

THE HONG KONG POLYTECHNIC UNIVERSITY



DEPARTMENT OF APPLIED MATHEMATICS

PROGRAMME DOCUMENT FOR RESEARCH DEGREES

Master of Philosophy

Doctor of Philosophy

2025

General Information

Institution	:	The Hong Kong Polytechnic University
Faculty	:	Faculty of Computer and Mathematical Sciences
Department	:	Department of Applied Mathematics 應用數學系
Head	:	Professor Defeng SUN
Programme Titles	:	Master of Philosophy (MPhil) / Doctor of Philosophy (PhD)
Medium of Instruction	:	All subjects are taught in English, unless otherwise specified.
Mode of Attendance	:	Full time and Part time
Duration (Normal study period)	:	Master of Philosophy (MPhil) 2 years for full-time, 4 years for part-time. 3- year Doctor of Philosophy (PhD) 3 years for full-time, 6 years for part-time. 4- year Doctor of Philosophy (PhD) 4 years for full-time, 8 years for part-time. (for admission with Bachelor Degree or Master Degree without any research components)
Implementation Date	:	September 2014
Awards	:	MPhil / PhD
Programme Leader	:	Professor Zhian WANG

The document is applicable to students admitted to the Research postgraduate programme in Applied Mathematics from academic year 2025/2026 onwards.

This Programme Document is subject to review and changes which AMA can decide to make from time to time. Students will be informed of the changes as and when appropriate.

This Document should be read together with the “Regulations and Administrative Procedures for the Degrees of MPhil and PhD” and the “Research Student Handbook”.

1 Programme Management

Programme Leader

The Programme Leader will provide the academic and organizational leadership for the programme. The Programme Leader should expect the full support and cooperation of the Head of Department and Heads of other contributing Departments but should recognise that a Head will have to balance a range of departmental demands and priorities in allocating staff and resources to the programme. In particular, a Programme Leader's responsibilities are:

- (i) to ensure the effective conduct and organization of the programme within agreed policies and regulations;
- (ii) to negotiate with the Head(s) of Department(s) about the allocation of appropriate staff for supervision and other duties required by the programme;
- (iii) to develop good working relationships with the Heads and relevant senior staff of Departments involved in the programme and with staff for supervision on the programme;
- (iv) to keep in close touch with the academic welfare and progress of students on the programme, and to be closely aware of students' views about the programme;
- (v) to report to the Heads of Departments concerned on the on-going requirements of staff and resources for the programme, as part of the preparation of departmental estimates;
- (vi) to lead the development of the programme and the implementation of the Programme Learning Outcomes Assessment Plan;
- (vii) to coordinate the inputs to and the debate of the Departmental Research Committee leading to the annual programme review reports (including the programme learning outcomes assessment results) which form part of the Academic Programme Review (APR), and other periodic programme reviews; and
- (viii) to take executive action as agreed by the Departmental Research Committee.

2 Entrance Requirements

Applicants seeking admission to a research postgraduate programme should satisfy the following minimum entrance requirements:

MPhil: at least hold a Bachelor's degree with Second Class Honours or above (or equivalent qualification) conferred by a recognised university.

3-year full-time / 6-year part-time PhD: normally hold a MPhil or equivalent (a research postgraduate degree with a dissertation as an award requirement) and a Bachelor's degree, conferred by a recognised university.

4-year full-time / 8-year part-time PhD: normally hold a Master's degree and a Bachelor's degree, conferred by a recognised university; or a Bachelor's degree with First Class Honours (or equivalent qualification), conferred by a recognised university.

Applicants from a university where the language of teaching /instruction /examination is NOT entirely in English should satisfy the minimum English proficiency requirements specified by both the University and individual Faculties.

Applicants who do not have a degree for which English was the language of instruction at a recognised university are normally required to obtain:

- an overall score of at least 6.5 in the International English Language Testing System (IELTS) Academic Module; or
- a Test of English as a Foreign Language (TOEFL) score of 80 or above for the Internet-based test or 550.

All English language test scores are considered valid for two years after the date of the test.

3 Programme aims and intended learning outcomes

Programme Aims

The aim of the programme is to enable the students to acquire competence in research methods and scholarship in Applied Mathematics, and to display sustained independent effort and independent original thought. This programme prepares students to become academics, researchers or industrial R & D professionals upon graduation.

Programme intended learning outcomes

Institutional Learning Outcomes	Programme Learning Outcomes
Socially responsible leaders with a strong sense of national pride and a global outlook	To recognize the importance of research ethics
Future-ready professionals who possess technical acumen	To learn up-to-date research advances and developments in applied mathematics
Critical thinkers and creative problem solvers	To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics
Effective communicators and collaborators	To present results with good scientific writing and presentation skills
Adaptable and resilient lifelong learners	To provide novel solutions to research problems and effectively interpret new research results

4 The Curriculum

Coursework/ Credit Requirement

Students are mainly conducting research study under the supervision of their Chief Supervisor's guidance. Different categories of students need to attain different credit requirements. The credit requirements should cover attending seminars and Practicum as follows:

2-year MPhil: 9 credits

(1 credit from Academic Integrity and Ethics (AIE) subject/ HTI6081 + 2 credits from attending seminars (AMA67711 +AMA67712) + 3 credits from AMA613+ 3 credits from other subjects)

3-year PhD: 15 credits

(1 credit from Academic Integrity and Ethics (AIE) subject/ HTI6081 + 3 credits from attending seminars (AMA67711+AMA67712+AMA67713) + 2 credits from Practicum (AMA67721+AMA67722) + 3 credits from AMA613+ 6 credits from other subjects)

4-year PhD: 22 credits

(1 credit from Academic Integrity and Ethics (AIE) subject/ HTI6081 + 4 credits from attending seminars (AMA67711+AMA67712+AMA67713+AMA67714) + 2 credits from Practicum (AMA67721+AMA67722) + 3 credits from AMA613+12 credits from other subjects)

Other subjects can be chosen from the research postgraduate subject list offered by AMA, other PolyU departments or other local Universities with a similar level.

List of the subjects offered by the department are varied from year to year.

Research seminars

Full-time students are required to attend at least 10 research seminars per year (of which at least 8 research seminars must be within AMA), in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year.

Part-time students are required to attend at least 10 research seminars per two years (of which at least 8 research seminars must be within AMA), in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years.

Students are recommended to complete one credit per year (for full-time students) or per two years (for part-time students) to fulfil the above-mentioned requirement, with an overall assessment grade of Pass and Fail. However, as deemed appropriate by the Chief Supervisor, they are allowed to complete at most two credits per year (for full-time students) or per two years (for part-time students) to fulfil the research seminar credit requirement.

Chief Supervisors are required to assess the report (with a pass or failure grade). Students who failed to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained. The Chief Supervisor has to pass the record of the seminars attended by their students and the report with a pass grade to the department's General Office (DGO) for custody at the end of each academic year.

Practicum (applicable to PhD students only)

As part of the programme requirement, PhD students, irrespective of funding source and mode of study, must complete two training credits before thesis submission. To earn one credit, students will be required to engage in teaching activities/professional service assigned by the HoD or his/her delegate for 6 hours/week in any 13-week semester.

Students are allowed to complete these two credits any time before thesis submission. They can choose to complete these two credits in two different semesters or within the same semester, subject to the approval of the Chief Supervisor. Stipend recipients are not allowed to fulfill part of their departmental training requirement through the completion of these compulsory training credits.

The HoD or his/her delegate is required to:

- a. ensure that the activities are structured and can be assessed properly;
- b. submit, at the end of the training session, an assessment report on the performance of the relevant student(s), with details of activities undertaken and an overall assessment grade of Pass or Fail.

In addition to the 2 credits requirement, the department would also assign students to mark assignments and invigilate mid-term tests and examinations in every semester. Students are also expected to help in conferences organized by the department.

Guided Study Subjects

For MPhil students, the maximum number of credits to be taken is 3.

For PhD students, the maximum number of credits to be taken is 6 and 9 for 3-year FT/6-year PT and 4-year FT/8-year PT respectively.

English Enhancement Subjects

All research students are required to take the Research Language Skills Assessment (RLSA) in their first semester of study at PolyU to be arranged by English Language Centre (ELC). Based on their performance of the RLSA, students will need to take relevant subjects according to the following arrangement:

RLSA Performance¹	<i>English enhancement subjects</i>
Band 1 in both Writing, and Speaking tasks	exempted
Band 2 or above in both Writing, and Speaking tasks	ENGL6016: <i>Advanced Academic English for Research Students: Publishing and Presenting</i>
Band 3 or below in either Writing, or Speaking tasks	ELC6011 and ELC6012 ELC6011: <i>Presentation Skills for Research Students</i> ELC6012: <i>Thesis Writing for Research Students</i>

Note 1: Band 1 is the highest grade and Band 5 the lowest.

Before thesis submission, students are required to take and pass the English enhancement subjects.

National Education Requirement

All research students admitted from the 2022/23 cohort onwards are required to complete the National Education requirement before thesis submission as a graduation requirement.

Students are required to take a 3-hour e-learning module on “Understanding China and the Hong Kong Special Administrative Region, P.R.C.” in English. Details on the requirement are specified at: <https://www.polyu.edu.hk/ous/nationaleducation/en/curriculum/research-postgraduate-programme/>.

Academic Integrity and Ethics (AIE) requirement and HTI6081 Ethics: Research, Professional & Personal Perspectives

Academic Integrity and Ethics (AIE) are important so students should understand the subject matters as soon as possible.

For students admitted from the 2024/25 cohort onwards

All RPg students admitted in and after the 2024/25 cohort are required to pass a compulsory one-credit subject on AIE within their first study year. Students should report the AIE completion status in their first annual progress monitoring exercise. If students fail to pass the AIE by the given timeline, they would be considered making unsatisfactory progress which may lead to de-registration.

Students may choose one AIE subject from the below subject pool that best suits their research studies. The subject pool is subject to review and change.

Discipline	Subject Code(s)	Subject
Business	AF/MM/LGT5R01	Academic Integrity and Ethics in Business
	HTM5R02	Academic Integrity and Ethics in Business Studies and Research
Engineering	EEE5R03	Engineering Ethics and Academic Integrity
Health and Social Science	HTI5R04	Academic Integrity and Ethics (Health and Social Sciences)
Humanities	CBS5R05	Professional Ethics and Academic Integrity
	CHC5R06	Academic Integrity and Ethics in China-related Humanities
Science	ABCT/AP/FSN5R07	Academic Integrity and Ethics in Science

For students admitted before the 2024/25 cohort

For RPg students admitted before the 2024/25 cohort and have not yet completed ‘HTI6081 Ethics: Research, Professional and Personal Perspectives’ before Semester One of 2024/25, they are required to complete one AIE subject from the above subject pool before thesis submission. Students who have completed HTI6081 are not required to take the AIE subject.

Thesis requirements

A PhD thesis must be submitted to the satisfaction of the supervisor(s) for reviews by external examiners. Prior to submission for reviews by external examiners, a PhD thesis which does not contain any accepted/published paper in a good journal must pass a review conducted by AMA PhD Thesis Assessment Committee. The AMA PhD Thesis Assessment Committee should consist of the Programme Leader (Panel Chair) and three independent members from different research groups.

Graduation Requirements

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

- (i) Accumulation of the requisite number of credits for the particular award, as defined in the definitive programme document; and
- (ii) Satisfying all other requirements as defined in the definitive programme document and as specified by the University; and
- (iii) All MPhil and PhD students need to complete their coursework with a qualifying GPA of 2.7 or above before submission of their thesis for examination.
- (iv) Take and pass an oral defense of his/her thesis
- (v) All other general University requirements relating to Graduation Requirements.

5 **Subject Grading and Calculation of Qualifying Grade Point Average (GPA)**

Grading

Assessment grades shall be awarded on a criterion-referenced basis. A student's overall performance in a subject shall be graded as follows with effect from the 2020/21 academic year for all students,:

<i>Subject grade</i>	<i>Short description</i>
A+	Excellent
A	
A-	
B+	Good
B	
B-	
C+	Satisfactory
C	
C-	
D+	Pass
D	
F	Failure

'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.

A numeral grade point is assigned to each subject grade, as follows:

Grade	New Grade Point
A+	4.3
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
F	0.0

The qualifying 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 obtained in the final attempt will be included in the GPA calculation

6 The Curriculum Map

Programme Outcomes *please refer to Section 3 for ILO details	AIE subjects / HTI6081	AMA610	AMA611	AMA612	AMA613	AMA614	AMA615	AMA616	AMA617^	AMA618	AMA619	AMA620	AMA621	ELC6011	ELC6012	ENGL6016	Attend seminars	Dept. training	Thesis
a. To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics		√	√	√	√	√	√	√	√	√	√	√	√						√
b. To present results with good scientific writing and presentation skills					√					√	√	√	√	√	√	√			√
c. To recognize the importance of research ethics	√																		√
d. To provide novel solutions to research problems and effectively interpret new research results									√	√	√	√	√						√
e. To learn up-to-date research advances and developments in applied mathematics									√	√	√	√	√				√	√	√

^The subject will be offered to PhD students only.

