

<p style="text-align: center;"><b>THE CHINESE UNIVERSITY OF HONG KONG</b> <b>M.Sc. Programme in Mechanical and Automation Engineering</b></p>
---

**First Term, 2022-2023 (Updated on 01 Oct.)**

**MAEG5745: Measurement and Instrumentation**

Course Coordinator: Dr. LI Yiyang (yli@mae.cuhk.edu.hk)  
Mentor: TBC  
Class Day: Thursday  
Class Period: 6:30 p.m. – 9:30 p.m.  
Classroom: Lecture Theatre 5, 2/F, Yasumoto International Academic Park, CUHK (YIA LT5)  
Office hour: Monday 4:30pm – 5:30pm @ERB315B, or by appointment

**Course Outline**

This course is intended to provide basic concepts and methods to interface electro-mechanical parts and sensors to computers. It covers the following topics: analogue and digital circuitry; design of linear circuits with ICs and Op-amps; design of low-noise circuits.

**Learning Outcomes**

Upon completion of the course, students should have achieved the following outcomes:

1. Able to understand the basics of sensor, instruments and measurement.
2. Able to understand the basics of data analysis and statistical inference.
3. Able to conduct the Design of Experiments.

**Textbook**

Measurement and Instrumentation: Theory and Application, 3rd Edition by Alan S. Morris and Reza Langari, Academic Press, 2020

**Reading list**

See the references listed at the end of each lecture note (if any).

**Homepage**    <https://blackboard.cuhk.edu.hk/ultra/stream>

**Assessment Scheme**

Assignment (4 assignments)	30%
Midterm exam	25%
Final exam	45%
Bonus (Class activities if any)	<5%

**Assessment Criteria**

**Assignment:** Due date will be specified. It will carry a 30% penalty if submitted in late. No credit will be given to a homework/assignment that is late for more than three days.

**Exam:** If for any reason you are unable to attend exam, you must seek approval of absence from the course instructor directly before the exam. Your request should be supported by valid documents, such as a medical certificate issued by a registered medical practitioner. Absence from the exam without prior approval of absence would result in zero score. Note that outside activities or more than one exam/test in a day are not acceptable excuses for missing the exam.

For students who are absent from exam with prior approval, a make-up (and only one) OR a special assessment will be arranged in due course.

### Grade Dispute Policy

Please check the grades of homework assignments, exams and etc. as soon as they are released. Any discrepancy should be reported to the TA/Instructor within one week from the day the results are announced. Late complaints will NOT be entertained.

### Academic Honesty

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at <http://www.cuhk.edu.hk/policy/academichonesty/>.

### Course Schedule (tentatively, subject to revision)

Class	Date	Contents
1	Sep 8, 2022 (Thu)	Chap. 1: Introduction
2	Sep 15, 2022 (Thu)	Chap. 2: Uncertainty and Data Analysis
3	Sep 22, 2022 (Thu)	Chap. 2: Uncertainty and Data Analysis (cont.) Chap. 3: Electrical Measurement
4	Sep 29, 2022 (Thu)	Chap. 3: Electrical Measurement (cont.) <b>Assignment 1 released</b>
5	Oct 6, 2022 (Thu)	Chap. 4: Measurement Systems
6	Oct 13, 2022 (Thu)	Chap. 5: Temperature Measurement <b>Assignment 2 released</b>
7	Oct 20, 2022 (Thu)	Chap. 6: Pressure, Flow and Level Measurement
8	Oct 27, 2022 (Thu): Midterm Examination	Coverage: Chapters 1 to 4
9	Nov 3, 2022 (Thu)	Chap. 6: ... Flow and Level Measurement (cont.) Chap. 7: Force, Torque and Strain Measurements <b>Assignment 3 released</b>
10	Nov 10, 2022 (Thu)	Chap. 7: ... and Strain Measurements (cont.) Chap. 8: Motion, Vibration and Sound Meas..
11	Nov 17, 2022 (Thu)	Chap. 8: Motion, Vib... (cont.) <b>Assignment 4 released</b>
	Nov 24, 2022 (Thu)	Class suspension due to the "91st Congregation for the Conferment of Degrees"
12	Dec 1, 2022 (Thu)	Chap. 9: Optical Measurement
13	Dec 8, 2022 (Thu)	Revision
14	Dec 15, 2022 (Thu): Final Examination	Exciting and Challenging!

## **Grade Descriptor**

'A': EXCELLENT - exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

'B': GOOD - good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

'C': FAIR - adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.

'D': MARGINAL - performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

'F': FAILURE - performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

## **Enrollment Requirement**

For students in MSc Mechanical and Automation Engineering