Course Description Form

1. Course Name:
Information theory and coding
2. Course Code:
CE4105
3. Semester / Year:
1 / 2023-2024
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
٤٥ hours / 30 units
7. Course administrator's name (mention all, if more than one name)
Name: Mustafa Dheyaa Hassib Email: mustafa.d.hassib@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Study the basic principles of the error probability in communications systems. • Study the basic principles of the coding theory in communications systems. • Providing the student with knowledge in the theoretical and analytical aspect of how to design efficient communication system.
9. Teaching and Learning Strategies	
Strategy	1. Lectures 2. Exercises 3. Homework 4. Reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Overview of Probability Theory	Introduction to Probability	Lectures, Tutorials	Quiz + Exam + HW
2	3	significance of “element” with respect to Information Theory	Sample space and Random Variables	Lectures, Tutorials	Quiz + Exam + HW
3	3	Relation between Random Variables and probability	Conditional and Joint probability	Lectures, Tutorials	Quiz + Exam + HW
4	3	Measure the Information	Modeling of Information Sources and Self Information	Lectures, Tutorials	Quiz + Exam + HW
5	3	Derive equations for entropy and mutual information	Entropy and Mutual Information	Lectures, Tutorials	Quiz + Exam + HW
6	3	Overview of Source Coding Theory	Source Coding Theory	Lectures, Tutorials	Quiz + Exam + HW
7	3	Analyses the performance of Shannon and Huffman algorithm	Shannon and Huffman algorithm	Lectures, Tutorials	Quiz + Exam + HW

8	3	Analyses the performance of Fano and Lempel Ziv. algorithm	Fano and Lempel Ziv. algorithm	Lectures, Tutorials	Quiz + Exam + HW
9	3	Overview of Binary Communication channels	Modeling of Communication channels	Lectures, Tutorials	Quiz + Exam + HW
10	3	Derive equations for capacity	Binary symmetric channel and Binary Erasure channel	Lectures, Tutorials	Quiz + Exam + HW
11	3	Overview of Channel coding Theory	Channel coding theorem	Lectures, Tutorials	Quiz + Exam + HW
12	3	Design Binary repetition code (encoding and decoding)	Binary repetition code	Lectures, Tutorials	Quiz + Exam + HW
13	3	Design linear block codes (encoding and decoding)	linear block codes for error correction	Lectures, Tutorials	Quiz + Exam + HW
14	3	Design cyclic codes (encoding and decoding)	Cyclic Codes	Lectures, Tutorials	Quiz + Exam + HW
15	3	Derive equations for capacity of coding system	Channel capacity of coding system	Lectures, Tutorials	Quiz + Exam + HW

11.Course Evaluation

Term Exam	Quizzes + HW	Final Exam
As(30%)	As(10%)	As(60%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Richard B. Wells, “Applied Coding and Information Theory for Engineers” Pearson Education, LPE 2004.
Main references (sources)	Thomas M Cover, Joy Thomas, “Elements of Information Theory”, MGH 2006.
Recommended books and references (scientific journals, reports...)	P.S. Satyanarayana, “Concepts of Information Theory and Coding”, Dynaram Publication, 2005
Electronic References, Websites	N/A

Course Description Form

1. Course Name:
Optical Networks I
2. Course Code:
CEO 4104
3. Semester / Year:
1 / 4th
4. Description Preparation Date:
27/9/2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)

30 hours / 30 units

7. Course administrator's name (mention all, if more than one name)

Name: Qussay Salim Tawfeeq
Email: qussay.tawfeeq@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Study the basic principles of the optical networks systems. • Study the operation principles of optical networks components. •Extending knowledge about optical networks applications