SUBJECT DESCRIPTIONS

(AMA SUBJECTS)

arranged in alphabetical order

Master of Philosophy

Doctor of Philosophy

Key: C = Compulsory CA = Continuous Assessment E =Elective EXAM= Examination

Code	Subject Title	C/E	Credit	Assessment CA : EXAM (%)	Pre-requisite (P)/ Expected background knowledge
AIE / HTI6081	Academic Integrity and Ethics / Ethics: Research, Professional & Personal Perspectives	C C	1 1	100 : 0 100 : 0	None None
AMA610	Advanced probability theory	E	3	40 : 60	A course in Probability Theory and a course in Advanced Calculus
AMA611	Applied Analysis	E	3	50 : 50	A course in Linear Algebra and a course in Advanced Calculus. A course in Partial Differential Equations or Analysis would be highly recommended.
AMA612	Numerical methods for Partial Differential Equations	E	3	40 : 60	A course in Differential Equations and a course in Advanced Calculus
AMA613	Mathematics Seminar	C	3	100 : 0	A compulsory subject for research students of AMA enrolled for at least six months
AMA614	Mathematical Statistics	E	3	40 : 60	A course in Probability and Statistics and a course in Advanced Calculus
AMA615	Nonlinear Optimization Methods	E	3	40 : 60	A course in Linear Algebra and a course in Advanced Calculus
AMA616	Statistics for Finance	E	3	40 : 60	A course in Statistical Analysis and a course in Advanced Calculus

AMA617*	Optimal Stopping and Stochastic Control in Mathematical Finance*	E	3	50 : 50	A course in stochastic calculus and a course in partial differential equations
AMA618	Advanced Topics in Applied Mathematics	E	3	50 : 50	A course in calculus, linear algebra, and basic functional analysis
AMA619	Advanced Mathematical Statistics	E	3	100 : 0	A course in college calculus, college linear algebra, and basic mathematical statistics
AMA620	Advanced Statistical Learning	E	3	100 : 0	A course in college calculus, college linear algebra, and basic mathematical statistics
AMA621	Sobolev spaces and partial differential equations	E	3	50 : 50	Real analysis, Functional analysis, Basic knowledge of Ordinary and Partial Differential Equations
AMA67711	Research Seminars	C	1	100 : 0	None
AMA67712	Research Seminars	C	1	100 : 0	(P): AMA67711
AMA67713	Research Seminars	C	1	100 : 0	(P): AMA67712
AMA67714	Research Seminars	C	1	100 : 0	(P): AMA67713
AMA67721	Practicum	C	1	100 : 0	None
AMA67722	Practicum	C	1	100 : 0	None
ELC6011	Presentation Skills for Research Students	C	2	100 : 0	None
ELC6012	Thesis Writing for Research Students	C	3	100 : 0	None
ENGL6016	Advanced Academic English for Research Students: Publishing and Presenting	C	3	100 : 0	None

*The subject will be offered to PhD students only.

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	AF/LGT/MM5R01
Subject Title	Academic Integrity and Ethics in Business
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	1. Raise students' awareness of the importance of adhering high standards of academic integrity in business studies 2. Enhance students' ability to critically analyse ethical issues in business and make appropriate ethical decisions.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: 1. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. 2. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. 3. Recognise important ethical issues and practices in a university context. 4. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. 5. Identify and deal with complex ethical and professional issues in business settings, and be able to communicate effectively the issues to the stakeholders and the public.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	• What academic integrity is and why it is important • Academic integrity raised by the latest technology • The need for ethics training and the meaning of ethical behavior • Philosophy and codes of ethics and their origins • Culture, religion and the law—how these relate to ethical codes of conduct • Obtaining ethical approval for a research project (where appropriate): procedures and processes • Ethics in business • Recent ethical issues affecting Hong Kong and the society in general • Ethical use of information in thesis or assignment writing: understanding copyright, plagiarism and proper citation

Teaching/Learning Methodology <i>(Note 3)</i>	Lecture/seminar/workshop; or case teaching approach							
Assessment Methods in Alignment with Intended Learning Outcomes <i>(Note 4)</i>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			1	2	3	4	5	
	1. Written assignment on business scenario/ case study analysis/ essay	60%	√	√	√	√		
	2. Oral presentation	25%	√	√			√	
	3. Attendance and class participation	15%			√			
	Total	100 %						
<i>To pass this subject, students are required to obtain Pass in the overall subject grade.</i>								
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: 1. Business scenario/case study analysis/essay will assess ability to identify and analyze academic integrity and ethical issues in business and to present a coherent and detailed critique and plan on how these could be avoided or resolved (giving sources and written work accompanied by a Turnitin Report). The assignment will assess the student’s ability to identify, discuss and analyze academic integrity and ethical principles and issues from a wide perspective, and evaluate how individual, professions and societies benefit from following ethically acceptable behavior and practices. 2. Oral presentations will assess the students’ ability to present and argue points in support of their rationale. 3. The attendance and class participation will ensure students are present in class to absorb the core principles and concepts of the course.								
Student Study Effort Expected	Class contact:							
	▪ Lecture/seminar/workshop/oral presentation							13 Hrs.
	Other student study effort:							
	▪ Self-study and group work							13 Hrs.
	▪ Assignment preparation							13 Hrs.
	Total student study effort							39 Hrs.

Reading List and References	Articles: Fanelli, D. (2009). How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. <i>PloS one</i>, 4(5), e5738. John, L. K., Loewenstein, G., & Prelec, D. (2012). Measuring the prevalence of questionable research practices with incentives for truth telling. <i>Psychological science</i>, 23(5), 524-532. Lund, B. D., Wang, T., Mannuru, N. R., Nie, B., Shimray, S., & Wang, Z. (2023). ChatGPT and a new academic reality: Artificial Intelligence-written research papers and the ethics of the large language models in scholarly publishing. <i>Journal of the Association for Information Science and Technology</i>, 74(5), 570-581. Swazey, J. P., Anderson, M. S., Lewis, K. S., & Louis, K. S. (1993). Ethical problems in academic research. <i>American Scientist</i>, 81(6), 542-553. Tsui, A. S., & McKiernan, P. (2022). Understanding scientific freedom and scientific responsibility in business and management research. <i>Journal of Management Studies</i>, 59(6), 1604-1627. Websites: International Center for Academic Integrity (ICAI). (2021). The Fundamental Values of Academic Integrity. (3rd ed.). https://academicintegrity.org/images/pdfs/20019_ICAI-Fundamental-Values_R12.pdf Northwestern University Principles Regarding Academic Integrity https://www.northwestern.edu/provost/policies-procedures/academic-integrity/principles.html University of Oxford Academic Integrity in Research https://hr.admin.ox.ac.uk/academic-integrity-in-research Hong Kong Polytechnic University Student Guide on Academic Integrity: https://www.polyu.edu.hk/ous/docdrive/Academic_Integrity/Student_Guide.pdf Hong Kong Polytechnic University Pao Yue-Kong Library guide on Academic Integrity: https://www.lib.polyu.edu.hk/research-support/academic-integrity Hong Kong Polytechnic University Educational Development Center: Generative AI https://teaching.cornell.edu/generative-artificial-intelligence/ai-academic-integrity Hong Kong Polytechnic University Educational Guidelines for Students on the Use of Generative Artificial Intelligence (GenAI): https://www.polyu.edu.hk/ar/students-in-taught-programmes/use-of-genai/ Materials from the Hong Kong Business Ethics Development Centre website: https://hkbedc.icac.hk/en Materials from EthicsWeb.ca: http://www.ethicsweb.ca/resources/professional/issues.html Retraction Watch: https://retractionwatch.com/
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

(5 Dec 2023)

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code &	HTM5R02
Subject Title	Academic Integrity and Ethics in Business Studies and Research
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	1. To raise students' awareness of the importance of adhering to high standards of academic integrity. 2. To enhance students' ability to critically analyse ethical issues and make appropriate ethical decisions.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: a. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. b. Enhance awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. c. Recognise important ethical issues and practices in a university context. d. Understand the implications and concerns on academic integrity raised by latest technologies such as ChatGPT and other Generative Artificial Intelligence tools. e. Identify and deal with complex ethical and professional issues in discipline-specific settings such as the use of confidential/sensitive company data, the use of animals for or the involvement of children and vulnerable adults in business research undertakings, and be able to communicate effectively on academic integrity and ethics issues to the concerned stakeholders and the general public.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	1. Definition and essence of academic integrity, and the philosophies, origins, and codes of ethics in social sciences research in general and in business research in particular. 2. The need for understanding and learning about business research ethics and the meaning of ethical behaviour in business research: Case studies, examples of ethical misbehaviours, instances of (self) plagiarism and retraction of published work,

	amongst other cases of academic integrity and ethics in business research. 3. The culture, politics and law(s) pertaining to ethical behaviour in business research and practice. 4. Mechanism and procedures in obtaining ethical approval for a business research project. 5. Ethics in businesses and industries: Common issues, guiding principles, and scenarios in business research. 6. Ethics and human behaviour: Individual, professional and societal responsibilities of business research. 7. Involving animals, children, minorities and other vulnerable people in tourism, recreation and other business research, as well as using confidential/sensitive company data for research. 8. Recent ethical issues affecting social economic development in Hong Kong 9. Ethical use of information and information technology in postgraduate studies and research: Understanding copyright, plagiarism and proper citations, and using ChatGPT for business research.
Teaching/Learning Methodology (Note 3)	This subject, in a one-hour weekly meeting mode, will consist of lectures, seminars, discussions, presentations, self-reflections, and other learning activities (as outlined below). • Interactive lectures – To explain concepts and theories with examples drawn from business research and practice. Learners are encouraged to raise issues for discussion in the classroom. • Discussions – To facilitate critical thinking on academic integrity and ethics in business research. • Seminars via guest speakers – Depending on availability, guest speakers may be invited to share their perspectives on research involving animals, children, minorities and other vulnerable people, as well as the use of confidential/sensitive company data in tourism, recreation and other business contexts. • Presentations – Learners will be requested, either individually or as a group, to present for example on issues relating to academic integrity and ethics in their own business-oriented research. • Self-reflections – Learners are encouraged to reflect on their own experience and liberal/intellectual growth relating to academic integrity and ethics in business research. To achieve the subject's objectives and learning outcomes, learners are expected to • Attend and positively participate in class lectures, seminars, discussions and other learning activities. • Prepare for class by completing required readings and other assignments on time.

	- Engage in discussions and share in the learning process with fellow classmates, the instructor, and guest speakers (if any). - Avoid disruptions and distractions (e.g., no conversing while others are speaking, no using/playing smartphones in class). - Respect diversity and positively nurture a community of learning and practice in class.																																															
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th></tr><tr><td>1. Group assignment on discipline-specific scenario/case study analysis</td><td>40%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>2. Individual assessment (1,000-word essay on a topic relating to academic integrity and ethics in business research)</td><td>30%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>3. Oral presentation</td><td>20%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>4. Attendance/class discussions</td><td>10%</td><td></td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Total</td><td>100%</td><td colspan="5"></td></tr></table> Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Notably, the intended learning outcomes of this subject focus on conceptual understandings of academic integrity and ethics in business research, as well as on the instrumental and process use of such knowledge in business research practice. The specified assessment methods/tasks serve exactly these outcomes, through analysing, discussing, speaking on and writing about issues on academic integrity and ethics in business research. Thus, with the above four specified assessments, the five intended learning outcomes will have been adequately achieved. Subject assessment will be graded on a pass/fail basis (where a total score ≥ 60 is pass, and a total score ≤ 59 is fail).	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					a	b	c	d	e	1. Group assignment on discipline-specific scenario/case study analysis	40%	√	√	√	√	√	2. Individual assessment (1,000-word essay on a topic relating to academic integrity and ethics in business research)	30%	√	√	√	√	√	3. Oral presentation	20%	√	√	√	√	√	4. Attendance/class discussions	10%		√	√	√		Total	100%					
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																												
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3. Oral presentation	20%	√	√	√	√	√																																										
4. Attendance/class discussions	10%		√	√	√																																											
Total	100%																																															

Student Study Effort Expected	Class contact:	
	▪ Lecture/seminar/workshop/oral presentation	13 Hrs.
	Other student study effort:	
	▪ Self study and group work	17 Hrs.
	▪ Preparation for assignments and presentations	10 Hrs.
	Total student study effort	40 Hrs.
Reading List and References	1. Cassell, C., Cunliffe, A., & Grandy, G. (2018, eds.). <i>The SAGE Handbook of Qualitative Business and Management Research Methods</i>. Thousand Oaks: Sage. 2. Denzin, N., & Lincoln, Y. (2018, eds.). <i>The SAGE Handbook of Qualitative Research</i>. Thousand Oaks: Sage. 3. Frechtling, D. (2018). On the ethics of tourism research. <i>Journal of Travel Research</i>, 57(8), 1054 –1067. 4. Hong Kong Business Ethics Development Centre (2023). Mission About Us Hong Kong Business Ethics Development Centre (icac.hk) 5. UNWTO (1999). Global Code of Ethics for Tourism (https://www.unwto.org/global-code-of-ethics-for-tourism)	

Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	EEE5R03
Subject Title	Engineering Ethics and Academic Integrity
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The objectives of the subject are to: 1. Raise students' awareness of the importance of adhering high standards of academic integrity 2. Enhance students' ability to critically analyse ethical issues and make appropriate ethical decisions.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: 1. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. 2. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. 3. Recognise important ethical issues and practices in a university context. 4. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. 5. Identify and deal with complex ethical and professional issues in discipline-specific settings, and be able to communicate effectively the issues to the stakeholders and the public. 6. Critically analyse and discuss problem cases related to engineering ethics and academic integrity.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	<u>Keyword Syllabus</u> • Introduction to engineering and research ethics – Needs for research ethics to the integrity and well-being of industry, professions, and community; overview of theories and methods in engineering and research ethics.

