

COURSE OUTLINE: MH4931

Course Title	Special Topics in Applied Mathematics		
Course Code	MH4931		
Offered	Study Year 3, Sem 1 Study Year 3, Sem 2 Study Year 4, Sem 1 Study Year 4, Sem 2		
Course Coordinator	Ng Keng Meng (Assoc Prof)	kmng@ntu.edu.sg	6513 8656
Pre-requisites	Approval by Division of Mathematical Sciences		
AU	4		
Contact hours	Lectures: 39, Tutorials: 12		
Approved for delivery from	AY 2020/21 semester 2		
Last revised	7 Dec 2020, 10:37		

Course Aims

This course aims to expose you to special topics in applied mathematics which are not regularly offered in any other module. The faculty who offers this course will provide you with opportunities to learn about a special topic in-depth and develop the skills and knowledge required. Through this course, you will be able to expand your horizon and become more up-to-date in your knowledge and skills in applied mathematics. You will also be trained in the relevant computing software and have the opportunity to put theoretical skills taught in the course to use in real-life applications. You will learn about how the special topic is put to use in the real world.

Intended Learning Outcomes

Upon successfully completing this course, you should be able to:

1. Analyze problems in a special topic in applied mathematics using the required mathematical tools, techniques and software
2. Independently process and interpret concepts and methodologies related to the special topic of interest
3. Apply the methods and tools taught to solve problems in the special topic
4. Demonstrate a desire and identify ways to expand your knowledge in applied mathematics
5. Develop the necessary computing skills and knowledge of the relevant software, and apply these skills to model and solve real-world problems
6. Explain how to bridge the gap between theoretical mathematical knowledge and useful practical skills in implementing this knowledge

Course Content

To be decided by the faculty offering this course

Assessment

Component	Course ILOs tested	SPMS-MAS Graduate Attributes tested	Weighting	Team / Individual	Assessment Rubrics
Continuous Assessment					
Tutorials					
Assignment	1, 2, 3, 4, 5, 6	1. a, b, c, d 2. a, b, c, d 3. a 4. a 5. a	15	individual	See Appendix for rubric
Mid-semester Quiz					
Mid-term test	1, 2, 3, 4, 5, 6	1. a, b, c, d 2. a, b, c, d 3. a 4. a 5. a	25	individual	See Appendix for rubric
Examination (2 hours)					
Final Examination	1, 2, 3, 4, 5, 6	1. a, b, c, d 2. a, b, c, d 3. a 4. a 5. a	60	individual	See Appendix for rubric
Total			100%		

These are the relevant SPMS-MAS Graduate Attributes.

1. Competence

- a. Independently process and interpret mathematical theories and methodologies, and apply them to solve problems
- b. Formulate mathematical statements precisely using rigorous mathematical language
- c. Discover patterns by abstraction from examples
- d. Use computer technology to solve problems, and to communicate mathematical ideas

2. Creativity

- a. Critically assess the applicability of mathematical tools in the workplace
- b. Build on the connection between subfields of mathematics to tackle new problems
- c. Develop new applications of existing techniques
- d. Critically analyse data from a multitude of sources

3. Communication

- a. Present mathematics ideas logically and coherently at the appropriate level for the intended audience

4. Civic-mindedness

- a. Develop and communicate mathematical ideas and concepts relevant in everyday life for the benefits of society

5. Character

- a. Act in socially responsible and ethical ways in line with the societal expectations of a mathematics professional, particularly in relation to analysis of data, computer security, numerical computations and algorithms

Formative Feedback

Feedback will be given to students through the weekly problem tutorial sets that are covered in tutorial. Common mistakes in the assignments and the midterm test will be discussed in the provided solution sets.

Learning and Teaching Approach

Lectures (39 hours)	Examples and Explanation - Motivates the concepts in the learning objectives through examples. The general theory and principles are then explained. This also introduces more abstract mathematical reasoning. Problem solving - Develops competence in solving a variety of problems and gaining familiarity with mathematical proofs.
Tutorials (12 hours)	Examples and Explanation - Motivates the concepts in the learning objectives through examples. The general theory and principles are then explained. This also introduces more abstract mathematical reasoning. Problem solving - Develops competence in solving a variety of problems and gaining familiarity with mathematical proofs.

Reading and References

To be decided by the faculty offering the course

Course Policies and Student Responsibilities

(1) General

You are expected to complete all assigned pre-class readings and activities, attend all tutorial classes punctually and take all scheduled assignments and tests by due dates. You are expected to participate in all tutorial discussions and activities.

(2) Absenteeism

All assignments and CA components must be submitted on time. Failure to do so will affect your score.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [Academic Integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
Ng Keng Meng (Assoc Prof)	MAS-05-09	6513 8656	kmng@ntu.edu.sg

Planned Weekly Schedule

Week	Topic	Course ILO	Readings/ Activities
1	Weeks 1-13: To be decided by the faculty offering this course	1, 2, 3, 4, 5, 6	

Appendix 1: Assessment Rubrics

Rubric for Tutorials: Assignment (15%)

Point-based marking (not rubric-based)

Rubric for Mid-semester Quiz: Mid-term test (25%)

Point-based marking (not rubric-based)

Rubric for Examination: Final Examination (60%)

Point-based marking (not rubric-based)