Course Description Form of Communications I

1. Course Name:
Communications I
2. Course Code:
WBM-41-03
3. Semester / Year: 2025\2024
Semester
4. Description Preparation Date:
2023−09−23
5. Available Attendance Forms:
presence in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
75 Hours / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Mohammed Merza Email: ahmed.merza@uowa.edu.iq
8. Course Objectives

Course Objectives	■ clearly understand the meaning of terms like: 'Band-limited Signals', Nyquist rate, Aliasing, etc., derive the low pass sampling theorem and explain its implication. ■ explain the basic concept of time-division-multiplexing, ■ understand the way the amplitude of each sample of a continuous-time band-limited signal, is represented in PAM, PDM and PPM, ■understand the need for and the effect of quantization, different types of quantizers, and the need for companding of speech signals in PCM systems, ■explain the relationship between Q , the number of quantization levels; n, the bits per codeword; r, the bit-rate and B_T , the transmission bandwidth of a pulse-code modulated signal, ■determine the signal-to-quantization noise ratio as well as signal-to-noise ratio for PCM systems ■explain the operation of DM, ADM, DPCM, systems using the block diagrams of their transmitters and receivers, ■view information as removal of uncertainty, is familiar with the 'measure' of information and can determine the average rate at which a Discrete Memory Source (DMS) is giving information, ■understand the need for source coding' and can encode the output from a discrete memoryless source using Fano coding, Huffman coding. ■relate the concept of 'Mutual information' of a channel to information transfer through the channel and understands that Shannon's Information capacity theorem sets a fundamental limit on the rate at which error-free transmission can be achieved over power-limited, band-limited Gaussian channels.

9. Teaching and Learning Strategies	
Strategy	**1.Theoretical Lectures:** Instructors provide lectures on fundamental concep theories, and principles of communication engineering. This helps stude

	understand the theoretical underpinnings of different communication systems a technologies. **2. Practical Demonstrations:** Instructors demonstrate the practical applications of communication engineering concepts using real-world examples, simulations, and case studies. This helps students visualize how theoretical concepts are applied in practice. **3. Assessments**: Students are assessed through a combination of quizzes, exams, assignments, and practical assessments to evaluate their understanding of communication engineering concepts. Feedback from assessments helps students identify areas for improvement.

10. Course Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
1	3	Introduction to Communications System element	Lectures presen in PDF format	Daily exams + homework assignments + monthly exams
2+3	6	Signal representation using Fourier Series.	Lectures presented in PDF format	Daily exams homework assignments monthly exams
4	3	Signal Spectrum using Fourier Transform	Lectures presented in PDF format	Daily exams homework assignments monthly exams
5+6	6	Filters: Filtering action, Filters Classification based on (response:" ideal & practical" and mode), characteristics of filters response	Lectures presented in PDF format	Daily exams homework assignments monthly exams
7+8+9	9	Amplitude Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
10+11+12	9	Frequency Modulation	Lectures presented in PDF format	Daily exams homework assignments monthly
13+14	6	Noise in communication systems	Lectures presented in PDF format	**Daily exams homework assignments monthly**
15	3	Sampling Theorem	Lecture presented in PDF format	**Daily exams homework assignments monthly**

11. Course Evaluation

- Daily exams with practical and scientific questions.
- Participation scores for difficult competition questions among students
- Establishing grades for environmental duties and the reports assigned to them
- Semester exams for the curriculum, in addition to the mid-year exam and final exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if ar	-(McGraw) Schaum's Outlines of Signals & Systems. -(Communications Engineering) Michael F Fundamentals of Communications Systems-McGraw-I Professional (2007)
Main references (sources)	Theory and Problems of Analog and Dig Communications_2nd_Ed_Schaum's Outline Series.
Recommended books and references (scientific journals, reports…)	All reputable scientific journals that are related to broad concept of mathematical theories and their result