	• Ethical issues related to project collaboration, publication, and authorship – Responsibility for quality works; credit and responsibility of project collaborators; citation and acknowledgment; qualifications for authorship; engineering case studies. • Professional and research misconduct – Definition of professional and research misconduct; self-deception in misconduct; factors that undermine integrity; understanding and fostering responsible conduct; engineering case studies. • Involving human subjects and animals – The common rule for the protection of human subjects in research and professional functions; responsibility for experimental animals; requirements governing research and professional functions involving human subjects and animals; engineering case studies. • Rights and responsibilities regarding intellectual property – Individual credit and the ownership of innovation; copyrights, “Fair Use,” and the Digital Millennium Copyright Act; patents and trade secrets; property rights contrasted with credit for invention; patenting of inventions contrasted with publication of project result; engineering case studies. • Cyber ethics – Common threats to information and systems in the cyberspace; core values of cybersecurity: privacy, security, fairness, and accountability; potential value conflicts and solutions; ethical hacking and concerns; legislative framework: EU Data Protection Regulation; engineering case studies. • Ethical use of Generative AI – AI ethics; introduction of Generative AI and its ethical considerations in engineering research and professional functions; AI hallucination; technical efforts in fake, bias, and plagiarism identification; ethical responsibility of developers using generative AI; regulating generative AI and the AI Act; engineering case studies.
Teaching/Learning Methodology <i>(Note 3)</i>	• Lectures: Formal classroom lectures will be given to introduce the concepts of engineering research ethics. Core principles of ethics will be illustrated with engineering cases. They support the intended learning outcomes 1 to 5. Since all lectures are important, <u>students need to achieve 100% attendance in the lectures to pass the subject.</u> • Group discussions and quizzes: During the lecture, students will form groups to analyse and discuss various engineering ethics cases related to the topic of the lecture. Students also need to complete an online quiz after the lecture to show their understanding of the teaching material. They support the intended learning outcomes 1 to 6. • Case study and reflection: Students need to choose one of the problem cases in engineering ethics and academic integrity for in-depth analysis. The analysis result will be shared with other students in a presentation session. Students also need to analyse an ethical problem related to their research project/field of

	professional work for the reflective study. They support the intended learning outcomes 1 to 6.								
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	This subject will be assessed on a pass/fail grading system and will not be included in the GPA calculation. To pass the subject, students need to attend all lectures and score 50% or higher in the total marks.								
	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
			1	2	3	4	5	6	
	1. Quizzes	20%	✓	✓	✓	✓	✓		
	2. Case study - Presentation	40%	✓				✓	✓	
	3. Reflective writing	40%	✓				✓	✓	
	Total	100 %							
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Quizzes: Students will complete an online quiz after each lecture to show their understanding of the teaching material. They assess the intended learning outcomes 1 to 5. Case study presentation: The best way to learn engineering ethics and academic integrity is to analyse previous problem cases so that students can learn the lessons from them. A presentation session will be arranged for students to share with other students their analysis results. It assesses the intended learning outcomes 1, 5, and 6. Reflective writing: To assist students to sink in the discussion in the classes, they are required to submit a reflective report to detail their analysis of an ethical problem related to their research project/field of professional work. It assesses the intended learning outcomes 1, 5, and 6. The reflective writing assignment submissions will be marked by students’ supervisors adopting a holistic approach.								
	Student Study Effort Expected	Class contact:							
		• Lecture and class activity						13 Hrs.	
Other student study effort:									
• Self-study and group work						12 Hrs.			
• Assignment preparation						10 Hrs.			
Total student study effort						35 Hrs.			

Reading List and References	1. Caroline Whitbeck (2011). <i>Ethics in Engineering Practice and Research</i>, Cambridge University Press. 2. Lance Eliot (2023). <i>Generative AI ChatGPT And AI Ethics</i>, Lance B. Eliot. 3. Markus Christen, Bert Gordijn, and Michele Loi (2020). <i>The Ethics of Cybersecurity</i>, Cham : Springer. 4. Kristin Shrader-Frechette (1994). <i>Ethics of Scientific Research</i>, Lanham, Md.: Rowman & Littlefield. 5. University of California, San Diego (UC San Diego). <i>Resources for Research Ethics Education</i>, http://research-ethics.net.
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	HTI5R04
Subject Title	Academic Integrity and Ethics (Health and social sciences)
Discipline	Health & Social Science
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	To equip students with a deep appreciation of professional integrity, ethical guidelines, and codes of conduct that they can apply in their research studies at PolyU and in their future professional and personal lives.
Intended Learning Outcomes <i>(Note 1)</i>	On successful completion of this subject, students will be able to: 1. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. 2. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. 3. Recognise important ethical issues and practices in a university context. 4. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. 5. Identify and deal with complex ethical and professional issues in discipline-specific settings, and be able to communicate effectively the issues to the stakeholders and the public. 6. Understand, discuss, and apply ethical principles and codes across a range of healthcare and social science related disciplines and scenarios.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	- The need for ethics training and the understanding of ethical behaviour in research: case studies, disasters, and learning by the mistakes of others. - Philosophy and codes of ethics and their origins.

	• Culture, religion, the law, and new technology development (e.g., in the area of artificial intelligence) – how these relate to ethical codes of conduct. • Obtaining ethical approval for a research project: procedures and processes. • Ethics in life science, humanities, education, business, and industry (e.g., patient care): common issues, guiding principles, discipline-specific scenarios. • Ethics in health and social science: common issues in and guiding principles for - o medical or behavioural studies through social media, electronic devices, or ChatGPT-types of APPs; - o inclusion of social and/or economic vulnerable populations (e.g., children and elderly) in medical and behavioural research; - o use of animal models for medical research. • Ethics and human behaviour: individual, professional, and societal responsibilities. • Recent ethical issues affecting Hong Kong and society in general. • Ethical use of information in thesis writing: understanding copyright, plagiarism, and proper citation																																																						
Teaching/Learning Methodology <i>(Note 3)</i>	A hybrid mode of learning combining lectures, seminars, workshops, group studies and course projects. It includes an initial set of mandatory lectures on the basic concepts, histories, theories and principles of ethics, followed by lectures and seminars with various case studies, group discussions and student course project presentations.																																																						
Assessment Methods in Alignment with Intended Learning Outcomes <i>(Note 4)</i>	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr><tr><td>1. In-class quizzes</td><td>40%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>2. Group assignment on discipline-specific scenario/case study analysis</td><td>40%</td><td>√</td><td></td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>3. Oral presentation</td><td>10%</td><td></td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr><tr><td>4. Attendance</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 colspan="6"></td></tr></table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						1	2	3	4	5	6	1. In-class quizzes	40%	√	√	√			√	2. Group assignment on discipline-specific scenario/case study analysis	40%	√		√			√	3. Oral presentation	10%				√	√	√	4. Attendance	10%	√	√	√	√	√	√	Total	100%						
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																																			
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Total	100%																																																						

	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: 1. Individually graded in-class quizzes will assess the mastery of the basic concepts and guiding principles of ethics as well as the ability of applying them to specific situations in medicine and social science and the ability of dealing with intellectual properties, copyrights, citations in theses and research papers. 2. Discipline-specific scenario/case study analysis will assess the ability to identify and analyse ethical issues in the student's own discipline and to present a coherent and detailed critique and plan on how these could be avoided or resolved (giving sources and written work accompanied by a Turn-it-in Report). The group assignment will assess the student's ability to identify, discuss and analyse ethical principles and issues from a wide perspective, and evaluate how individuals, professions, and societies benefit from following ethically acceptable behaviour and practices. 3. Oral presentations will assess the students' ability to present and argue points in support of their rationale. 4. Attendance is required to support the hybrid mode of teaching, particularly group studies and group course projects. 5. Performance is assessed through individually graded quizzes and group studies and projects. The final pass/fail grade will be based on the numerical scores computed based on the metrics in the table above.	
Student Study Effort Expected	Class contact:	
	▪ Lecture/seminar/workshop	13 Hrs.
	Other student study effort:	
	▪ Oral presentation	5 Hrs.
	▪ Self-study and group work	12 Hrs.
	▪ Assignment preparation	10 Hrs.
	Total student study effort	40 Hrs.
Reading List and References	Guy, M.E., (1990). <i>Ethical Decision Making in Everyday Work Situations</i>, Bloomsbury Academic. Liautaud, S. and Sweetingham, L., (2021) <i>The Power of Ethics: How to make good choices in a complicated world</i>, Simon & Schuster. Liao, S. M., (2020) <i>Ethics of Artificial Intelligence</i>, Oxford University Press. van der Burg, S. and Swierstra, T., (2013) <i>Ethics on the Laboratory Floor</i>, Palgrave Macmillan. Singer, P., (2011) <i>Practical Ethics</i>, Cambridge University Press. Materials from the Hong Kong Ethics development website	

	(http://www.icac.org.hk/hkedc/eng/library2.asp) Materials from EthicsWeb.ca (http://www.ethicsweb.ca/resources/professional/issues.html) Selected readings and videos Declaration of Helsinki (revised 2008)
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	CBS5R05
Subject Title	Professional ethics and academic integrity
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The objectives of the subject are to: 1. Raise students' awareness of the importance of adhering high standards of academic integrity 2. Enhance students' ability to critically analyse ethical issues and make appropriate ethical decisions.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: 1. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. 2. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. 3. Recognise important ethical issues and practices in a university context. 4. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. 5. Identify and deal with complex ethical and professional issues in discipline-specific settings, and be able to communicate effectively the issues to the stakeholders and the public.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	• Introduction to moral theory; Philosophy and codes of ethics and their origins • Applying ethics to different linguistic communities and language policy advising; Ethics in recruiting human subjects (including children and vulnerable adults), working with consultants, experimental designs and conducting experiments on human subjects for linguistic research • Ethics in linguistic fieldwork and analysis: authorship and data ownership; copyright; data management

	• Ethics in translation research and practice: common issues, guiding principles, discipline-specific scenarios • Ethics in research conducted in various professional settings such as classrooms, health-related contexts and media • Obtaining ethical approval for a research project: procedures and processes • Ethics and human behavior: individual, professional, and societal responsibilities • Guidelines in using GenAI tools • Academic integrity: avoiding plagiarism																																								
Teaching/Learning Methodology (Note 3)	Lectures: introduce students to fundamental principles and theories of ethics in research; examine case studies and examples to illustrate ethical dilemmas that researchers may encounter during their research; lead students to discuss topics such as informed consent, confidentiality of data, recruitment of human subjects, and the responsible use of data. Seminars: encourage students to practice the procedure in obtaining human subjects ethics approval; encourage students to reflect on the ethical dimensions of research and critically evaluate decisions made in case studies; lead students to raise questions and discuss contents of case studies presented by peer students; encourage students to debate on topics related to ethics.																																								
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>1. Tests</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>2. Oral presentation</td><td>25%</td><td></td><td></td><td></td><td></td><td>✓</td></tr><tr><td>3. Attendance</td><td>15%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Total</td><td>100 %</td><td colspan="5"></td></tr></table> The subject is assessed on a Pass/Fail grading mechanism. The attendance includes scores of in-class quizzes, which assess the learning outcomes. Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: 1. Two tests will evaluate students’ knowledge of human ethics and academic integrity and their ability to identify and analyze ethical issues in their study and research. They will assess students’ ability to identify, discuss and analyze ethical principles and issues, and evaluate how individuals, professions, and societies benefit from following ethically acceptable behavior and practices. 2. One oral presentation will assess the students’ ability to present	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					1	2	3	4	5	1. Tests	60%	✓	✓	✓	✓	✓	2. Oral presentation	25%					✓	3. Attendance	15%	✓	✓	✓	✓		Total	100 %					
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																					
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2. Oral presentation	25%					✓																																			
3. Attendance	15%	✓	✓	✓	✓																																				
Total	100 %																																								

	and argue points in support of their rationale.	
Student Study Effort Expected	Class contact:	
	▪ Lecture/seminar/workshop/oral presentation	13 Hrs.
	Other student study effort:	
	▪ Self-study and group work	27.5 Hrs.
	Total student study effort	40.5 Hrs.
Reading List and References	1. De Costa, P. I. (2015). <i>Ethics in applied linguistics research: Language researcher narratives</i>. Routledge. 2. Koskinen, K., & Pokorn, N. K. (2020). <i>The Routledge handbook of translation and ethics</i>. Routledge. 3. Inghilleri, M. (2013). <i>Interpreting justice: Ethics, politics and language</i>. Routledge. 4. Hong Kong Business Ethics Development Centre. (n.d.). https://hkbedc.icac.hk/en 5. The Hong Kong Polytechnic University. (2023). <i>Guidelines for Students on the Use of Generative Artificial Intelligence (GenAI): Effective from 2022/23 Summer Term</i>. https://www.polyu.edu.hk/en/ar/students-in-taught-programmes/use-of-genai/	

Note 1: Intended Learning Outcomes

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

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The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	CHC5R06
Subject Title	Academic Integrity and Ethics in China-related Humanities
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	To equip students with a deep appreciation of ethical guidelines and codes of conduct that they can apply in their research studies at PolyU and in their future professional and personal lives.
Intended Learning Outcomes (Note 1)	On completion of the subject, students will be able to: 1. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. 2. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. 3. Recognise important ethical issues and practices in a university context. 4. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. 5. Identify and deal with complex ethical and professional issues in discipline-specific settings, and be able to communicate effectively the issues to the stakeholders and the public.
Subject Synopsis/ Indicative Syllabus (Note 2)	1. The need for ethics training and the meaning of ethical behavior in research, fieldwork, data and artifact collection, interviews, and written work 2. Codes of ethics and their origins 3. Obtaining ethical approval for a research project: procedures and processes 4. Ethics in the humanities: issues, principles, and case studies 5. Understanding copyright, plagiarism and proper citation in term papers, presentations, and theses 6. Introduction to types of AI used in the humanities and their appropriate uses

	7. Understanding abuses of AI in plagiarism and presenting inaccurate or biased facts and interpretations 8. Ethics and human behavior: individual, professional and societal responsibilities																																														
Teaching/Learning Methodology (Note 3)	Like most other RPg subjects in the humanities disciplines, the primary teaching/learning methods will include the following: 1. Self-study: Students will be required to complete the weekly reading assignments before each class session; 2. Lecture: Instructors can choose to use part of the class session to deliver a short lecture on the topic that will be discussed in that session; 3. Discussion and presentation: At least half of the class contact time should be used for discussions and presentations on the weekly topics.																																														
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th></th></tr><tr><td>1. Group assignment and oral presentations</td><td>60%</td><td></td><td>X</td><td>X</td><td>X</td><td></td><td></td></tr><tr><td>2. Written exam</td><td>25%</td><td></td><td>X</td><td>X</td><td>X</td><td>X</td><td></td></tr><tr><td>3. Attendance and participation</td><td>15%</td><td>X</td><td></td><td></td><td></td><td>X</td><td></td></tr><tr><td>Total</td><td>100%</td><td colspan="6"></td></tr></table> Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The group assignment and oral presentations will assess the student’s ability to identify, discuss and analyze ethical principles and issues in the humanities and the importance for following ethically acceptable behavior and practices. The written exam will assess the students’ understanding of the course material and their ability to form and present arguments related to research ethics and academic integrity. Attendance and participation allow students to critically process and interpret what they have learned through readings and lectures.	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						1	2	3	4	5		1. Group assignment and oral presentations	60%		X	X	X			2. Written exam	25%		X	X	X	X		3. Attendance and participation	15%	X				X		Total	100%						
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																											
		1	2	3	4	5																																									
1. Group assignment and oral presentations	60%		X	X	X																																										
2. Written exam	25%		X	X	X	X																																									
3. Attendance and participation	15%	X				X																																									
Total	100%																																														

