Programme Title: Research Postgraduate Programme in Applied Mathematics

Hosted by: Department of Applied Mathematics (AMA)

Award: MPhil. / PhD.

Normal study period:

2 years for full-time MPhil., 4 years for part-time MPhil.
3 years for full-time 3-year PhD., 6 years for part-time PhD.
4 years for full-time 4-year PhD. (for admission with Bachelor Degree or Master Degree without any research components)

Note: 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.

Coursework/credit requirement

It was agreed that the credit requirements should also cover requirement on attending seminars and departmental training.

Credit requirement of different categories of students would then be:

2-year MPhil: 9 credits
(1 credit from HTI6081 + 2 credits from attending seminars (AMA67711+AMA67712) +AMA613+ 3 credits from other subjects)

3-year PhD: 15 credits
(1 credit from HTI6081 + 3 credits from attending seminars (AMA67711+AMA67712+AMA67713)+ 2 credits from departmental training (AMA67721+AMA67722) + AMA613+ 6 credits from other subjects)

4-year PhD: 22 credits
(1 credit from HTI6081 + 4 credits from attending seminars (AMA67711+AMA67712+AMA67713+AMA67714) + 2 credits from departmental training (AMA67721+AMA67722) + AMA613+12 credits from other subjects)

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

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

All MPhil students need to complete their coursework with a qualifying GPA of 2.75 or above, and all PhD students need to complete their coursework with a qualifying GPA of 3.0 or above before submission of their thesis for examination.

Attendance in research seminars/workshops/conferences

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.

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 Research Office for custody at the end of each academic year.

Departmental Training

As part of the programme requirement, PhD students, irrespective of funding source and mode of study, must complete two training credits before graduation. 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.

Students are allowed to complete these two credits any time before they graduate. 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 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.

Language proficiency requirement after admission

Students should be required to take and pass the recommended remedial subjects before the submission of thesis.

Thesis requirement

A thesis must be submitted to the satisfaction of the supervisor(s) for reviews by external examiners. The submitted thesis must contain at least one accepted/published paper in an SCI journal for PhD. students.

Curriculum

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
AMA610	Advanced probability theory	E	3	40 : 60	A course in Probability Theory and a course in Advanced Calculus
AMA611	Applied Analysis	E	3	40 : 60	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 and before confirmation, and not yet reached the maximum number of subjects taken.
AMA614	Mathematical Statistics	E	3	40 : 60	(P) AMA610
AMA615	Nonlinear Optimization Methods	E	3	40 : 60	A course in Linear Algebra and a course in Advanced Calculus
AMA6881	Guided Study in Applied Optimization	E	3	100:0	None
AMA6882	Guided Study in Operations Research	E	3	100:0	None
AMA6883	Guided Study in Applied Statistics	E	3	100:0	None

AMA6884	Guided Study in Financial Mathematics	E	3	100:0	None
AMA6885	Guided Study in Engineering Mathematics	E	3	100:0	None
AMA6886	Guided Study in Computational Mathematics	E	3	100:0	None
AMA6887	Guided Study on Research Topics in Applied Mathematics	E	3	100:0	None
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	Departmental Training	C	1	100:0	None
AMA67722	Departmental Training	C	1	100:0	None
HTI6081	Ethics: Research, Professional & Personal Perspectives	C	1	100:0	None

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.

Programme Outcomes

1. **To enhance students' research knowledge in Applied Mathematics**
2. **To enhance students' scientific writing and presentation skills**
3. **To nourish students' up-to-date research development in applied mathematics**
4. **To recognize the importance of research ethics**
5. **To learn the skill in writing research articles** (for PhD programme)

Part I: Curriculum map in Rpg programme

Programme Outcomes	AMA610	AMA611	AMA612	AMA613	AMA614	AMA615	AMA616	AMA6881	AMA6882	AMA6883	AMA6884	AMA6885	AMA6886	AMA6887	HTI 6081	Attend seminars	Dept. training	Thesis
1. To enhance students' research knowledge in Applied Mathematics	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√
2. To enhance students' scientific writing and presentation skills				√				√	√	√	√	√	√	√				√
3. To nourish students' up-to-date research development in applied mathematics								√	√	√	√	√	√	√		√	√	√
4. To recognize the importance of research ethics															√			√
5. To learn the skill in writing research articles				√				√	√	√	√	√	√	√				√

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

Programme learning outcomes assessment methods and procedures

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 enhance students' research knowledge 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	• 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 enhance students' 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	
3. To nourish students' up-to-date research 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	

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 recognize the importance of research ethics	Written report in HTI 6081	Assessment to be done by HTI 6081 subject lecturer	70% or more of students being rated "satisfactory" or above	Same as above
5. To learn the skill in writing research articles (for PhD programme)	Research paper accepted or published in a journal	Assessment to be done by supervisor	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
	2015-16	2016-17	2018-19	
1. **To enhance students' research knowledge in Applied Mathematics**	√			AMA613 subject coordinator & individual supervisor
2. **To enhance students' scientific writing and presentation skills**	√			AMA613 subject coordinator & individual supervisor
3. **To nourish students' up-to-date research development in applied mathematics**		√		Individual supervisor
4. **To recognize the importance of research ethics**		√		HTI6081 subject lecturer
5. **To learn the skill in writing research articles** (for PhD programme)			√	Individual supervisor

Attachment 1

Mapping of Intended Learning Outcome of Individual Research Degree Programme against the University Overarching Aims of Research Degree Programmes

Programme Title: Research Postgraduate Programme in Applied Mathematics

Hosted by: Department of Applied Mathematics

University Overarching Aims of Research Degree Programmes	**Intended Learning Outcomes of Individual Research Degree Programme ***
The research degree programmes are designed in such a way to enable the student to: a. acquire competence in research methods and scholarship; and b. display sustained independent effort and independent original thought. The PhD programmes should target to produce academics, researchers or industrial R & D professionals.	Upon completion of the programme, students will be able to 1. possess the necessary research knowledge in applied mathematics 2. present results with good scientific writing and presentation skills 3. learn up-to-date research developments in applied mathematics 4. recognize the importance of research ethics For the PhD programme, students will also be able to 5. possess the skill in writing research articles

Note:

* The desired outcomes of the PhD and MPhil programmes should be differentiated. If found necessary, intended learning outcomes of individual research degree programme can be split into two parts: one part on the coursework and one part on the research work.

Attachment 2

Curriculum Map for Individual Research Degree Programme

Programme Title: Outcome-based Rpg Programme

Hosted by: Department of Applied Mathematics

Please put a " √ " in the relevant box where the subject helps to fulfill the specific programme outcome.

Programme Outcomes	AMA610	AMA611	AMA612	AMA613	AMA614	AMA615	AMA616	AMA6881	AMA6882	AMA6883	AMA6884	AMA6885	AMA6886	AMA6887	HTI 6081	Attend seminars	Dept. training	Thesis
1. To enhance students' research knowledge in Applied Mathematics	√	√	√	√	√	√	√	√	√	√	√	√	√	√				√
2. To enhance students' scientific writing and presentation skills				√				√	√	√	√	√	√	√				√
3. To nourish students' up-to-date research development in applied mathematics								√	√	√	√	√	√	√		√	√	√
4. To recognize the importance of research ethics															√			√
5. To learn the skill in writing research articles				√				√	√	√	√	√	√	√				√