The Hong Kong Polytechnic University

Subject Description Form

Subject Code	AMA4707
Subject Title	Real Analysis II
Credit Value	3
Level	4
Pre-requisite	AMA3707 Real Analysis
Objectives	The subject aims to introduce students to the fundamental concepts and techniques of Lebesgue measure and Lebesgue integral.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) understand the construction and properties of Lebesgue measure on the real line; (b) understand the concept and properties of measurable functions; (c) understand the construction and properties of Lebesgue integral, its theoretical significance and its relation to Riemann integral; (d) construct rigorous mathematical proofs related to measure theory and Lebesgue integration.
Subject Synopsis/ Indicative Syllabus	*Lebesgue Measure* Outer measure; Lebesgue measurable sets; approximation by outer and inner measure; countable additivity and continuity; nonmeasurable sets. *Measurable Functions* Definition and properties of measurable functions; simple approximation theorem; Egoroff's theorem and Lusin's theorem. *Lebesgue Integration* Review of Riemann integral; definition and properties of Lebesgue integral; convergence theorems; characterizations of integrablility
Teaching/Learning Methodology	Concepts, theorems, examples and techniques of Lebesgue measure and Lebesgue integrals will be taught in lectures and students will learn the skills of problem solving in the tutorials.

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. Assignments	10%	√	√	√	√
2. Test	30%	√	√	√	√
3. Exam	60%	√	√	√	√
Total	100%				

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

The subject focuses on knowledge, skills and understanding of Lebesgue measure and Lebesgue integral, thus exam-based assessment is the most appropriate assessment method, including 30% test and 60% examination. Continuous Assessment comprises of assignments and test. A written examination is held at the end of the semester.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Homework and self-study	78 Hrs.
Total student study effort	117 Hrs.

Reading List and References

Real Analysis, 4th ed, H.L.Royden & P.M. Fitzpatrick, Prentice Hall, 2010

Lebesgue Integration on Euclidean Space, revised ed, Frank Jones, Jones and Bartlett Publishers, 2001

Measure, Integral, Derivative, Sergei Ovchinnikov, Springer, 2013