Student Study Effort Expected	Class contact:	
	▪ Lecture/seminar/oral presentation	13 Hrs.
	Other student study effort:	
	▪ Self study and group work	15 Hrs.
	▪ Assignment preparation	15 Hrs.
	Total student study effort	43 Hrs.
Reading List and References	Jeremy Knox, <i>AI and Education in China: Imagining the Future, Excavating the Past</i>. Taylor & Francis, 2023. Benjamin H. Bratton, Anna Greenspan and Bogna Konior, eds. <i>Machine Decision Is Not Final: China and the History and Future of Artificial Intelligence</i>. Urbanomic: 2024. JAN KRIKKE, “China’s ancient worldview shines light on future of AI,” Asian Times, 2018, 2,5 https://asiatimes.com/2018/02/chinas-ancient-world-view-shines-light-future-ai/ 扬·克里克, “前往人工智能的未来, 要先回到中国的历史,” 观察者, 2018,2,21 https://www.guancha.cn/JanKrikke/2018_02_21_447504.shtml Shuangye Chen & Bruce Macfarlane Dawson, A. G. (2023). “Academic Integrity in China” https://link.springer.com/referenceworkentry/10.1007/978-981-287-079-7_32-1 Stephen Gow & Qingyang Sun. “Academic Integrity in China: Challenges for Policy, Practice, and Quality Assurance in Higher Education” https://link.springer.com/referenceworkentry/10.1007/978-3-031-39989-3_175 <i>Artificial Intelligence and Academic Integrity</i>. Aspen. Ethics in Generative AI. https://www.datacamp.com/tutorial/ethics-in-generative-ai	

	Stenmark, C. K. and Winn, N. A. (2015). Ethics in the Humanities pp.1-14. In <i>Handbook of Academic Integrity</i>. Springer. Diebel-Fischer, H. Research Ethics in the Digital Age: Fundamentals and Problems (2018). In Dobrick, F. M., Fischer, J. and Hagen, L. M. (eds). <i>Research Ethics in the Digital Age Ethics for the Social Sciences and Humanities in Times of Mediatization and Digitization</i>. Springer 馮象, “我是阿爾法：論人機倫理,” 《新國際》, https://www.newinternationalism.net/?p=6966
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	ABCT/AP/FSN5R07
Subject Title	Academic Integrity and Ethics in Science
Credit Value	1
Level	5
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	1. Raise students' awareness of the importance of adhering high standards of academic integrity. 2. Enhance students' ability to critically analyse ethical issues and make appropriate ethical decisions. 3. Equip students in science with a deep understanding and respect of academic integrity and ethics that they can apply in their scientific research and use of generative artificial intelligence (AI) at PolyU as well as in their future professional endeavours.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: a. Demonstrate knowledge and understanding of the concepts and principles of academic integrity and ethics. b. Demonstrate awareness and ability to analyse academic integrity and ethical issues, such as copyright and plagiarism, and act properly to avoid academic and ethical misbehaviours. c. Recognise important ethical issues and practices in a university context. d. Understand the implications and concerns on academic integrity raised by the latest technology, such as ChatGPT and other Generative Artificial Intelligence (GenAI) tools. e. Identify and deal with complex ethical and professional issues in discipline-specific settings, and be able to communicate effectively the issues to the stakeholders and the public. f. Develop a consciousness of prevailing ethical issues and dilemmas in relation to their specific scientific research area and generative AI.

	g. Critically analyse and debate scenarios of potential or actual ethical misconduct within the scope of their scientific discipline and generative AI. h. Discuss the extension and application of research ethics principles to professional and personal codes of conduct in the context of scientific integrity and societal wellbeing.																												
Subject Synopsis/ Indicative Syllabus (Note 2)	The Necessity for Ethics Training: Understanding ethical behaviour in scientific research and generative AI through case studies and learning from past errors. Philosophy and Ethics Codes: Origins and applications of ethical guidelines. The Intersection of Culture, Religion, and Law: Understanding the connection between these and ethical codes of conduct. Research Project Ethical Clearance: Procedures, methodologies, and considerations for obtaining ethical approval. Discipline-Specific Ethics: Common problems, guiding principles, and discipline-specific scenarios in science, including use of animals and human beings in scientific research, gene editing, societal impact, environmental and security issues, etc. Ethics and Human Behaviour: Individual, professional, and societal responsibilities in the context of the ethical use of generative AI. Ethical Information Use: Comprehension of copyright, plagiarism, and appropriate citation, particularly for research and scientific writing that involve the use of generative AI.																												
Teaching/Learning Methodology (Note 3)	Lectures: Related knowledge and background will be introduced. Case studies will be employed to illustrate the relevant issues. Guest speakers will be invited to deliver guest lectures on selected topics if deemed necessary. Interactive discussions will be fostered to stimulate critical thinking and propose ethical solutions and decision-making strategies. Group presentations: Groups of students will deliver presentations on selected topics and answer questions from the lecturer and other students. This will reinforce their teamwork, enable them to have a better understanding on ethnics in science, and promote collaborative learning and the application of ethical principles.																												
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="8">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th><th>g</th><th>h</th></tr><tr><td>1. Individual assignment on</td><td>50%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr></table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)								a	b	c	d	e	f	g	h	1. Individual assignment on	50%	√	√	√	√	√	√	√	√
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																									
		a	b	c	d	e	f	g	h																				
1. Individual assignment on	50%	√	√	√	√	√	√	√	√																				

	discipline-related scenario/case analysis									
	2. Group presentation	50%	√	√	√	√	√	√	√	√
	Total	100 %								
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: 1. Each student will be required to submit an assignment on discipline-related scenario/case analysis, which will assess the student’s ability to identify and analyse ethical issues in related fields and figure out how these could be avoided or resolved. 2. Students will be grouped to deliver presentations on selected topics, which will assess their ability to present and argue points in support of their rationale. The subject will be assessed on a Pass/Fail grading mechanism.									
Student Study Effort Expected	Class contact:									
	▪ Lecture/seminar/workshop/presentation								13 Hrs.	
	Other student study effort:									
	▪ Self study and group work								13 Hrs.	
	▪ Assignment preparation								13 Hrs.	
	Total student study effort								39 Hrs.	
Reading List and References	- Saxena, A., (2019). <i>Ethics in Science: Pedagogic Issues and Concerns</i>. Springer. - Rollin, B. E., (2006). <i>Science and ethics</i>. Cambridge University Press. - Bretag, T. (2016). <i>Handbook of academic integrity</i>. Springer Singapore. - Rettinger, D. A., & Gallant, T. B. (2022). <i>Cheating Academic Integrity: Lessons from 30 Years of Research</i>. Wiley. - Holbrook, J. B., & Mitcham, C., (2015). <i>Ethics, science, technology, and engineering: a global resource (2nd edition)</i>. Gale, Cengage Learning. - Comstock, G., (2010). <i>Life science ethics (2nd edition)</i>. Springer. - von Braun, J., S. Archer, M., Reichberg, G. M. & Sánchez Sorondo, M., (2021). <i>Robotics, AI, and Humanity: Science, Ethics, and Policy</i>. Springer Nature.									

	• Loukides, M., Mason, H. & Patil, D. J., (2018). <i>Ethics and Data Science</i>. O'Reilly Media, Inc. • Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. <i>Innovations in Education and Teaching International</i>, 1-12. https://doi.org/10.1080/14703297.2023.2190148
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

Subject Description Form

Subject Code	AMA610
Subject Title	Advanced Probability Theory
Credit Value	3
Level	6
Expected background knowledge	A course in Probability Theory and a course in Advanced Calculus
Objectives	To enable students to have an overview and thorough understanding of the modern probability theory.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Apply the concepts of probability, conditional probability and conditional expectations. (b) Calculate probabilities, moments and other related quantities based on given distributions. (c) Understand and apply the laws of large numbers and central limit theorems. (d) Understand and apply martingale limit theory. (e) Understand and apply Brownian motion model.
Subject Synopsis/ Indicative Syllabus	Measure theory concepts needed for probability. Expectation, distributions. Laws of large numbers and central limit theorems for independent random variables. Characteristic function methods. Conditional expectations, martingales and martingale convergence theorems. Brownian Motion.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of solid mathematical techniques and how the techniques can be applied to solving research and real application problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting		Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d	e		
	1. CA	40	✓	✓	✓	✓	✓		
	2. Exam	60	✓	✓	✓	✓	✓		
	Total	100 %							
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The subject focuses on knowledge and understanding of Measure Theory and Probability Theory. The Exam-based assessment is the most appropriate assessment method, including tests and examination. Moreover, assignments are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.								
Student Study Effort Expected	Class contact:								
	▪ Lecture					26Hrs.			
	▪ Tutorial					13Hrs.			
	Other student study effort:								
	▪ Assignment					30Hrs.			
	▪ Self-study					61Hrs.			
	Total student study effort				130Hrs.				
Reading List and References	R. Durrett, Probability: Theory and Examples. Cambridge University Press, 2010; available online at http://www.math.cornell.edu/~durrett/PTE/PTE4_Jan2010.pdf								
	K.L. Chung, A Course in Probability Theory. Academic Press, 2001.								
	S.C. Chow and H. Teicher, Probability Theory: Independence, Interchangeability, Martingales. Springer, 2003.								

Subject Description Form

Subject Code	AMA 611
Subject Title	Applied Analysis
Credit Value	3
Level	6
Expected background knowledge	A course in Linear Algebra and a course in Advanced Calculus. A course in Partial Differential Equations or Analysis would be highly recommended.
Objectives	To teach students how to use functional analysis to prove various existence, stability and dynamical results of solutions to partial differential equations (PDEs) arising from Physics, Biology, Geometry and Engineering.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a. Learn some basic functional analysis; b. Learn how to use inequalities to prove estimates; c. Prove existence and analyze qualitative features of solutions to PDEs; d. Analyze stability and dynamics of solutions to PDEs.
Subject Synopsis/ Indicative Syllabus	<i>Basic functional analysis</i> Banach and Hilbert Spaces; L_p spaces; Sobolev spaces; inequalities; linear operators and spectrum (discrete and continuous); Compactness. <i>Fixed point theorems and applications</i> The contraction mapping; local and global well-posedness;

	Gateaux and Frechet derivatives; implicit and inverse function theorems; applications to PDEs arising from Physics, Biology, Geometry and Engineering. <i>Variational Calculus</i> Functionals; constraints and Lagrange multipliers; minimization by direct methods; saddle points and the Mountain Pass Lemma; Hamiltonian equations.
Teaching/ Learning Methodology	The subject will be delivered mainly through lectures and tutorials. Tutorials will be spent answering questions, reviewing some background material and going over tutorial questions that are related to assignments. In addition, tutorials will be spent discussing some possible topics for the mini projects.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
			a	b	c	d
	1. Assignments	25%	✓	✓	✓	✓
	2. Midterm Test	25%	✓	✓	✓	✓
	3. Final Exam	50%	✓	✓	✓	✓
	Total	100 %				
The project must be pre-approved by the instructor. Continuous assessment comprises of assignments and project. A written examination is held at the end of the semester.						
Student Study Effort	Class contact:					

Expected	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Assignments ▪ Project	30 Hrs. 30 Hrs.
	▪ Self-study	31 Hrs.
	Total student study effort	130 Hrs.
Reading List and References	M. Reed and B. Simon. Methods of Modern Mathematical Physics: Vol. I: Functional Analysis. Academic Press, 1972. E. H. Lieb and M. Loss. Analysis, Graduate studies in Mathematics. American Mathematical Society, Vol. 14, 2nd ed. 2001. G. B. Folland. Real Analysis: modern techniques and their applications. Wiley, New York, 1984. R. C. McOwen. Partial Differential Equations: methods and applications. Prentice Hall, 1996. L. C. Evans. Partial Differential Equations, volume 19 of Graduate studies in mathematics. American Mathematical Society, 1998. P. D. Hislop and I. M. Sigal. Introduction to spectral theory, Vol. 133 of Applied Mathematical Sciences. Springer Verlag, 1996. S. Gustafsson and I.M. Sigal. Mathematical Concepts of Quantum Mechanics. Springer Verlag, 2003.	

Subject Description Form

Subject Code	AMA 612
Subject Title	Numerical methods for Partial Differential Equations
Credit Value	3
Level	6
Expected background knowledge	A course in Differential Equations and a course in Advanced Calculus
Objectives	This subject is to introduce students to numerical techniques for solving partial differential equations, with applications in physics, engineering, finance and economics.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: - Gain a deep understanding of algorithms of finite difference and finite element methods for solving partial differential equations; - Solve simple partial differential equations numerically; - Gain a basic knowledge of theories of finite difference and finite element methods; - Apply finite difference or finite element methods to solve problems arising in physics, engineering, finance and economics numerically.
Subject Synopsis/ Indicative Syllabus	<i>Finite difference methods:</i> Finite difference methods for model problems, Stability, Consistency, Convergence, Lax equivalent theorem, Error estimates. <i>Finite element methods:</i> Finite element methods for model problems, Interpolation theory in Sobolev Spaces, Conforming finite elements, Error estimates. <i>Time discretization of evolution equations:</i> Parabolic equations and BDF methods, Subdiffusion equations and convolution quadrature, Approximation to nonsmooth solutions.

