The Hong Kong Polytechnic University

Subject Description Form

Subject Code	AMA3700
Subject Title	Professional and Research Skills in Mathematical Science
Credit Value	2
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	The objectives of this subject are to: 1) introduce students to the methodologies and processes essential for conducting mathematical research; 2) provide students with a thorough understanding of ethical considerations and best practices in scientific research. 3) enhance students' oral and written communication skills for effectively presenting mathematical research.
Intended Learning Outcomes	Upon completion of the course, students will be able to: a) understand and discuss the role of professionalism and ethics in the mathematical research practices and context; b) explain how mathematical science professionals approach and solve complex problems; c) conduct comprehensive literature reviews on selected mathematical research topics; d) develop and refine written communication skills for effectively presenting mathematical research findings; e) deliver clear and engaging oral presentations of mathematical research results.
Subject Synopsis/ Indicative Syllabus	The subject explores a range of topics selected by the subject lecturer(s), drawing from both standard and advanced mathematical textbooks as well as significant research monographs in contemporary mathematics. Students will engage with cutting-edge research areas, gaining insights into current developments and methodologies. In addition to technical content, the course emphasizes the importance of professionalism and ethical conduct in mathematical research, equipping students with the skills to navigate ethical dilemmas and uphold integrity in their scholarly work.
Teaching/Learning Methodology	The subject lecturer(s) will guide students in developing essential skills for conducting literature searches in mathematical research, while also emphasizing the importance of professionalism and ethical standards. Students will enhance their oral and written presentation abilities, ensuring they can effectively communicate their findings. Each student will be assigned specific reading materials, which will serve as the foundation for their exploration of relevant research findings. Students are expected to prepare and deliver oral presentations based on these materials and their comprehensive review of the literature. Ultimately, each student will submit a detailed written report that synthesizes the insights gained from

	their presentations and research. This process not only enhances technical proficiency but also reinforces the importance of professionalism and ethical standards in mathematical research.

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. Class participation	10%	✓	✓	✓		✓
2. Two oral presentations	60%		✓	✓		✓
3. One written report	30%	✓	✓	✓	✓	
Total	100%					

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

Oral Presentations:
Each student is required to deliver two oral presentations on their chosen research topic. These presentations will evaluate the student's ability to effectively communicate mathematical ideas and concepts, as well as their proficiency in conducting literature searches.

Written Report:
Students must submit a written report on their research topic. This report will assess their skills in articulating mathematical statements and proofs, alongside their capability in performing thorough literature reviews.

Class Participation:
Active participation is expected from students during their peers' oral presentations. By attending and engaging in class discussions, students can gain valuable insights from their classmates' approaches to preparing and delivering presentation materials. This collaborative environment not only fosters learning and enhances presentation skills but also reinforces the importance of professionalism and ethical standards. Students will learn to provide constructive feedback, respect diverse perspectives, and uphold integrity in their interactions, all of which are crucial for their development as ethical professionals in the mathematical sciences.

Student Study Effort Expected		
	Class contact:	
	Lecture / Tutorial / Seminar	26 Hrs.
	Other student study effort:	
	Self-learning from reference materials	20 Hrs.
	Reading and research for the case study	24 Hrs.
	Total student study effort	70 Hrs.

Reading List and References	American Mathematical Society, Ethical Guidelines of the American Mathematical Society, https://www.ams.org/about-us/governance/policy-statements/sec-ethics European Mathematical Society, Code of Practice for Mathematical Publication, https://euromathsoc.org/code-of-practice Bowden, John. Writing a report: how to prepare, write and present really effective reports. 9th edition. How To Books. 2011. Gillman, Leonard. Writing mathematics well. American Mathematical Society. 1987. Velleman, Daniel J. How to prove it: a structured approach. 2nd edition. Cambridge University Press. 2006.