The Hong Kong Polytechnic University

Subject Description Form

Subject Code	AMA4420
Subject Title	Partial Differential Equations
Credit Value	3
Level	4
Pre-requisite	AMA3410 Differential Equations, or AMA3724 Further Mathematical Methods
Objectives	The subject aims to provide students with comprehensive knowledge about partial differential equations and the techniques in solving such PDEs, with application to real-world problems in other disciplines such as physics, finance and engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) understand the concepts about PDE; (b) apply PDEs to model different real-world situations; (c) master the methods and techniques in solving PDEs; (d) interpret and analyze the solution of PDEs, hence informing the meaning in real-world situations.
Subject Synopsis/ Indicative Syllabus	Transport Equations, Maximum Principle, Calculus of Variation, Properties of Harmonic Functions, Energy Methods, Fourier Series, Green's identities, Poisson's Formula, General Eigenvalue Problems, Laplace Transforms, Asymptotics, Nonlinear first order PDEs.
Teaching/Learning Methodology	This course will be delivered mainly through lectures and tutorials. The lectures will introduce concepts, knowledge, techniques about PDE, illustrated by example problems and application in other disciplines. While the tutorial will support students in solving problems. Both lectures and tutorials will integrate computer illustrations, simulations, and other interactive activities whenever appropriate. Self-learning by students themselves with the help of e-learning materials or other reference materials 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	d
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:

The written quizzes, tests and exam will assess students' understanding in the course knowledge and techniques in solving the mathematical problems. Assignments will involve not only mathematical problems but also applicational problems which require students to apply PDE to other disciplines.

Student Study Effort Expected

Class contact:	
▪ Lectures	26 Hrs.
▪ Tutorials	13 Hrs.
Other student study effort:	
▪ Self-learning	35 Hrs.
▪ Assessments	30 Hrs.
Total student study effort	104 Hrs.

Reading List and References

Walter A. Strauss, Partial Differential Equations An introduction Second Edition, Wiley 2007

Lawrence C. Evans, Partial Differential Equations Second Edition, American Mathematical Society 2010