Teaching/ Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The lectures will be conducted to introduce numerical methods for partial differential equations in the syllabus, which are then reinforced by learning activities involving demonstration, tutorial exercise and assignments.
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Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
			a	b	c	d
	1. CA	40%	✓	✓	✓	✓
	2. Exam	60%	✓	✓	✓	✓
	Total	100 %				
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The subject focuses on knowledge, skill and understanding of <u>Numerical methods for Partial Differential equations, thus, Exam-based assessment</u> is the most appropriate assessment method, including 25% test and 60% examination. Moreover, 15% worth of assignments are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and tests. A written examination is held at the end of the semester.					
Student Study Effort Expected	Class contact:					
	▪ Lecture					26 Hrs.

	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Assignment	36 Hrs.
	▪ Self-study	27 Hrs.
	Total student study effort	102 Hrs.
Reading List and References	J.W. Thomas, Numerical partial differential equations—Finite Difference Methods, Springer, 1995. Randall J. LeVeque, Finite Difference Methods for Ordinary and Partial Differential Equations--Steady State and Time Dependent Problems, SIAM: Society for Industrial and Applied Mathematics, 2007. Philippe G. Ciarlet, The Finite Element Method for Elliptic Problems, SIAM: Society for Industrial and Applied Mathematics; 2nd edition, 2002. O.C. Zienkiewicz and K. Morgan, Finite Element Method, John Wiley, 1983.	

Subject Description Form

Subject Code	AMA613
Subject Title	Mathematics Seminar
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for research students of AMA enrolled for at least six months.
Objectives	The aim of this subject is to provide education on students' oral and written presentations of research results.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Do research on an agreed topic/area/issue. (b) Gain an in-depth understanding of the literature related to topics of interest. (c) Develop written skills for presentation of research results. (d) Develop oral academic communication and presentation skills.
Subject Synopsis/ Indicative Syllabus	Topics presented to be determined by the participants, coordinated by the subject examiner (coordinator).
Teaching/Learning Methodology	Subject lecturer teaches students about both oral and written presentation skills and chairs all students' oral presentations. Students are required to research, develop and deliver a formal presentation using appropriate audiovisual media support and handouts. The presentation assessment tool includes three graded components: content, communication, and organization. The report is expected to include but not limited to problem identification, methodology, solutions, implementation, interpretations, conclusions, and discussions. Students' presentation materials are required to be submitted to the subject lecturer for checking before class.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d		
	1. Two oral presentations	50%	✓	✓		✓		
	2. One research report	50%	✓	✓	✓			
	Total	100 %						
	Selected topics will be presented by the students. Content, communication and organization will be included in assessing the oral presentation of the student; and content and organization will be included in assessing the research report.							
Student Study Effort Required	Class contact:							
	▪ Three lectures					6 Hrs.		
	▪ Presentation of supervised research topic					10 Hrs.		
	▪ Presentation of selected topic					10 Hrs.		
	Other student study effort:					112 Hrs.		
	▪ Self-study					Hrs.		
	Total student study effort					138 Hrs.		
Reading List and References	Bowden, John	Writing a Report: How to Prepare, Write and Present Powerful Reports, 6th ed.					Oxford, 2002	
	Moore, Nick	How to Do Research: a Practical Guide to Designing and Managing Research Projects, 3 rd ed.					London: Facet Pub., 2006	
	Van Emden, Joan	Presentation Skills for Students					Basingstoke: Palgrave Macmillan, 2004	

Subject Description Form

Subject Code	AMA614
Subject Title	Mathematical Statistics
Credit Value	3
Level	6
Expected background knowledge	A course in Probability and Statistics and a course in Advanced Calculus
Objectives	To enable students to have an overview and thorough understanding of the modern mathematical statistics theory.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Use the approach of maximum likelihood to obtain the estimator of parameters of distributions and derive the asymptotic properties of estimators (b) Find the UMVU estimators. (c) Apply the method of pivotal quantity to obtain interval estimates. (d) Use the likelihood ratio principle to construct statistical tests. (e) Find uniformly most powerful tests based on the Neyman-Pearson Lemma.
Subject Synopsis/ Indicative Syllabus	This course is concerned with the fundamental theory of statistical inference. Topics include exponential families of distributions, sufficient statistics, complete statistics, convex loss functions, UMVU estimators, performance of the estimators, maximum likelihood estimation, the information inequality, large-sample comparisons of estimators and asymptotic efficiency.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. The teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of solid mathematical techniques and how the techniques can be applied to solving research and real application problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	e
	1. CA	40	✓	✓	✓	✓	✓
	2. Exam	60	✓	✓	✓	✓	✓
	Total	100 %					
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The subject focuses on knowledge and understanding of Statistical Theory. The Exam-based assessment is the most appropriate assessment method, including tests and examination. Moreover, assignments are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.						
Student Study Effort Expected	Class contact:						
	▪ Lecture					26Hrs.	
	▪ Tutorial					13Hrs.	
	Other student study effort:						
	▪ Assignment					30Hrs.	
	▪ Self-study					61Hrs.	
	Total student study effort					130Hrs.	
Reading List and References	J. Shao, Mathematical Statistics. Springer. 2003.						
	G. Casella and R. L. Berger, Statistical Inference. Second edition, Thomson, 2002.						
	E. Lehmann and G. Casella, Theory of Point Estimation. Second Edition, 1998						
	Ferguson, T. S. A Course in Large Sample Theory. 1996						

Subject Description Form

Subject Code	AMA615
Subject Title	Nonlinear Optimization Methods
Credit Value	3
Level	6
Expected background knowledge	A course in Linear Algebra and a course in Advanced Calculus
Objectives	To enable students to learn to use more advanced mathematical and computational techniques applicable in solving real engineering and management problems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Understand basic theory of nonlinear optimization. (b) Solve unconstrained optimization problems. (c) Solve constrained optimization problems.
Subject Synopsis/ Indicative Syllabus	I. Unconstrained Optimization 1.1 First, second order optimality conditions Convex optimization 1.2 First order methods Steepest descent methods, Conjugate gradient methods, Trust region methods 1.3 Second order methods Newton methods, Quasi-Newton methods, Trust region Newton methods 1.4 Non-differentiable objective function First order optimality condition, Proximal point methods, Smoothing methods II. Constrained Optimization 2.1 First, second order optimality conditions, KKT conditions, Constraint Qualification 2.2 Penalty methods 2.3 Augmented Lagrangian methods (ALM) 2.4 Alternating direction method of multipliers (ADMM) III. Optimization methods in Data Science 3.1 Least absolute shrinkage and selection operator (Lasso), Semi-smooth Newton methods 3.2 Folded concave penalized estimation, Difference-convex (DC) optimization methods 3.3 Non-Lipschitz regularization, Smoothing methods 3.4 Composite nonsmooth nonconvex optimization in deep learning
Teaching/Learning	The subject will be delivered mainly through lectures and tutorials. The

Methodology	teaching and learning approach is mainly problem-solving oriented. The approach aims at the development of mathematical techniques and how the techniques can be applied to solving problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating and applying theories to practice.																															
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr> <tr> <th>a</th><th>b</th><th>c</th></tr> </thead> <tbody> <tr> <td>1. Assignments</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>2. Mid-term test</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>3. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td></tr> <tr> <td>Total</td><td>100 %</td><td colspan="3"></td></tr> </tbody> </table> Continuous Assessment comprises of assignments and a mid-term test. A written examination is held at the end of the semester.				Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			a	b	c	1. Assignments	20%	✓	✓	✓	2. Mid-term test	20%	✓	✓	✓	3. Examination	60%	✓	✓	✓	Total	100 %			
Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)																														
		a	b	c																												
1. Assignments	20%	✓	✓	✓																												
2. Mid-term test	20%	✓	✓	✓																												
3. Examination	60%	✓	✓	✓																												
Total	100 %																															
Student Study Effort Required	Class contact:																															
	▪ Lecture		26 Hrs.																													
	▪ Tutorial		13 Hrs.																													
	Other student study effort:																															
	▪ Assignment		23 Hrs.																													
	▪ Self-study		40 Hrs.																													
	▪ Total student study effort		102 Hrs.																													
Reading List and References	Fletcher, R.	Practical Methods of Optimization, 2nd Edition	Wiley, 1987																													
	Nocedal, J. and Wright, S.J.	Numerical Optimization, 2nd Edition	Springer, 2006																													
	Dennis, J.E. and Schnabel, R.B.	Numerical Methods for Unconstrained Optimization and Nonlinear Equations	SIAM, 1996																													
	Mangasarian, O.L.	Nonlinear Programming	SIAM, 1994																													
	Rockafellar, R.T.	Convex Analysis	Princeton University Press, 1970																													
	Facchinei, F. and Pang, J-S.	Finite-Dimensional Variational Inequalities and Complementarity Problems	Springer, 2003																													

Subject Description Form

Subject Code	AMA 616
Subject Title	Statistics for Finance
Credit Value	3
Level	6
Expected background knowledge	A course in Statistical Analysis and a course in Advanced Calculus
Objectives	To give a comprehensive introduction into important ideas of financial mathematics and statistics for the modelling and statistical analysis of financial data.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a. Gain a deep understanding of option pricing model and financial time series; b. Solve simple option pricing problems numerically; c. Carry out basic statistical analysis on financial data; d. Apply option pricing theory to model new financial products and various statistical models to model the financial time series.
Subject Synopsis/ Indicative Syllabus	<i>Option pricing theory</i> Derivatives, Arbitrage, Wiener process, binomial processes, geometric random walks, stochastic integrals, Ito's Lemma, Black-Scholes model, hedging. European options, Binomial model, Cox-Ross-Rubinstein approach. American options, arbitrage relationship, trinomial model, numerical techniques, applications

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Assignment	36 Hrs.
	▪ Self-study	27 Hrs.
	Total student study effort	102 Hrs.
Reading List and References	J. Franke, W. Hardle and C.M. Hafner, Statistics of Financial Markets, 3rd Edition, 2012. P.J. Wilmott, Quantitative Finance, John Wiley & Sons Ltd., 2007. J.C. Hull, Options, Futures , and Other Derivatives, 8th Edition, Prentice Hall, 2012. C. Chatfield, The Analysis of Time Series: an introduction, 6th Edition, Chapman & Hall/CRC, 2003. J.D. Cryer and K.S. Chan, Time Series Analysis with Applications in R, 2nd Edition, Springer, 2008. R.S. Tsay, Analysis of financial time series, 3rd edition, Wiley, 2010.	

Subject Description Form

Subject Code	AMA617
Subject Title	Optimal Stopping and Stochastic Control in Mathematical Finance
Credit Value	3
Level	6
Pre-requisite/ Co-requisite/ Exclusion	A course in stochastic calculus and a course in partial differential equations
Objectives	This subject is to introduce students to the fundamental theory of optimal stopping and stochastic control in finance.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: a. Gain a deep understanding of the American option pricing model, portfolio selection problems with and without market frictions, and capital structure models. b. Learn how to conduct theoretical analysis for optimal stopping time problems and singular stochastic control problems; c. Gain a basic knowledge of the finite difference method for HJB equations arising from finance.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	American option pricing, Merton's model, dynamic mean-variance analysis, Merton's model with transaction costs, and Merton's problem with capital gains taxes, capital structure, time-inconsistency, optimal stopping problems, stochastic control, singular control, impulse control, HJB equations, viscosity solutions, variational inequality equations, numerical solutions, etc.
Teaching/Learning Methodology <i>(Note 3)</i>	The subject will be delivered mainly through lectures and tutorials. Assignments and projects will be also given.

Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>1. CA</td><td>50%</td><td>√</td><td>√</td><td>√</td></tr><tr><td>2. Exam</td><td>50%</td><td>√</td><td>√</td><td>√</td></tr><tr><td>Total</td><td>100%</td><td colspan="3"></td></tr></table> Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The subject focuses on knowledge and understanding of optimal stopping and stochastic control problems arising from finance. A final exam (50%) is an appropriate way to examine students’ learning effect. Continuous Assessment (50%) comprises of assignments and projects, which are designed to evaluate students’ progress.					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			a	b	c	1. CA	50%	√	√	√	2. Exam	50%	√	√	√	Total	100%			
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2. Exam	50%	√	√	√																								
Total	100%																											
Student Study Effort Expected	Class contact:																											
	▪ Lecture		26 Hrs.																									
	▪ Tutorial		13 Hrs.																									
	Other student study effort:																											
	▪ Assignment/ mini-project		36Hrs.																									
	▪ Self-study		36Hrs.																									
	Total student study effort		111Hrs.																									
Reading List and References	1. Fleming, W. H., and Soner, H. M. (2006). Controlled Markov Processes and Viscosity Solutions. Springer Science & Business Media. 2. Huyen Pham (2010). Continuous-time Stochastic Control and Optimization with Financial Applications, Springer. 3. Steven E. Shreve (2004). Stochastic Calculus for Finance, Volume II: Continuous-Time Models. Springer-Verlag, New York. 4. Jiongmin Yong and Xun Yu Zhou (1999). Stochastic Controls: Hamiltonian Systems and HJB Equations. Springer-Verlag, New York.																											

Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

Subject Description Form

Subject Code	AMA618
Subject Title	Advanced Topics in Applied Mathematics
Credit Value	3
Level	6
Expected background knowledge	A course in calculus, linear algebra, and basic functional analysis
Objectives	This subject is to introduce students to some advanced topics in applied mathematics.
Intended Learning Outcomes <i>(Note 1)</i>	Upon completion of the subject, students will be able to: a. Learn how to use generalized functions, Fourier transform, singular integrals, Sobolev spaces, and related concepts; b. Learn how to use Laplace transform and semigroup theory to study time-dependent partial differential equations; c. Learn how to construct numerical approximations by using Laplace transform and semigroup techniques.
Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	Banach spaces, generalized functions, Fourier transform, Fourier multipliers, singular integrals, Sobolev spaces, Laplace transform, second-order elliptic equations, heat equation, subdiffusion equation
Teaching/Learning Methodology <i>(Note 3)</i>	The subject will be delivered mainly through lectures and tutorials. Assignments and projects will be also given.

Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>1. CA</td><td>50%</td><td>√</td><td>√</td><td>√</td></tr><tr><td>2. Exam</td><td>50%</td><td>√</td><td>√</td><td>√</td></tr><tr><td>Total</td><td>100%</td><td colspan="3"></td></tr></table>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			a	b	c	1. CA	50%	√	√	√	2. Exam	50%	√	√	√	Total	100%			
	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)																									
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	1. CA	50%	√	√	√																							
	2. Exam	50%	√	√	√																							
	Total	100%																										
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:																												
The subject focuses on knowledge, skill and understanding of advanced topics in applied mathematics. Thus exam-based assessment is the most appropriate assessment method, including 30% mid-term test and 50% examination. Moreover, 20% worth of assignments are included as a component of continuous assessment so as to keep the students in progress. Continuous Assessment comprises of assignments and tests. A written examination is held at the end of the semester.																												
Student Study Effort Expected	Class contact:																											
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Reading List and References	1. Todd Arbogast and Jerry L. Bona: Methods of Applied Mathematics. Lecture notes, Department of Mathematics, The University of Texas at Austin. 2. L. C. Evans: Partial Differential Equations. American Mathematical Society, second edition, 2010.																											

Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

Subject Description Form

Subject Code	AMA619
Subject Title	Advanced Mathematical Statistics
Credit Value	3
Level	6
Pre-requisite	A course in college calculus, college linear algebra, and basic mathematical statistics
Objectives	The objectives of this course are to introduce the most important and modern methods and theory in mathematical statistics and provide systematic theoretical training to graduate students who are interested in pursuing a PhD degree in statistics and related fields.
Intended Learning Outcomes (Note 1)	Upon completion of the subject, students will be able to: - Have a systematic understanding of the basic theory and methods of modern mathematical statistics. - Acquire the ability and skill to critically read the theoretical statistics literature. - Develop skills to develop formal arguments for providing theoretical justifications to a statistical method. - Be well prepared for conducting methodological and applied research in statistics and the related fields.
Subject Synopsis/ Indicative Syllabus (Note 2)	- Convergence of random vectors: basic convergence concepts, laws of large numbers and central limit theorems, delta-method. - Estimation Methods: moment estimators, maximum likelihood estimators, M- and Z-estimators. - Some basic results from empirical process theory: stochastic convergence in metric spaces, Glivenko-Cantelli and Donsker classes, applications to M- and Z-estimators. - Comparisons of estimators, contiguity, local asymptotic normality, relative efficiency of estimators. - Selected topics in high-dimensional statistics: Lasso and related methods, non-asymptotic error bounds, debiased Lasso, hypothesis testing in high-dimensional models.

Teaching/Learning Methodology (Note 3)	The subject will be delivered mainly through lectures and tutorials, and class discussions, questions, and answers. Additional reading of relevant books and research papers will be encouraged. The teaching and learning approach are mainly problem-solving oriented. The approach aims at the development of statistical learning methods, theories, and algorithms and how they can be applied to solving research and real application problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating, and applying theories to practice.						
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	
	Assignment	20%	✓		✓	✓	
	Quiz	20%	✓		✓		
	Projects	60%	✓	✓	✓	✓	
	Total	100%					
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Assignment: assessment of the understanding the basic concepts and the ability for self-learning by acquiring knowledge from published works and online information. Quiz: assessment of the ability for comprehension of fundamental concepts, principles, algorithms, and theories by providing answers to given questions. Project: assessment of the ability for developing methods and algorithms for solving practical problems. The results will be presented in written reports and oral presentations.						
Student Study Effort Expected	Class contact:						
	▪ Lectures					26 Hrs.	
	▪ Tutorials					13 Hrs.	
	Other student study effort:						
	▪ Assignment					30 Hrs.	

	▪ Self-study	61 Hrs.
	Total student study effort	130 Hrs.
Reading List and References	• Lehmann, E. and Casella, G. (1998). Theory of Point Estimation. Springer, New York. • Van der Vaart, A. W. (2007). Asymptotic Statistics. Cambridge University Press. • Van der Vaart A. W. and Wellner, J. A. (1996). Weak Convergence and Empirical Processes. Springer, New York. • Wainright, M. (2019). High-Dimensional Statistics: A Non-Asymptotic Viewpoint. Cambridge University Press. • Vershynin, V. (2018). High-Dimensional Probability: An Introduction with Applications in Data Science. Cambridge University Press.	

Subject Description Form

Subject Code	AMA620
Subject Title	Advanced Statistical Learning
Credit Value	3
Level	6
Pre-requisite	A course in college calculus, college linear algebra, and basic mathematical statistics
Objectives	The objectives of this course are to introduce the most important and modern methods, theory and algorithms in statistical learning and provide a solid foundation for graduate students who are interested in working in data science and related fields.
Intended Learning Outcomes (Note 1)	Upon completion of the subject, students will be able to: - Have a good understanding of the basic theory and methods of modern statistical learning. - Know how to assess statistical uncertainties for conclusions based on data and statistical analysis. - Develop and implement new methods that are appropriate for specific data problems in applications. - Be well prepared for conducting methodological and applied research in statistical learning and the related fields.
Subject Synopsis/ Indicative Syllabus (Note 2)	Introduction Overview of statistical learning Review of nonparametric statistics Review of high-dimensional statistics Deep Neural Networks Deep neural network functions Nonparametric regression using deep neural networks Approximation properties of deep neural networks Empirical process theory for stochastic error analysis Error analysis for deep nonparametric regression Distribution Learning Nonparametric density estimation Generative learning: GANs, VAE

	Diffusion models Error analysis for distribution learning Applications Conditional Distribution Learning Nonparametric conditional density estimation Conditional generative learning Supervised learning Semi-supervised learning Prediction: conformal prediction Error analysis for conditional distribution learning Applications Learning and Optimization Difference between learning and optimization Challenges in neural network optimization Stochastic gradient descent Representation learning (time permitting) Supervised representation learning Self-supervised learning Applications: Transfer learning and domain adaptation
Teaching/Learning Methodology <i>(Note 3)</i>	The subject will be delivered mainly through lectures and tutorials, and class discussions, questions, and answers. Additional reading of relevant books and research papers will be encouraged. The teaching and learning approach are mainly problem-solving oriented. The approach aims at the development of statistical learning methods, theories, and algorithms and how they can be applied to solving research and real application problems. Students are encouraged to adopt a deep study approach by employing high level cognitive strategies, such as critical and evaluative thinking, relating, integrating, and applying theories to practice.

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
		a	b	c	d	
Assignment	20%	✓			✓	
Quiz	20%	✓	✓			
Projects	60%	✓	✓	✓	✓	
Total	100%					

Assignment: assessment of the understanding the basic concepts and the ability for self-learning by acquiring knowledge from published works and online information.

Quiz: assessment of the ability for comprehension of fundamental concepts, principles, algorithms, and theories by providing answers to given questions.

Project: assessment of the ability for developing methods and algorithms for solving practical problems. The results will be presented in written reports and oral presentations.

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Assignment	30 Hrs.
▪ Self-study	61 Hrs.
Total student study effort	130 Hrs.

- Anthony, M. and Bartlett, P. L. (2009). Neural Network Learning: Theoretical Foundations. Cambridge University Press, Cambridge.
- Bishop, C. (2006). Pattern Recognition and Machine Learning. Springer.
- Boucheron, S., Lugosi, G., and Massart, P. (2013). Concentration Inequalities: A Nonasymptotic Theory of Independence. Oxford University Press.
- Hastie, T., Tibshirani, R. and Friedman, J. (2009). The Elements of Statistical Learning, 2nd Ed., Springer.

	• Hastie, T., Tibshirani, R., and Wainright, M. (2015), Statistical Learning with Sparsity: The Lasso and Generalizations, Chapman and Hall. • Mohri, Mehryar; Rostamizadeh, Afshin; Talwalkar, Ameet (2012). Foundations of Machine Learning. USA, Massachusetts: MIT Press. • Ian Goodfellow, Yoshua Bengio and Aaron Courville (2017). Deep Learning. The MIT Press, Cambridge, MA. • Van der Vaart A. W. and Wellner, J. A. (1996). Weak Convergence and Empirical Processes. Springer, New York.
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Subject Description Form

Subject Code	AMA621
Subject Title	Sobolev spaces and partial differential equations
Credit Value	3
Level	6
Expected background knowledge	Real analysis, Functional analysis, Basic knowledge of Ordinary and Partial Differential Equations would be helpful. Some concepts will be reviewed in the lecture when necessary.
Objectives	To enable students to be familiar with important aspects of modern partial differential equations. The knowledge will be useful to those who will work with PDE on the theoretical or numerical side.
Intended Learning Outcomes	Upon satisfactory completion of the subject, students should be able to: a. Understand Sobolev spaces and use the related theories to study PDEs. b. Understand weak derivatives and analyse the regularity of weak solutions to elliptic and parabolic equations. c. Use Lax-Milgram theorem/Galerkin method and prove the existence and uniqueness of weak solutions.
Subject Synopsis/ Indicative Syllabus	<i>Sobolev spaces:</i> Weak derivatives, Sobolev spaces, Sobolev inequalities, Trace, Rellich-Kondrachov compactness. <i>Elliptic equations</i> Weak solutions of elliptic boundary value problems, Lax-Milgram theorem, regularity, spectral theory. <i>Parabolic equations</i> Weak solutions, Galerkin methods, Regularity.
Teaching/Learning Methodology	The subject will be delivered mainly through lectures and tutorials. Tutorials will be spent answering questions, reviewing some background material, and going over tutorial questions that are related to assignment.

Assessment Methods in Alignment with Intended Learning Outcomes	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
			a	b	c
	1. Assignments	20%	✓	✓	✓
	2. Mid-term test	30%	✓	✓	✓
	3. Final exam	50%	✓	✓	✓
	Total	100%			
Student Study Effort Required	Class contact:				
	▪ Lecture			26 Hrs.	
	▪ Tutorial			13 Hrs.	
	Other student study effort:				
	▪ Assignment			31 Hrs.	
	▪ Self-study			60 Hrs.	
	▪ Total student study effort			130 Hrs.	
Reading List and References	1. L.C. Evans, Partial Differential Equations, vol. 19 of Graduate studies in Mathematics, American Mathematical Society, 1998. 2. H. Brezis, Functional analysis, Sobolev spaces, and partial differential equations.				

Subject Description Form

Subject Code	AMA67711																																												
Subject Title	Research Seminars																																												
Credit Value	1																																												
Level	6																																												
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for research students of AMA																																												
Objectives	The aim of this subject is to provide students with the opportunity to learn the latest advances in Applied Mathematics and facilitate communications with experts in the field.																																												
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Gain a good understanding of different advanced topics. (b) Learn oral academic communication and presentation skills.																																												
Subject Synopsis/ Indicative Syllabus	Seminars to be attended are determined by the students and chief supervisors.																																												
Teaching/Learning Methodology	Students are required to attend at least 10 research seminars per year, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year. Part-time students are required to attend at least 10 research seminars per two years, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years. Chief Supervisors are required to assess the report (with a pass or failure grade). Students who failed to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained.																																												
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 30%;">Specific assessment methods/tasks</th><th rowspan="2" style="width: 10%;">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr> <tr> <th style="width: 5%;">a</th><th style="width: 5%;">b</th><th style="width: 5%;"></th><th style="width: 5%;"></th><th style="width: 5%;"></th><th style="width: 5%;"></th></tr> </thead> <tbody> <tr> <td>1. Attend 10 research seminars</td><td style="text-align: center;">80%</td><td style="text-align: center;">✓</td><td style="text-align: center;">✓</td><td></td><td></td><td></td><td></td></tr> <tr> <td>2. One report on one of the attended seminars</td><td style="text-align: center;">20%</td><td style="text-align: center;">✓</td><td style="text-align: center;">✓</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Total</td><td style="text-align: center;">100 %</td><td colspan="6"></td></tr> </tbody> </table>							Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b					1. Attend 10 research seminars	80%	✓	✓					2. One report on one of the attended seminars	20%	✓	✓					Total	100 %						
Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)																																											
		a	b																																										
1. Attend 10 research seminars	80%	✓	✓																																										
2. One report on one of the attended seminars	20%	✓	✓																																										
Total	100 %																																												

Subject Description Form

Subject Code	AMA67712																																												
Subject Title	Research Seminars																																												
Credit Value	1																																												
Level	6																																												
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for research students of AMA																																												
Objectives	The aim of this subject is to provide students with the opportunity to learn the latest advances in Applied Mathematics and facilitate communications with experts in the field.																																												
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Gain a good understanding of different advanced topics. (b) Learn oral academic communication and presentation skills.																																												
Subject Synopsis/ Indicative Syllabus	Seminars to be attended are determined by the students and chief supervisors.																																												
Teaching/Learning Methodology	Students are required to attend at least 10 research seminars per year, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year. Part-time students are required to attend at least 10 research seminars per two years, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years. Chief Supervisors are required to assess the report (with a pass or failure grade). Students who failed to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained.																																												
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Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)																																											
		a	b																																										
1. Attend 10 research seminars	80%	✓	✓																																										
2. One report on one of the attended seminars	20%	✓	✓																																										
Total	100 %																																												

Subject Description Form

Subject Code	AMA67713																																						
Subject Title	Research Seminars																																						
Credit Value	1																																						
Level	6																																						
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for research students of AMA																																						
Objectives	The aim of this subject is to provide students with the opportunity to learn the latest advances in Applied Mathematics and facilitate communications with experts in the field.																																						
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Gain a good understanding of different advanced topics. (b) Learn oral academic communication and presentation skills.																																						
Subject Synopsis/ Indicative Syllabus	Seminars to be attended are determined by the students and chief supervisors.																																						
Teaching/Learning Methodology	Students are required to attend at least 10 research seminars per year, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year. Part-time students are required to attend at least 10 research seminars per two years, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years. Chief Supervisors are required to assess the report (with a pass or failure grade). Students who failed to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained.																																						
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr> <tr> <th>a</th><th>b</th><th></th><th></th><th></th><th></th></tr> </thead> <tbody> <tr> <td>1. Attend 10 research seminars</td><td>80%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr> <tr> <td>2. One report on one of the attended seminars</td><td>20%</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> </tbody> </table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b					1. Attend 10 research seminars	80%	✓	✓					2. One report on one of the attended seminars	20%	✓	✓					Total	100 %						
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		a	b																																				
1. Attend 10 research seminars	80%	✓	✓																																				
2. One report on one of the attended seminars	20%	✓	✓																																				
Total	100 %																																						

