

<table>
<tr><td></td><td>communities and their respective roles and contributions in an organization and/or the marketplace.

Students are able to demonstrate how to introduce knowledge community or communities into their organization’s knowledge management and/or learning strategy.

Methods on how to measure/appraise the value (both tangible and intangible) of communities are also covered. Students are also expected to demonstrate how to develop a business case for launching a community, critically assess the ongoing value of a community, and use appropriate tools to gauge and report on the relationships in social/personal networks.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Interactive and multimedia online learning materials are available to students for self-directed learning. Online quizzes, discussion forums, email support, and supplementary face-to-face instructor-led seminars are available to facilitate students' learning. There is also the requirement to tackle a project in which the students need to demonstrate their learned skills and techniques to help in launching or resolving some critical issues associated with a community.</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</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Tutorial exercise</td><td>20%</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td>2. Workshop exercise</td><td>20%</td><td>✓</td><td></td><td>✓</td><td></td></tr>
<tr><td>3. Bulletin Board</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>4. Guided project</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>
The tutorial and workshop exercises expose students to several of the fundamental issues common to most communities. They need to conduct background research as well as articulate the learned concepts to tackle these exercises. Throughout the semester, the bulletin board requires the student to discuss and offer opinions on many of the issues and topics that are brought up in various lessons. The guided project is a major piece of work that requires a student to articulate many of the concepts learned in the subject and apply them in a practical situation, by either launching a community or providing a critical view of an existing or dormant community.</td></tr>
<tr><td rowspan="2">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Face-to-face lectures/seminars/presentations</td><td>24 Hrs.</td></tr>
</table>

(Block Mode / Evening Mode)	6 hours per week x 4 weeks	
	▪ Guest lectures/seminar 2 hours per week x 2 weeks	4 Hrs.
	▪ Bulletin Board participation 1 hour per week x 14 weeks	14 Hrs.
	Other student study effort:	
	▪ Study of online content 1.5 hours per week x 14 weeks	21 Hrs.
	▪ Bulletin Board participation 1 hour per week x 14 weeks	14 Hrs.
	▪ Preparation and revision	14 Hrs.
	▪ Assignments and projects	28 Hrs.
	Total student study effort	119 Hrs.
Student Study Effort Expected **(Online Learning Mode)**	Class contact:	
	▪ Face-to-face instructor-led seminars/workshops	9 Hrs.
	▪ Project briefing/consultation/site visit	7 Hrs.
	▪ Online tutorial and quizzes	4 Hrs.
	Other student study effort:	
	▪ On-line learning	50 Hrs.
	▪ Discussions group/Forum	20 Hrs.
	▪ Case-based project/Assignments	30 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	1. Wenger, E, McDermott, R, Snyder, W, M. 2002, *Cultivating Communities of Practice*, Harvard Business School Press 2. Saint-Onge, H, Wallace, D. 2002, *Leveraging Communities of Practice for Strategic Advantage,* Butterworth-Heinemann 3. Wenger, E. 1998, *Communities of Practice: Learning, Meaning, and Identity,* Cambridge University Press	

Subject Code	ISE5606
Subject Title	Business Intelligence and Data Mining
Credit Value	3
Level	5
Pre-requisite/Co-requisite/Exclusion	Students must have basic mathematical skills.
Objectives	This subject enables students to 1. master the basics in business intelligence (BI), data mining (DM), and knowledge discovery in databases; 2. learn the role that software tools/applications play in BI and DM, with emphasis on industrial case studies and practical applications; 3. Have an overall understanding of the major issues and applications in business intelligence and data mining, including a basic grasp of the algorithm classes and best practices for building successful BI projects.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. examine the concepts of data warehousing and OLAP; b. apply the concepts of BI and DM techniques for clustering, association, and classification; c. understand the operation procedures of BI projects in an organization; d. select appropriate DM tools and methods to manipulate and achieve data; e. apply DM concepts for formulating business strategies and programs to enhance business intelligence.
Subject Synopsis/ Indicative Syllabus	The syllabi of this subject are: 1. <u>Business Intelligence (BI)</u> Introduction to BI, BI concepts, and methods; Nature and representation of data; Building data warehouses; Data marts; OLAP; Concepts in data analysis, reporting, and analytics; Defining BI objectives; Maintenance of data infrastructure; Successful design methodology; Measuring and refining success. 2. <u>Data Mining and Knowledge Discovery in Databases (DM and KDD)</u> Introduction to data mining; Data mining algorithms; Predictive methods; Descriptive methods; Scalability considerations; Integration with DBMS and data warehouses; Lifecycle of data mining; Embedding data mining in business solutions; Example applications; Challenges and special considerations. 3. <u>Case Studies</u>