9. Teaching and Learning Strategies

Strategy	Lecture notes, homework, selective topics presentation

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understanding the need for optical Networks	Introduction to Optical Networks	Lecture	Quiz + Exam + HW
2	2	Characteristics of Optical Fiber	Emphasis on Non Linear Characteristics	Lecture	Quiz + Exam + HW
3	2	Characteristics of Optical Fiber	Timing & Synchronization	Lecture	Quiz + Exam + HW
4	2	Understand the operation principles of optical networks components	Couplers, Isolators & Circulators	Lecture	Quiz + Exam + HW
5	2	Understand the operation principles of optical networks components	Multiplexers and De-multiplexers, & Filters	Lecture	Quiz + Exam + HW
6	2	Understand the operation principles of optical networks components	Optical Amplifiers types and comparison	Lecture	Quiz + Exam + HW
7	2	Understand the operation principles of optical networks components	Tunable Laser, Switches.	Lecture	Quiz + Exam + HW
8	2	Understand the operation principles of optical networks components	Wavelength Converters	Lecture	Quiz + Exam + HW
9	2	Understanding Networks Fundamentals	SONET/SDH , Multiplexing, SONET/ SDH Layers,	Lecture	Quiz + Exam + HW
10	2	Understanding Networks Fundamentals	Frame Structure, Frame Structure, Physical Layer,	Lecture	Quiz + Exam + HW
11	2	Understanding Networks Fundamentals	Elements of a SONET/SDH Infrastructure	Lecture	Quiz + Exam + HW
12	2	Understanding Networks Fundamentals	ATM , Functions of ATM, Adaptation Layers, Quality of Service	Lecture	Quiz + Exam + HW
13	2	Understanding Networks Fundamentals	. WDM Network Elements , Optical Line Terminals,	Lecture	Quiz + Exam + HW

14	2	Understanding Networks Fundamentals	, Optical Line Terminals Optical Line Amplifiers,	Lecture	Quiz + Exam + HW
15	2	Understanding Networks Fundamentals	Optical Add/ Drop Multiplexers, Optical Cross Connects	Lecture	Quiz + Exam + HW

11.Course Evaluation

Term Exam	Quizzes + HW	Final Exam
As(30%)	As(10%)	As(60%)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Black, Uyless / "Optical Networks Third Generation Transport Systems"/ Pearson Educations.
Main references (sources)	Ramaswami, Rajiv & Sivarajan, Kumar N. / "Optical Networks a Practical perspective"/ Morgan Kaufmann Publishers / 2nd Ed.
Recommended books and references (scientific journals, reports...)	P.S. Satyanarayana, "Concepts of Information Theory and Coding", Dynaram Publication, 2005
Electronic References, Websites	N/A

Course Description Form

13. Course Name: Digital Signal Processing I
14. Course Code: CE 4106
15. Semester / Year: Semester
16. Description Preparation Date: 18/3/2024
17.Available Attendance Forms: Attending
18.Number of Credit Hours (Total) / Number of Units (Total): 3 / 2
19. Course administrator's name (mention all, if more than one name)

Name: Shayma Wail Nourildean
Email: shayma.w.nourildean@uotechnology.edu.iq

20. Course Objectives

Course Objectives	• **To teach the student the Discrete time signals and systems.** • **To teach the student the Sampling of continuous−time signals.** • **To teach the student DFT, Fast Fourier transform.** • **To teach the student the Z − transform.**

21. Teaching and Learning Strategies

Strategy	• Lecture method: By clarifying and explaining subjects that are difficult for the student to understand such as proves the laws, • Discussion Allow the student to participate in the group dialogue. • Tutorial: By giving the students examples to clarify various problems. • Practical presentations by using the video to present the lesson, and this method contributes to make the student master the lesson quickly and the consolidation of information in the mind of the student.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Motivation, advantages digital over analog.	Introduction	Lectures	Quiz+ Exam+ H.W.
2	3	The ability to understand Basic sequences (exponential, sinusodial, unit sample, unit step) and their properties	Discrete time signals and systems	Lectures	Quiz+ Exam+ H.W.

