

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	AMA4750
Subject Title	Applied Functional Analysis
Credit Value	3
Level	4
Pre-requisite	AMA3707 Real Analysis or equivalent; and AMA1751 Linear Algebra or equivalent
Objectives	This course aims to provide students with a profound understanding of the principles and methods of functional analysis, which can be applied to the development of advanced mathematical knowledge in various fields.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) understand the concepts of functional analysis; (b) solve mathematical problems using functional analysis approach; (c) explore the application of functional analysis in other fields of mathematics.
Subject Synopsis/ Indicative Syllabus	Normed Space, Linear Functionals, Hilbert Space, Duality, Reflexive Spaces, Weak Convergence, Hahn-Banach Theorem, Uniform Boundedness Theorem, Open Mapping Theorem, Closed Graph Theorem, Riesz-Frechet representation Theorem, Spectral Theory, Fixed Point Theorem.
Teaching/Learning Methodology	This course will be delivered mainly through lectures and tutorials. The lectures will introduce concepts, knowledge, techniques about functional analysis and its application in other fields. While the tutorial will support students in solving problems. Self-learning by students themselves with the learning materials provided and other reference would also be important to enhance learning.

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 / Quizzes	15%	✓	✓	✓
	2. Tests	25%	✓	✓	✓
	3. Exam	60%	✓	✓	✓
	Total	100 %			
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: Continuous assessment comprises of assignments, quizzes and tests to assess students’ learning progress throughout the course. A written exam will be conducted at the end to assess students’ overall understanding to the course knowledge.				
Student Study Effort Expected	Class contact:				
	▪ Lecture				26 Hrs.
	▪ Tutorial				13 Hrs.
	Other student study effort:				
	▪ Self-study				40 Hrs.
	▪ Assessments				30 Hrs.
	Total student study effort				109 Hrs.
Reading List and References	Sergei Ovchinnikov, Functional Analysis An Introductory Course, Springer 2018 Walter Rudin, Functional Analysis Second Edition, McGraw-Hill Science 1991 Peter D. Lax, Functional Analysis 1st Edition, Wiley-Interscience 2002				