Case studies drawn from commercial, industrial, and research applications. These include eBusiness applications, cross-sell and up-sell methods; Fraud detection; Market prediction and forecasting.

In this subject, the techniques and methods covered are applied to both intra-organizational data and market data (e.g., industry statistics, trends, and competitive information). Enterprise as well as market-oriented applications are covered.

Teaching/Learning Methodology

Learning is facilitated through face to face lecturing and guided learning. Face-to-face seminars/labs are available to facilitate students' learning. The integrated application-oriented mini-project is designed to help students acquire the knowledge of understanding and using different BI and DM principles, techniques, and tools to solve a real problem through team work.

Teaching/Learning Methodologies	Intended subject learning outcomes to be assessed				
	a	b	c	d	e
Lecture	✓	✓		✓	✓
Tutorial/Labs		✓			
Projects			✓	✓	✓
Case Studies	✓		✓		

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
1. Assignment/ Test	20%	✓	✓	✓		
2. Mini-project/ project presentation	30 %	✓	✓	✓	✓	
3. Test	50 %	✓	✓	✓	✓	✓
Total	100 %					

Student Study Effort Expected **(Block Mode/ Evening Mode)**	Class contact:	
	Lectures/ seminars/ labs	24 hrs
	Presentation/ test/case studies/project discussion	15 hrs
	Other student study effort:	
	▪ Study of materials for exercises/assignments	28 Hrs.
	▪ Preparation and revision for in class test	28 Hrs.
	▪ Project and presentation preparation	28 Hrs.
	Total student study effort	123 hrs
Reading List and References	1. Jiawei Han, Micheline Kamber and Jian Pei, 2012, *Data Mining: Concepts and Techniques,* 3rd Edition, Morgan Kaufmann *2.* Jerzy Surma, 2011, *Business Intelligence: Making Decisions through Data Analytics*, New York, N.Y., Business Expert Press 3. Pang-Ning Tan, 2006, *Introduction to Data Mining,* Boston : Pearson Addison Wesley	

DISSERTATION

GUIDELINES AND ASSESSMENT

CONTENT

1 Introduction

The dissertation is a very significant component of a Master's programme. It carries a weight equivalent to three taught subjects and represents around 315 – 405 hours of student effort. Since students usually continue with their jobs while they work on their dissertation, the subject of the dissertation is preferably related to the student's employment.

The dissertation should be an exposition of a student's own work and ideas. Where others have had an input (e.g. in a team situation) this should be clearly identified. Plagiarism is unacceptable. Expulsion may be imposed in cases of proven plagiarism (s*ee Page 3-84*).

Though the subject areas of dissertations are so diverse, it is impossible to define a standard approach to carry out the dissertation. Its content should include an introduction and definition of objectives, a literature survey, a review of the problem followed by a description of the student's approach to solving the problem, the results or findings, an intellectual analysis of the results or findings, are finally a logical review of the conclusions drawn.

Students are encouraged to initiate dissertation topics relating to their employment. However, students may take up campus based dissertations in cases of difficulty.

2 Registration of Dissertation

2.1 Students can register on dissertations only if they are co-taking and/or have taken a total of 3 taught subject (including credit transferred subjects) in that semester. Students are required to pay for all of the 9 credits the dissertation carries in the first semester when he/she enrolls on the dissertation. Fees paid will not be refunded even if the student withdraws from his/her dissertation or from the Scheme during the course of his/her registration. Students will be required to complete their dissertations within the normal period of 3 semesters (the minimum period for completion of dissertation is 1 semester). Those who are not able to complete their dissertation may apply on the advice of the supervisor to the Programme Leader for approval to extend the dissertation registration beyond the normal period but within the maximum period of 4 semesters. Applications for extension beyond the normal period will be considered by the Scheme Committee and approved only under exceptional circumstances.

