The Hong Kong University of Science and Technology
UG Course Syllabus (Spring 2025-26)

[Course Title] IoT and Smart Sensing

[Course Code] COMP4531

[No. of Credits] 3-credits

[Any pre-/co-requisites]

COMP 1021 OR COMP 1022P OR COMP 1023 OR COMP 2011 OR COMP 2012H

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Course Description

The objective of this course is to introduce the spectrum of research on the Internet of Things (IoT) and smart sensing. The lectures cover a range of techniques in sensing, computing, communication, and wireless networking and connect them to various applications in analytics, localization, cyber-physical systems, mobile health, security, and wearables. This course is designed with multidisciplinary students in mind.

The course is designed to be self-contained. It will cover introductory materials on mathematics and signal processing basics. Familiarity with the undergraduate level calculus, probability, linear algebra, and programming is preferred.

List of Topics

1. Introduction of Internet-of-Things

2. Sensing and communication basics
    - 2.1 Introduction to sensing and sensors
    - 2.2 Wireless sensing and communication techniques

3. Wireless networking

4. Applications
    - 4.1 Localization & tracking
    - 4.2 Human activity recognition
    - 4.3 RFID and others

5. Security and privacy

Course Intended Learning Outcomes

This course is designed with multidisciplinary students in mind. Every topic begins from first principles and gradually ramps up to the system design, implementation, and application, helping students to understand the state-of-the-art developments in this area and initiate research. The students will also need to present state-of-art research and develop a real IoT based system in the class.

Intended Learning Outcomes (ILOs)

On successful completion of the course, students will be able to:

1. Design, implement and evaluate a IoT system to achieve smarting purpose with certain application domain, such as smart home or smart healthcare.
2. Use new techniques and tools necessary for practical IoT system design of concrete application domain, such as smart home or smart healthcare.
3. Apply knowledge of computing and mathematics appropriate to the IoT and smart sensing problem space.
4. Analyze the IoT system related problem, and identify and define the smart sensing requirements appropriate to its solution.
5. Explain and present the IoT system to audience with relatively technical background.
6. Communicate effectively with a range of audiences by presenting the state-of-art work related to IoT system and lead the related discussion.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage, and due dates; perhaps, add a summary table as below, to precede the details for each assessment.]

Assessment Task	Contribution to Overall Course grade (%)	Due date
Class involvement and discussions	10%	N.A.*
Midterm Exam	25%	TBA*
Lab assignments (eight assignments, each accounting for 5%)	40%	TBA *
Final project (group based) Project execution, demonstration and report	25%	TBA

* Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
[Assessed Task 1]	ILO5	This task assesses student participation in classroom and their ability to communicate and describe with IoT language.
[Assessed Task 2]	ILO3, ILO4	The mid-term exam will cover the topic 1-2, and will focus on evaluating students' ability to analyze and compute IoT questions and/or problems.
[Assessed Task 3]	ILO1, ILO2	There will be a total number of 8 lab assignments which will assess students' ability in designing, implementing, engineering IoT systems, as well as applying state-of-the-art techniques and tools in building IoT systems.
[Assessed Task 4]	ILO1, ILO2, ILO5, ILO6	The final project comprehensively evaluates students' ability in building working systems that will bring value to real IoT application scenarios. The evaluation will be based on system demonstration and illustration, which assesses students' performance in effective explanation and communication of IoT system/applications

Grading Rubrics (Assessment Rubrics)

[Detailed rubrics for each assignment will be provided. These rubrics clearly outline the criteria used for evaluation. Students can refer to these rubrics to understand how their work will be assessed.]

1. Class engagement
2. Quality of lab assignments and project (execution, presentation, demo, and report)
3. Mid-term exam grade

Final Grade Descriptors:

[As appropriate to the course and aligned with university standards]

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive and in-depth grasp of the subject matter, strong expertise in problem-solving and system building, and a high level of creativity and originality in thinking. Consistently exceeding core requirements to achieve and extend the intended learning outcomes.
B	Good Performance	Shows solid knowledge and understanding of the main subject matter, competent problem-solving skills and system building, and the ability to analyze and evaluate relevant issues. Demonstrates the ability to work effectively and constructively with others to achieve the intended learning outcomes.
C	Satisfactory Performance	Demonstrates adequate knowledge of the core subject matter, competence in addressing familiar problems, and some capacity for analysis and critical thinking. Shows reasonable effort and persistence in meeting broadly defined learning outcomes.
D	Marginal Pass	Demonstrates threshold knowledge of the core subject matter and a basic ability to make informed judgments. Shows potential to develop key professional skills and benefits from the course, but performance remains limited in depth, consistency, or independence.
F	Fail	Demonstrates insufficient understanding of the subject matter and inadequate problem-solving skills. Shows limited ability to think critically or analytically and minimal engagement with learning tasks. Does not meet the threshold requirements for progression or professional development in the discipline.

Course AI Policy

Students are allowed to use generative AI tools to assist their implementation and engineering of the course projects. They are not allowed to use the AI tools for mid-term exam.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include places with errors or to improve. Students who have further questions about the feedback including marks should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Late submission of lab assignments is allowed with penalties – student with legitimate medical reasons will be waived from penalties.

Required Texts and Materials (Text Book)

N/A

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to Academic Integrity | HKUST – Academic Registry for the University's definition of plagiarism and ways to avoid cheating and plagiarism.

Additional Resources (Reference books)

State-of-the-art research papers which may be updated from time to time