City University of Hong Kong
Course Syllabus

offered by College/School/Department of _Mathematics_____
with effect from Semester __B____ 20_17_ / _18_

Part I Course Overview

Course Title:	**Partial Differential Equations**
Course Code:	**MA3512**
Course Duration:	**One semester**
Credit Units:	**3**
Level:	**B3**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**MA3511 Ordinary Differential Equations**
Precursors: *(Course Code and Title)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to provide an introduction to the theory and applications of partial differential equations. It trains students to formulate physical problems mathematically and develops a systematic approach of solving elementary partial differential equations.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	explain clearly concepts and theory of basic methods for solving partial differential equations.			y	y
2.	recognize the types of second-order partial differential equations as typified by classical equations of mathematical physics, such as the wave equation, heat-diffusion equation and Laplace equation.			y	y
3.	apply eigenfunction expansion methods to solve non-homogeneous versions of heat-diffusion and wave equations.			y	y
4.	recognize the concept of a Green function and its applications in solving non-homogeneous problems and elementary boundary value problems (with the use of Dirac delta).			y	
5.	create and formulate mathematical models for a range of scientific and engineering problems involving partial differential equations.			y	
6.	the combination of CILOs 1--5				
	** If weighting is assigned to CILOs, they should add up to 100%.*	100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5	6	
Lecture	Learning through **teaching** is	Y	Y	Y	Y	Y	Y	39 hours in total

	primarily based on lectures.							
Take-home assignments	Learning through **take-home assignments** helps students understand basic mathematical concepts and methods of solving elementary partial differential equations as well as their applications to scientific problems.	Y	Y	Y	Y	Y		after-class
Online applications	Learning through **online examples for applications** helps students create and formulate mathematical models and apply to a range of problems in science and engineering.					Y		after-class
Math Help Centre	Learning activities in **Math Help Centre** provides students extra help.	Y	Y	Y	Y	Y		after-class

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

30% Coursework

70% Examination (Duration: 3 hours, at the end of the semester)

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5	6		
Continuous Assessment: __30__%								
Test	Y	Y	Y				15-30%	Questions are designed for the first part of the course to see how well the students have learned the basic methods and techniques of solving partial differential equations as typified by the wave equation, Laplace equation, etc.
Hand-in assignments	Y	Y	Y	Y	Y		0-15%	These are skills based assessment to enable students to demonstrate the basic concepts and

								theory of solving elementary partial differential equations and their applications to physical sciences.
Formative take-home assignments	Y	Y	Y	Y	Y		0%	The assignments provide students chances to demonstrate their achievements on solving partial differential equations learned in this course.
Examination: __70__% (duration: 3 hrs, if applicable)								Examination questions are designed to see how far students have achieved their intended learning outcomes. Questions will primarily be skills and understanding based to assess the student's versatility in partial differential equations.
** The weightings should add up to 100%.*							100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Test	Capacity to APPLY and EXPLAIN the basic concepts and methodology of partial differential equations	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Hand-in assignments	Capacity to UNDERSTAND basic concepts and tools for solving partial differential eqution s	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Ability to APPLY different approaches in the theory of partial differential equations to concrete problems.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Formative take-home assignments	Ability for SELF-DIRECTED LEARNING to understand and apply different approaches in the theory of partial differential equations	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Basic Concepts of Partial Differential Equation. Heat-diffusion Equation. Eigenvalue Problems. Wave Equations. Elliptic Equations. Green's Function.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Parital Differential Equations. An Introduction. By Walter A. Strauss, 2nd Edition, 2008.
2.	
3.	
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2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	
2.	
3.	
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