2.2 When permission is granted to extend the dissertation registration beyond the normal period, the student will be required to pay a fee which is set out in the Student Handbook, which shall entitle him/her to register for one additional semester.

2.3 Break of study is normally not permitted once a student registers for dissertation and students are expected to pursue their dissertation in consecutive semesters.

2.4 The assessment panel will consist of two categories of member, namely:

2.4.1 the academic supervisors; and

2.4.2 a second assessor who is a subject expert from the department, from another department in the University, or from industry, to be nominated by the Programme Leader/Academic Supervisor.

3 Dissertation Process: Preparation, Progress and Assessment

The procedures for preparing a dissertation can be divided into two different stages.

3.1 Proposal

3.1.1 Students are expected to prepare a dissertation proposal in a standard format using a synopsis form (*Form ISE100*) in consultation with his/her academic supervisor. This standard form can be downloaded from the web.

3.1.2 Students are expected to submit their dissertation proposal to the academic supervisor for approval no later than the last teaching day of the semester in which the student first registers for dissertation.

3.1.3 Once a dissertation proposal is approved the student shall proceed at once to carry out the work.

3.1.4 Students are expected to inform their academic supervisor of the progress at least once every semester to ensure smooth progress of the dissertation.

3.1.5 Students should inform their academic supervisors immediately when difficulties arise.

3.2 Submission of Dissertation before Assessment

3.2.1 Under normal circumstances, with the agreement of the supervisor(s), students may prepare for assessment after satisfactory progress.

3.2.2 Students should submit the dissertation together with a Dissertation Submission Form (*Form ISE101*) to the academic supervisor one month prior to the end of the semester.

3.2.3 A copy of the dissertation should be sent to each of the assessors and one copy should be kept by the student.

3.3 Assessment

3.3.1 Oral examination

After the submission of the dissertation for assessment, the academic supervisor shall make arrangements with the assistance of the department on a mutually convenient time and place for an oral exam at which the other assessors will be present.

3.3.2 Assessment Panel

The assessment panel will consist of two categories of member, namely:

3.3.2.1 the academic supervisors; and

3.3.2.2 a second assessor who is a subject expert from the department, from another department in the University, or from industry, to be nominated by the Programme Leader/Academic Supervisor.

3.3.3 Regulations concerning dissertation assessment

3.3.3.1 After conducting the oral examination, the assessment panel will jointly allocate a grade guided by the following weightings which may vary depending on the nature of the project. Individual awards may modify key items and the recommended weightings according to the needs of each award.

Progress 20%	Report 50%	Oral 30%	Total 100%

3.3.3.2 After the assessment of the dissertation is complete, the academic supervisor shall write a report on the outcome using a standard outline report form. This report must be signed by who participated in the assessment of the dissertation and be forwarded to the Programme Leader.

3.3.3.3 The report shall contain a date by which the student should submit his/her final dissertation and the number of hard and electronic copy required to the Department which would arrange to send an electronic copy to the Library. The deadline for submission of the report of the assessment panel to the Programme Leader is TWO WEEKS before the meeting of the Subject Assessment Review Panel.

3.3.3.4 Department could at their discretion allow students to complete their dissertations during the summer break. In such cases, these results could be processed by the Subject Assessment Review Panel held for the summer semester to allow students to graduate.