Subject Description Form

Subject Code	AMA67714																																												
Subject Title	Research Seminars																																												
Credit Value	1																																												
Level	6																																												
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for research students of AMA																																												
Objectives	The aim of this subject is to provide students with the opportunity to learn the latest advances in Applied Mathematics and facilitate communications with experts in the field.																																												
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Gain a good understanding of different advanced topics. (b) Learn oral academic communication and presentation skills.																																												
Subject Synopsis/ Indicative Syllabus	Seminars to be attended are determined by the students and chief supervisors.																																												
Teaching/Learning Methodology	Students are required to attend at least 10 research seminars per year, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year. Part-time students are required to attend at least 10 research seminars per two years, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years. Chief Supervisors are required to assess the report (with a pass or failure grade). Students who failed to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained.																																												
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		a	b																																										
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2. One report on one of the attended seminars	20%	✓	✓																																										
Total	100 %																																												

Subject Description Form

Subject Code	AMA67721																														
Subject Title	Practicum																														
Credit Value	1																														
Level	6																														
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for PhD students of AMA																														
Objectives	The aim of this subject is to provide students with the opportunity to engage in teaching / research supporting activities in AMA.																														
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) Gain an understanding of teaching activities. (b) Learn to support organized research activities.																														
Subject Synopsis/ Indicative Syllabus	Teaching/research supporting activities are assigned by the HoD or his/her delegate.																														
Teaching/Learning Methodology	To earn one credit, students will be required to engage in teaching/research supporting activities assigned by the HoD or his/her delegate for 6 hours/week in any 13-week semester. The HoD or his/her delegate is required to: a. ensure that the activities are structured and can be assessed properly; b. submit, at the end of the training session, an assessment report on the performance of the relevant student(s), with details of activities undertaken and an overall assessment grade of Pass or Fail.																														
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1. Undertake teaching/research supporting activities	100%	✓	✓																												

Subject Description Form

Subject Code	AMA67722																																				
Subject Title	Practicum																																				
Credit Value	1																																				
Level	6																																				
Pre-requisite / Co-requisite/ Exclusion	A compulsory subject for PhD students of AMA																																				
Objectives	The aim of this subject is to provide students with the opportunity to engage in teaching / research supporting activities in AMA.																																				
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Student Study Effort Required	Class contact:	
	• Lecture/seminar/workshop/oral presentation	16 Hrs.
	Other student study efforts:	
	• Self-study and group work	27.5 Hrs.
	• Assignment preparation	15 Hrs.
	Total student study effort	58.5 Hrs.
Reading List and References	Materials from the Hong Kong Ethics development website (http://www.icac.org.hk/hkedc/eng/library2.asp) Materials from EthicsWeb.ca (http://www.ethicsweb.ca/resources/professional/issues.html)	

07.2015

	Selected readings and videos Declaration of Helsinki (revised 2008)
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/ Indicative Syllabus

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

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC6011
Subject Title	Presentation Skills for Research Students
Credit Value	2
Level	6
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject is designed to improve research students' academic speaking proficiency, enhance their awareness of academic conventions during an academic discussion/presentation, and develop their skills in using clear, appropriate, persuasive and analytical language for their delivery of effective academic presentations.
Intended Learning Outcomes (Note 1)	Upon completion of the subject, students will be able to: a. organise academic presentations logically by following academic conventions b. present research contribution by critically analysing previous research; c. use clear, appropriate, persuasive and analytic language for presentations at seminars, conferences and viva; and d. defend research logically, critically, and persuasively.
Subject Synopsis/ Indicative Syllabus (Note 2)	1. Critical analysis of prior research Understanding academic presentation process and the structure; identifying language features appropriate for academic speaking settings. 2. Awareness of academic conventions Developing awareness of citation practices, and language use adopted in the related disciplines. 3. Inter and intra section connections Using effective signpost language to organize and connect different parts of an academic presentation. 4. Clear, appropriate, persuasive, and analytical language use Summarising, evaluating, and citing sources; describing and discussing research data; objectively evaluating research contribution.

Teaching/Learning Methodology (Note 3)	The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input, class discussion both formally and informally, and presentations both individually and in groups. Elements of the flipped classroom are integrated in the subject delivering. Peer feedback, self-reflection and critique of student presentations are also an important part of the instructional scaffolding.							
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			a	b	c	d		
	Presenting an effective introduction and literature review - video submission	40%	✓	✓	✓			
	Delivering an effective research presentation – in-class individual presentation	60%	✓	✓	✓	✓		
	Total	100%						
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Presenting an effective Introduction and Literature review of a study is most challenging for research students. To help them develop related skills, the subject requires that students present the Introduction and Literature review sections only in Assessment 1. This presentation will be submitted as a short video and thus allows students multiple attempts during the delivery process. After teacher feedback, peer feedback and self-reflection on the performance of Assessment 1, students are better prepared for a full presentation of a research paper required for Assessment 2.							
Student Study Effort Expected	Class contact:							
	▪ Seminars					20 Hrs.		
	▪ Assessment					6 Hrs.		
	Other student study effort:							
	▪ Self-study/preparation for assessments					52 Hrs.		
	▪ Total student study effort					78 Hrs.		
Reading List and References	<u>Course material</u>							

	Learning materials tailor-made for research students by the English Language Centre. <u>Online Videos:</u> BBC Learning English. (2017). <i>Tim's pronunciation workshop</i>. Retrieved from http://www.bbc.co.uk/learningenglish/english/features/pronunciation Practical Psychology (2017, Jan 16). <i>How to give a great presentation: 7 presentation skills and tips to leave an impression</i> [Video file]. Retrieved from https://www.youtube.com/watch?v=MnIPpUiTcRc University of Melbourne (2015, Mar 11). <i>Academic skills: Presenting effectively Part 1 – 5 things you should know about presenting and organizing your talk</i> [Video file]. Retrieved from https://www.youtube.com/watch?v=qFLL-XB56UU University of Melbourne (2015, Mar 11). <i>Academic skills: Presenting effectively Part 2 – Engaging the audience</i> [Video file]. Retrieved from https://www.youtube.com/watch?v=lo9xOV6WUqM University of Melbourne (2015, Mar 11). <i>Academic skills: Presenting effectively Part 3 – Effective visuals and PowerPoint slides</i> [Video file]. Retrieved from https://www.youtube.com/watch?v=O-D9fZN01yk <u>Selected Websites</u> Dryden, A. (2013, April 20). <i>What you need to know about speaking at conferences</i>. Retrieved from https://www.ashedryden.com/blog/what-you-need-to-know-about-speaking-at-conferences Hayward, A. (2017). <i>9 Tips for presenting at an academic conference</i>. Retrieved from https://www.editage.com/insights/9-tips-for-presenting-at-an-academic-conference Johnson, C. D. (2007). <i>Rules for a better PhD dissertation and oral defense</i>. Retrieved from http://cns-alumni.bu.edu/~djohnson/dissertation_rules.html Lakdawalla, E. (2018). <i>Speak your science: How to give a better conference talk</i>. Retrieved from http://www.planetary.org/blogs/emily-lakdawalla/2018/0206-speak-your-science.html
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Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4:Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	ELC6012
Subject Title	Thesis Writing for Research Students
Credit Value	3
Level	6
Pre-requisite/ Co-requisite/ Exclusion	ELC6011
Objectives	This subject aims to improve research students' academic writing proficiency, enhance their understanding of the academic audience, develop their awareness of academic conventions, and develop their skills in using clear, appropriate, persuasive, and analytical language in thesis writing.
Intended Learning Outcomes (Note 1)	Upon completion of the subject, students will be able to present their research effectively in a thesis through: - presenting the study clearly, appropriately and concisely in the Abstract; - providing the Introduction analytically; - reviewing the literature critically; - analysing the appropriateness of the methodology used in the study, - reporting and discussing the findings of the study; and - discussing the significance of the study in the Conclusion. To achieve the above outcomes, students are expected to use language, text structures, and cohesive devices appropriate to the academic audience, select and present information analytically, concisely and appropriately, examine and cite sources critically, and analyse the impact and significance of the research persuasively.
Subject Synopsis/ Indicative Syllabus (Note 2)	- Critical analysis of prior research Understanding research thesis writing process and the structure of a thesis; identifying language features of thesis writing. - Awareness of academic conventions Developing awareness of citation practices, referencing format and language use adopted in the related disciplines. - Inter and intra paragraphing connections Using effective cohesive devices to plan, organize and connect different parts of a research thesis.

	4. Clear, appropriate, persuasive and analytical language use Summarising, evaluating and citing sources; describing and discussing research data; objectively evaluating research contribution; writing, revising, and proofreading written texts.																																														
Teaching/Learning Methodology (Note 3)	The study method is primarily seminar-based. Activities include teacher input as well as individual and group work involving writing practice, evaluation of texts, mini-presentations and discussions. Practical work will involve analysing texts such as journal articles and research theses that are relevant to students’ research areas. Students will be provided with opportunities to apply the language skills acquired to the preparation of their own thesis. Students will be referred to information on the Internet and the ELC’s Centre for Independent Language Learning. Learning materials developed by the English Language Centre are used throughout this course. Additional reference materials will be recommended as required.																																														
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	<table><tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th></tr><tr><td>1. Writing an introduction for a research study (draft)</td><td>20%</td><td></td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr><tr><td>2. Writing an introduction for a research study (final)</td><td>30%</td><td></td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr><tr><td>3. Developing an e-Portfolio for thesis writing</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr></table> Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Assessments 1 and 2 assess students’ abilities to write an effective introduction for their own research study. The assessments require that students introduce the background, rationale and objectives of their research, review the literature and establish the niche in their research area, and describe the methods used in their study to occupy the niche (ref. LOs (b), (c) and (d)). Assessment 3 requires that students collect learning materials that are conducive to their writing-up of a research thesis, and provide annotated thesis excerpts to illustrate their understanding of the structure and language use specific to each thesis chapter (ref. LOs (a) to (f)).	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c	d	e	f	1. Writing an introduction for a research study (draft)	20%		✓	✓	✓			2. Writing an introduction for a research study (final)	30%		✓	✓	✓			3. Developing an e-Portfolio for thesis writing	50%	✓	✓	✓	✓	✓	✓	Total	100 %						
Specific assessment methods/tasks	% weighting			Intended subject learning outcomes to be assessed (Please tick as appropriate)																																											
		a	b	c	d	e	f																																								
1. Writing an introduction for a research study (draft)	20%		✓	✓	✓																																										
2. Writing an introduction for a research study (final)	30%		✓	✓	✓																																										
3. Developing an e-Portfolio for thesis writing	50%	✓	✓	✓	✓	✓	✓																																								
Total	100 %																																														

	In addition to the three assessments, students are required to complete further language training through out-of-class collocation practice, short in-class writing tasks and language practices in the course handouts.	
Student Study Effort Expected	Class contact:	
	▪ Seminars	39 Hrs.
	Other student study effort:	
	▪ Self-study and preparation for assessments	78 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	<u>Course material</u> Learning materials developed by the English Language Centre <u>Recommended references</u> Cooley, L., & Lewkowicz, J. (2003). <i>Dissertation writing in practice: Turning ideas into text</i>. Hong Kong: Hong Kong University Press. Cooksey, R. W., & McDonald, G. (2019). <i>Surviving and thriving in postgraduate research</i> (Second edition). Singapore: Springer Singapore. Feak, C. B., & Swales, J. M. (2009). <i>Telling a research story: Writing a literature review</i>. University of Michigan Press. Felix, M. S., & Smith, I. (2019). <i>A practical guide to dissertation and thesis writing</i>. UK: Cambridge Scholars Publishing. Kornuta, H. M., & Germaine, R. W. (2019). <i>A concise guide to writing a thesis or dissertation: Educational research and beyond</i> (Second edition). Abingdon, Oxon: Routledge. Oliver, P. (2013). <i>Writing your thesis (Third Edition)</i>. London: Sage. Paltridge, B., & Starfield, S. (2020). <i>Thesis and dissertation writing in a second language : a handbook for students and their supervisors</i> (Second edition). Abingdon, Oxon: Routledge. Swales, J. M., & Feak, C. B. (2004). <i>Academic writing for graduate students: Essential tasks and skills</i> (Second Edition). Ann Arbor, MI: University of Michigan Press.	

Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

(Form AR 140) 8.2020

The Hong Kong Polytechnic University

Subject Description Form

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

Subject Code	ENGL6016
Subject Title	Advanced Academic English for Research Students: Publishing and Presenting
Credit Value	3
Level	6
Pre-requisite/ Co-requisite/ Exclusion	None
Objectives	The objective of the subject is to enable research postgraduate students to publish successfully in international journals and deliver effective conference presentations. This is achieved by equipping students with the essential English language skills and linguistic knowledge to effectively communicate the background, rationale, findings, and significance of their research. Students will be guided systematically to (1) improve their academic English; (2) acquire and apply knowledge of the generic and linguistic features of conference presentations and research articles; and (3) increase the persuasiveness of their spoken and written discourse. The primary focus will be on writing research articles.
Intended Learning Outcomes (Note 1)	Upon completion of the subject, students will be able to: a. Be familiar with the differences between spoken and written academic English; b. Analyze and apply generic structures and linguistic features in research writing; c. Write research articles in clear, accurate and appropriate English; d. Prepare articles for publication in light of comments from editors and reviewers; e. Structure and deliver clear and persuasive presentations in English.
Subject Synopsis/ Indicative Syllabus (Note 2)	Part 1 – Publishing in international journals: (2/3) ▪ Interacting with readers; ▪ Writing effective introductions and literature reviews; ▪ Describing research methods; ▪ Discussing the implications and significance of the findings; ▪ Drawing conclusions; ▪ Writing abstracts; and ▪ Addressing editors’ and reviewers’ comments. Part 2 – Delivering an effective conference presentation: (1/3) ▪ Structuring and delivering conference presentations in clear and appropriate academic English; ▪ Interacting with an audience and responding to questions.

