

# **MATH4992 Capstone Project in Applied Mathematics**

## **Course Outline – Fall 2023**

### **1. INSTRUCTOR**

Dr. Shingyu Leung

**Email:** masyleung @ ust.hk

**Office:**

**Office hours:**

### **2. TA**

Dr. Yin Bon KU

Email: maybku

### **3. MEETING TIME AND VENUE**

Lectures: Mon/Wed 1200noon-1320pm

Tutorial: Mon 600-650pm

### **4. COURSE DESCRIPTION**

Credits: 3

Prerequisites: LANG3010 or LANG3011, and MATH3312

Exclusions: Nil

This is a project-based course that provides students an opportunity to integrate and apply their mathematical knowledge. Students will be assigned to a section according to their program or track. Upon completion of projects, students are required to submit written reports following standard professional formats. For MATH and MAEC Year 4 students only.

### **5. INTENDED LEARNING OUTCOMES**

Upon successful completion of this course, students should be able to

No.	ILOs
1	Explain advanced mathematical theories, concepts and principles using precise mathematical language.
2	Apply independent judgment to investigative mathematical work.
3	Apply a rigorous logical and analytic approach to execute tasks and solve mathematical problems.
4	Work independently and collaborate effectively in a team.
5	Communicate mathematical concepts and methods effectively to a range of audiences, both orally and in writing.
6	Evaluate individual performance to identify and work towards targets for personal, academic and career development.
7	Apply the fundamental principles and conventions of ethical scientific practice and academic integrity.
8	Analyze the influence of mathematical sciences and their impact of human activity.
9	Draw on a global perspective and sound scientific evidence to evaluate the role of mathematical sciences in the international science community.

### **6. ASSESSMENT SCHEME**

a. Final examination duration: Nil

b. Grading scheme

- Project Proposal (10%) + Weekly Progress (20%) + Meeting Reflections (10%) + Report (30%) + Project Presentation (30%)

Assessment	Assessing Course ILOs
Assignment	1, 2, 3, 7
Proposal, Progress and Report	1, 2, 3, 4, 6, 7, 8, 9
Presentation	1, 5, 6, 9

**7. STUDENT LEARNING RESOURCES**

Lecture notes

**8. TEACHING AND LEARNING ACTIVITIES**

Scheduled activities: 3 hours (lecture), 1 hour (tutorial)

**9. COURSE SCHEDULE (37.5 hours)**

- Software for Applied/Computational Mathematics
  - MATLAB
  - LaTeX
- Introduction to Mathematical Modeling
- Designing Mathematical Graphics
- Writing an Academic Paper
- Doing an Academic Presentation

<b>Weeks 1-2</b>	<p><b>4 Sept (Mon):</b> General introduction. <i>What and why capstone project?</i> Mathematical Modeling.</p> <p><b>4 Sept (Mon) Tutorial:</b> No Class</p> <p><b>6 Sept (Wed):</b> Examples</p> <p><b>11 Sept (Mon):</b> <i>How to write a MATH report and give a presentation?</i></p> <p><b>11 Sept (Mon) Tutorial:</b> LaTeX</p>
<b>Week 2, 3, 4</b>	<p><b>Sept 13, 18, 20, 25, 27</b> Meeting 1</p>
<b>Week 5, 6, 7</b>	<p><b>Oct 4, 9, 11, 16, 18</b> Meeting 2</p>

<b>Week 8, 9, 10</b>	<b>Oct 25, 30, Nov 1, 6, 8</b> Meeting 3
<b>Week 11, 12, 13</b>	<b>Nov 13, 15, 20, 22, 27, 29</b> Final Presentation

### **ACADEMIC HONESTY**

You should browse the university website <https://registry.hkust.edu.hk/resource-library/academic-standards> to understand the rules concerning academic honesty.

### **LEARNING ENVIRONMENT**

In classes (lectures and tutorials), we should respect each other. Please arrive on time and avoid leaving early. You may ask questions by raising your hand. Please do not cause rude disturbances. In particular, your mobile phones should be off while you are in class. You are highly encouraged to come to office hours for consultation. This is a difficult course for many, but not all students. Although there are lecture notes, students should attend all lectures and tutorials as lectures notes are only brief records of materials covered in class, which may contain typographical errors. Of course, questions from students and answers from instructors or other digressions will not be recorded. You are advised to take your own notes.

All materials presented in lectures and tutorials as well as proper class conduct are your responsibility. The instructor reserves the right to make any changes to the course throughout the semester. To succeed in this course, you should actively engage in learning and do the assigned works with your own effort.