3.3.3.5 The amount of effort required by students in the dissertation should clearly be reflected in the quantity and quality of the final submission. In assessing the standard of dissertations, supervisors will be seeking to ensure that the student has met with the aims of this part of the programme. The student and academic supervisor should contact each other from time to time to discuss progress against his/her agreed programme. The responsibility for arranging meetings between student and academic supervisor is shared by both parties. The academic supervisor will provide guidance to complement that available within the student's employing organization and advise the student about the style of presentation of the dissertation. Academic and professional supervisors will liaise as circumstances require. The academic supervisor will be available for consultation on a regular basis both at the University and at the student's workplace according to circumstances. The role of the professional supervisor (optional) is to be able to assess the student's effort in the workplace and assist in the conduct of the oral examination and provide assurance that the candidate's work has been independently done. Students should approach a prospective professional supervisor and explain their requirements and should obtain his/her agreement to act as professional supervisor. If the work for the dissertation forms part of a

group endeavour within the student's organization, it is essential that the student's personal contribution can be identified and that the professional supervisor can speak for the part which the student has played. In cases where no suitable professional supervisor can be found, the Committee will appoint a second academic supervisor to take the place of the professional supervisor. If the dissertation topic is based in the student's workplace, visits to the student's place of work by the academic supervisor(s) will be necessary.

4 About Plagiarism

Plagiarism refers to the act of using the creative works of others (e.g. ideas, words, images or sound, etc) in one's own work without proper acknowledgement of the source.

The University views plagiarism, whether committed intentionally or because of ignorance of negligence, as a serious disciplinary offence. Excuses such as "not knowing that this is required" or "not knowing how to do it" will not be accepted. It is the student's responsibility to understand what plagiarism is, and take action steps to avoid plagiarism in their academic work. The golden rule is: "if in doubt, acknowledge".

To know more about plagiarism and how to cite sources properly in your work, please refer to the booklet "About Plagiarism and how to Avoid it" developed by the University at http://edc.polyu.edu.hk/PSP/Plagiarism_Booklet.pdf.

You can also obtain more information about using sources and referencing styles from the following web page of the Centre for Independent Language Learning, English Language Centre of this University.

The University Library subscribes to two reference management tools, RefWorks, and EndNote. They could be used to help you create your own bibliographic database.

Form ISE100

Postgraduate Scheme in Industrial and Systems Engineering
Synopsis

Dissertation Proposal for MSc in _____

This form should be typewritten. All sections should be completed in full. Section 1-3 are to be completed by the student. In signing this form the Programme Leader confirms that the student is registered on dissertation, the proposal is of an acceptable academic standard and that the university resources necessary for the dissertation will be made available. The completed form should be sent to the Programme Leader for approval no later than the last teaching day of a semester.

Section 1 : Student Details

Student's Name : PolyU ID No. :

Tel No. : Fax No. :

Intake Year:

Subjects taken so far (include title, grade, and academic year for all subjects for which a grade has been obtained)

Section 2 : Supervisor Details

Academic Supervisor's Name, Qualifications and Department :

Professional Supervisor's Name, Qualifications, Position, and Affiliation (appointment of which is optional)

Professional Supervisor's Address :

Tel. No.: Fax No.:

Section 3 : Details of Dissertation Topic

Dissertation title :

Signature of student : Date :

Section 4 : Comments of Academic Supervisor

Signature : Date :

Section 5 : Comments of Professional Supervisor, if any

Signature : Date :

Section 6 : Decision of Programme Leader

Approved/Referred back for improvement/Rejected

Name:

Signature : Date :

Programme Leader

Objectives of the Project

Content

(Innovative features, challenge, academic value and applicability of the project)

(Cont’d)

Methodology

References

Scheduled programme of work

Description of facilities required and justification (if applicable)

(Also detail any other supporting facilities obtained elsewhere)

Expected completion date :

_____

Student’s Signature

Form ISE101

Postgraduate Scheme in Industrial and Systems Engineering
Dissertation Submission Form

Section 1 : To be completed by the student

Student's Name : _____ PolyU ID No.: _____

MSc in : _____

Dissertation Title :

_____

Signature : _____ Date : _____

Section 2 : To be completed by Academic Supervisor

☐ I agree that the dissertation is ready for submission.

☐ I do not agree that the dissertation is ready for submission. My specific views on the shortcomings have been made known to the student.

☐ I am satisfied with the title proposed by the student.

☐ I have amended the title proposed by the student to:

Signature : _____ Date : _____

Section 3 : To be completed by Programme Leader

The Programme Leader has nominated _____ as the assessor for this dissertation (optional if a professional supervisor is present).

Signature : Date:

Please '√' as appropriate.

* Please delete as appropriate.