Teaching/Learning Methodology (Note 3)	A learner-centered and highly interactive mode of teaching will be adopted. Students will engage in activities where they can share their experience and concerns, put forth their own thinking and comment on each other’s research ideas, and critique each other’s academic writings. Students will be encouraged and guided to discover for themselves the various language linguistic and generic features of successful presentations and academic writing through intellectually challenging tasks.						
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)				
			a	b	c	d	e
	1. Individual presentation	30%	✓	✓	✓		
	2. Term paper	50%			✓	✓	✓
	3. Class participation	20%	✓	✓	✓	✓	✓
	Total	100 %					
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: <u>Individual presentation</u> Students will prepare a 15-minute conference presentation in which they demonstrate their ability to use appropriate academic English and engage effectively with the audience. <u>Term paper</u> This assignment requires students to critique a research article to demonstrate their knowledge of the generic and linguistic features of research articles. Their ability to present ideas and arguments coherently and persuasively using appropriate academic English will also be assessed. The term paper could be in the form of a research article from the student’s field. <u>Class participation</u> Students’ active participation and engagement with the learning activities will be part of the assessment of the subject.						

Student Study Effort Expected	Class contact:	
	▪ Interactive lectures	39 Hrs.
	▪	Hrs.
	Other student study effort:	
	▪ Reading	42 Hrs.
	▪ Preparation for assignments	30 Hrs.
	Total student study effort	111 Hrs.
Reading List and References	Hyland, K. (2006). English for Academic Purposes: An Advanced Resource Book. Oxon; New York: Routledge. Jalongo, M., and Machado, C. (2016). Making effective presentations at professional conferences: a guide for teachers, graduate students and professors. Cham: Springer. Kline, J. A. (2004). Speaking Effectively: Achieving Excellence in Presentations, Upper Saddle River, N.J.: Pearson/Prentice Hall. Reinhart, S. M. (2002). Giving Academic Presentations, Ann Arbor, Michigan: University of Michigan Press. Strunk, W. & White, E.B. (2000) The Elements of Style, New York: Pearson. Swales, J. & Christine, F. (2012). Academic writing for graduate students: Essentials tasks and skill (3rd ed.) Ann Arbor: University of Michigan. Wallace, M. & Wray, A. (2011). Critical Reading and Writing for Postgraduates. London; California; New Delhi; Singapore: SAGE.	

Note 1: Intended Learning Outcomes

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

Note 2: Subject Synopsis/Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology

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

Note 4: Assessment Method

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

Subject Description Form

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

Subject Code	HTI6081
Subject Title	Ethics: Research, Professional & Personal Perspectives
Credit Value	1
Level	6
Pre-requisite / Co-requisite/ Exclusion	None
Objective	To equip students with a deep appreciation of ethical guidelines and codes of conduct that they can apply in their research studies at PolyU and in their future professional and personal lives.
Intended Learning Outcomes <i>(Note 1)</i>	On successful completion of this subject, students will be able to: - Demonstrate knowledge and understanding of the need for ethical behavior and guiding codes of ethics in research and the professions. - Understand, discuss and apply ethical principles and codes across a range of disciplines and scenarios - Demonstrate awareness of current ethical issues and problems in relation to their own discipline and research area - Critically analyze and discuss scenarios cases of possible or actual ethical misconduct - Discuss how the guiding principles of ethics in research extend and apply to business, professional and personal codes of conduct and why this is important to the integrity and the well-being of the business, the professions, and our community. - Show a fundamental understanding of the issues of copyright, plagiarism, and proper citation, and be able to apply this in their own work.

Subject Synopsis/ Indicative Syllabus <i>(Note 2)</i>	• The need for ethics training and the meaning of ethical behavior in research: case studies, disasters, and learning by the mistakes of others • Philosophy and codes of ethics and their origins • Culture, religion, and the law – how these relate to ethical codes of conduct • Obtaining ethical approval for a research project: procedures and processes • Ethics in life science, humanities, education, business, and industry: common issues, guiding principles, discipline-specific scenarios • Ethics and human behavior: individual, professional, and societal responsibilities • Recent ethical issues affecting Hong Kong and society in general • Ethical use of information in thesis writing: understanding copyright, plagiarism, and proper citation
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Teaching/Learning Methodology <i>(Note 3)</i>	Lecture/seminar/workshop							
Assessment Methods in Alignment with Intended Learning Outcomes <i>(Note 4)</i>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
			1	2	3	4	5	6
	1. Group assignment on discipline-specific scenario/case study analysis	60%	√		√			√
	2. Oral presentation	25%					√	√
	3. Attendance	15%			√			
	Total	100 %						
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: - Discipline-specific scenario/case study analysis will assess the ability to identify and analyze ethical issues in the student's own discipline and to present a coherent and detailed critique and plan on how these could be avoided or resolved (giving sources and written work accompanied by a Turn-it-in Report). The group assignment will assess the student's ability to identify, discuss and analyze ethical principles and issues from a wide perspective, and evaluate how individuals, professions, and societies benefit from following ethically acceptable behavior and practices. - Oral presentations will assess the students' ability to present and argue points in support of their rationale.								

The Hong Kong Polytechnic University

Department of Applied Mathematics (AMA)

Outcome-based Rpg Programme of Applied Mathematics

Programme Aims

The aim of the programme is to enable the students to acquire competence in research methods and scholarship in Applied Mathematics, and to display sustained independent effort and independent original thought. This programme prepares students to become academics, researchers or industrial R & D professionals upon graduation.

Intended Learning Outcome of Individual MPhil Programme against the Institutional Learning Outcomes

Institutional Learning Outcomes	Intended Learning Outcomes of Individual Research Degree Programme
Socially responsible leaders with a strong sense of national pride and a global outlook MPhil graduates should demonstrate a critical awareness of current issues in local, national and global contexts, be able to deal with complex issues and make responsible decisions, and lead with integrity and pride for the benefit of society and a sustainable future.	To recognize the importance of research ethics MPhil students should strictly adhere to research ethics, well understand contemporary issues at local, national, and global levels, be able to deal with complex issues and make accountable decisions, and lead with integrity and pride for the benefit of society and a sustainable future.
Future-ready professionals who possess technical acumen MPhil graduates should be able to critically apply advanced discipline knowledge and scholastic skills in a broad range of professional contexts, make critical use of changing and emerging technologies for work, and deal with complex interdisciplinary issues. They should also be able to critically apply advanced knowledge in their expertise areas, perform research with minimal supervision, and make valuable contributions to the discovery of knowledge.	To learn up-to-date research advances and developments in applied mathematics MPhil students should stay informed about the latest research developments and techniques in applied mathematics, critically integrate them into their own researches, conduct independent research with minimal supervision, and contribute meaningfully to the knowledge advancement. Additionally, they should be prepared to tackle future challenges in their field.
Critical thinkers and creative problem solvers MPhil graduates should be able to critically evaluate complex information and arguments, make sound judgement in the absence of complete data, identify and analyse problems in complex situations and formulate creative strategic solutions. They should also be able to formulate individual research tasks and develop well-reasoned solutions.	To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics MPhil students should develop and demonstrate research skills and knowledge in applied mathematics; critically analyze complex information from real world, identify application-driven problems and apply methodologies of applied mathematics to derive viable solutions.
Effective communicators and collaborators MPhil graduates should be able to communicate effectively with a broad range of audiences, and foster effective and harmonious collaboration in an intercultural and/or interdisciplinary team.	To present results with good scientific writing and presentation skills MPhil students should effectively communicate research findings through clear scientific writing and compelling presentations, convey complex concepts to general audiences, and foster productive collaborations with scholars across disciplines.
Adaptable and resilient lifelong learners MPhil graduates should engage in continual professional development, reflect on their goals and purposes, refine their learning approaches, adapt to unfamiliar learning situations, and persevere through setbacks.	To provide novel solutions to research problems and effectively interpret new research results MPhil students should pursue continuous professional development, reflect on their goals, refine learning strategies, adapt to new learning situations, and persevere through setbacks.

Intended Learning Outcome of Individual PhD Programme against the Institutional Learning Outcomes

Institutional Learning Outcomes	Intended Learning Outcomes of Individual Research Degree Programme
Socially responsible leaders with a strong sense of national pride and a global outlook PhD graduates should demonstrate foresight and originality in tackling emerging and unforeseen local, national and global challenges, be able to deal with highly complex issues and make responsible decisions, and lead with integrity and pride for the benefit of society and a sustainable future.	To recognize the importance of research ethics PhD students should strictly adhere to research ethics, well understand contemporary issues at local, national, and global levels, be able to deal with complex issues and make accountable decisions, and lead with integrity and pride for the benefit of society and a sustainable future.
Future-ready professionals who possess technical acumen PhD graduates should be able to critically apply knowledge and skills at the forefront of an academic discipline and extend that knowledge through original research, anticipate future technology needs for professional practice, and deal with emerging complex interdisciplinary issues. They should also be well-versed in research skills and be able to critically apply in-depth knowledge in their expertise areas, perform independent research, and make significant and original contributions to the discovery and advancement of knowledge.	To learn up-to-date research advances and developments in applied mathematics PhD students should stay informed about the latest research developments and techniques in applied mathematics, critically integrate them into their own researches, conduct independent research with minimal supervision, and contribute meaningfully to the knowledge advancement. Additionally, they should be prepared to tackle future challenges in their field.
Critical thinkers and creative problem solvers PhD graduates should be able to engage in critical inquiry of complex issues, make astute judgement in the absence of complete data, conceptualise problems in professional contexts and formulate sophisticated original solutions. They should also demonstrate robust logical thinking to identify and formulate original research problems and develop innovative solutions.	To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics PhD students should develop and demonstrate research skills and knowledge in applied mathematics; critically analyze complex information from real world, identify application-driven problems and apply methodologies of applied mathematics to derive viable solutions.
Effective communicators and collaborators PhD graduates should be able to communicate complex ideas effectively to both specialist and non-specialist audiences, and establish and sustain interdisciplinary collaborations in academic/ professional endeavours.	To present results with good scientific writing and presentation skills PhD students should effectively communicate research findings through clear scientific writing and compelling presentations, convey complex concepts to general audiences, and foster productive collaborations with scholars across disciplines.
Adaptable and resilient lifelong learners PhD graduates should engage in an enduring quest for knowledge with a deep sense of purpose, critically reflect on their epistemic beliefs and learning approaches, adapt to new learning situations, and learn from failure.	To provide novel solutions to research problems and effectively interpret new research results PhD students should pursue continuous professional development, reflect on their goals, refine learning strategies, adapt to new learning situations, and persevere through setbacks.

Part I: Curriculum map in Rpg programme

Programme Outcomes* *please refer to above section for ILO details	AIE subjects / HTI6081	AMA610	AMA611	AMA612	AMA613	AMA614	AMA615	AMA616	AMA617^	AMA618	AMA619	AMA620	AMA621	ELC6011	ELC6012	ENGL6016	Attend seminars	Dept training	Thesis
a. To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
b. To present results with good scientific writing and presentation skills					✓					✓	✓	✓	✓	✓	✓	✓			✓
c. To recognize the importance of research ethics	✓																		✓
d. To provide novel solutions to research problems and effectively interpret new research results									✓	✓	✓	✓	✓						✓
e. To learn up-to-date research advances and developments in applied mathematics									✓	✓	✓	✓	✓				✓	✓	✓

^The subject will be offered to PhD students only.

Part II: Programme Learning Outcomes Assessment (LOA) Methods and Procedures

Programme learning outcomes assessment methods and procedures (for MPhil and PhD students)

Programme intended learning outcomes	LOA method and measures	How the data will be collected	Criteria for Success*	How the data will be disseminated and used for improvement
1. To recognize the importance of research ethics	Written report in AIE/ HTI6081	Assessment to be done by AIE/ HTI6081 subject lecturer	70% or more of students being rated “satisfactory” or above	• Results to be summarized in the annual LOA report that will be forwarded to the HoD and programme team • Results to be reviewed and discussed in the programme committee meeting each year, to identify weakness and plan for improvements • LOA results and improvement plan to be reported in the annual Departmental QA Report for Dean’s and PolyU QAC(AD)’s endorsement and scrutiny
2. To learn up-to-date research advances and development in applied mathematics	Written reports in attending seminars	Assessment to be done by supervisor	70% or more of students being rated “satisfactory” or above	
3. To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics	Written report in AMA613	Assessment to be done by the subject coordinator and supervisor	70% or more of students being rated “satisfactory” or above in mini-project	

Programme intended learning outcomes	LOA method and measures	How the data will be collected	Criteria for Success*	How the data will be disseminated and used for improvement
4. To present results with good scientific writing and presentation skills	Oral presentation and written report in AMA613	Assessment to be done by the subject coordinator and supervisor	70% or more of students being rated “satisfactory” or above	Same as above
5. To provide novel solutions to research problems and effectively interpret new research results	Research paper accepted or published in a journal or passing the thesis review by the Thesis Vetting Committee	Assessment to be done by the members of the Thesis Vetting Committee	70% or more of students being rated “satisfactory” or above	

Part III: Implementation Schedule and Responsibility

Programme Intended Learning Outcomes	Implementation schedule			Person(s) responsible
	2025-26	2026-27	2027-28	
1. To recognize the importance of research ethics		√		AIE/ HTI6081 subject lecturer
2. To learn up-to-date research advances and development in applied mathematics		√		Individual supervisor
3. To develop and demonstrate research skills and knowledge in applied mathematics; critically analyze new and complex information from real problems, and effectively utilize research methodologies in applied mathematics	√			AMA613 subject coordinator & individual supervisor
4. To present results with good scientific writing and presentation skills	√			AMA613 subject coordinator & individual supervisor
5. To provide novel solutions to research problems and effectively interpret new research results			√	Individual supervisor