

The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] Digital Communications and Wireless Systems

[Course Code] ELEC4110

[No. of Credits] 3

[Pre-requisites] ELEC2100

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Course Description

The aim of this course is to provide a comprehensive treatment of the theory, analysis, and design of digital communications and introduce advance concepts such as M-ary modulation, signal space concept, wireless communication systems, cellular networks, 5G and beyond. The method of instruction will be through lectures, tutorial and project

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Recognize the key technological developments of digital communications and wireless systems
2. Identify the fundamental principles related to digital communication technology
3. Use Matlab to solve simple simulation problems in digital communications
4. Able to comprehend technical specifications and understand how and why practical wireless systems are designed

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
Mid-Term	25%	13/11/2025 *
In-course homework	15%	29/11/2025 *
Group Project	10%	5/12/2025 *
Final examination	50%	8/12/2025

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

Mapping of Course ILOs to Assessment Tasks

[add to/delete table as appropriate]

Assessed Task	Mapped ILOs	Explanation
Midterm, Homework and Final Exam	IL1, IL2, IL4	Multiple choice / short questions for students to demonstrate their recognition of the key technological developments of digital communications and wireless systems. Problem sets / written exam questions for students to apply their knowledge of digital communication theory to solve simple engineering problems
Group Project	IL3	Group term project (with project report) for students to apply their knowledge of digital communication theory

Grading 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.]

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 grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.]
B	Good Performance	[Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.]
C	Satisfactory Performance	[Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.]
D	Marginal Pass	[Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.]

F	Fail	[Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.]
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Course AI Policy

Students are allowed to use AI for homework and group project but they must be accountable for the correctness of the substance and cite the references correctly.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include [specific details, e.g., strengths, areas for improvement]. 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

Resubmission is not allowed.

Required Texts and Materials

Lecture notes will be self-contained. The following reference books are optional.

Reference Books:

- R. E. Ziemer and W. H. Tranter, "Principles of Communications: Systems, Modulation, and Noise, Houghton Mifflin, 4th Edition, 1995"
- John G. Proakis and M. Salehi, "Communication Systems Engineering, Prentice Hall, 1994"
- Simon Haykin, "Digital Communications, Wiley, 1988"
- R. Kwok, V.K.N. LAU, "Wireless Internet and Mobile Computing: Interoperability and Performance, John Wiley and Sons, 2007"

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.

[Optional] Additional Resources

[List any additional resources, such as online platforms, library resources, etc.]