3	3	The ability to understand Systems: memoryless, linear, time invariant, causal, stable, dynamic, LTI, Discrete linear convolution	Discrete time signals and systems	Lectures	Quiz+ Exam+ H.W.
4	3	The ability to understand Ideal (periodic) sampling, frequency domain representation of sampling, nonideal sampling, aliasing,	Sampling of continuous-time signals	Lectures	Quiz+ Exam+ H.W.
5	3	The ability to understand yquist (sampling) theorem, Reconstruction, sinc-interpolation, Discrete-time processing of continuous-time signals, Antialiasing filtering	Sampling of continuous-time signals	Lectures	Quiz+ Exam+ H.W.
6	3	The ability to understand A/D conversion, sample & hold, Quantization, quantization errors, coding, D/A conversion, sample & hold.	Sampling of continuous-time signals	Lectures	Quiz+ Exam+ H.W.
7	3	The ability to understand Discrete Time Fourier Transform (DTFT), symmetry properties, Fourier analysis of periodic signals.	Discrete Fourier Transform and realization	Lectures	Quiz+ Exam+ H.W.
8	3	Studying the Definition DFT, inverse DFT, Properties: shift, linear/circular convolution with DFT,	Discrete Fourier Transform and realization	Lectures	Quiz+ Exam+ H.W.
9	3	Studying the using of the DFT in linear filtering, Spectral analysis of sinusoidal signals, leakage effect	Discrete Fourier Transform and realization	Lectures	Quiz+ Exam+ H.W.
10	3	Developing skills in windows (Hamming, Hanning, Blackman, Kaiser), mainlobe width, sidelobe level	Discrete Fourier Transform and realization	Lectures	Quiz+ Exam+ H.W.

11	3	Studying Fast Fourier Transform (FFT) Algorithm	Fast Fourier Transform FFT	Lectures	Quiz+ Exam+ H.W.
12	3	Studying Decimation in time (DIT), Decimation in Frequency (DIF),.	Fast Fourier Transform FFT	Lectures	Quiz+ Exam+ H.W.
13	3	Studying Definition, region of convergence (ROC), Right-sided, left-sided, two-sided z-transform	Z-Transform	Lectures	Quiz+ Exam+ H.W.
14	3	Studying Transfer function, Inverse z-transform: definition, residue theorem, partial fraction expansion	Z-Transform	Lectures	Quiz+ Exam+ H.W.
15	3	Properties: linearity, time shift, multiplication by an exponential sequence, differentiation, conjugation of a complex sequence, convolution	Z-Transform	Lectures	Quiz+ Exam+ H.W.

23. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- -Pall A. Lynn, Digital signal processing with Computer applications, 2nd edition, 1998. 2-Emmanuel C. Ifeachor, Digital Signal Processing, 1993.
Main references (sources)	Digital Signal Processing Fundamentals and Applications, Li Tan and Jean Jiang, second edition
Recommended books and references (scientific journals, reports…)	3- Advanced Engineering Mathematics, by O'Neil 4- Robert J. Schilling and Sandra L. Harris, Digital Signal Processing Using MATLAB, 3rd Edition, 2015. 5-Joan C. Proakis and Dimitris G. Manolakis, Digital Signal Processing: Principles, Algorithms and Applications.

Electronic References, Websites	Lecture Notes and videos.

Course Description Form

1. Course Name:
Data communication and computer network
2. Course Code:
CE4107
3. Semester / Year:
1 / 2023-2024
4. Description Preparation Date:
19/3/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. prof. Dr. wael A. H. Hadi Email:wael.a.hadi@uotechnology.edu.iq
8. Course Objectives

Course Objectives	To provide the student with knowledge a basics of data transmission and computer networks. To provide the student with knowledge the types of network topology To provide the student with knowledge of the OSI layers. To have knowledge types of switching techniques To have knowledge on wire and wireless LAN.

9. Teaching and Learning Strategies

Strategy	1. Lectures 2. Exercises 3. Homework 4. Reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Overview of computer network	**Introductions**	Lectures, Tutorials	Quiz + Exam + HW
2	4	Topology types and OSI layers	**Topology and OSI layers**	Lectures, Tutorials	Quiz + Exam + HW
1	2	Types of source encoding advantages and disadvantages	**Data encoding and decoding**	Lectures, Tutorials	Quiz + Exam + HW
1	2	Types and performance of transmission media	**Transmission media**	Lectures, Tutorials	Quiz + Exam + HW
2	4	Types of switching techniques and switch design	**Switching**	Lectures, Tutorials	Quiz + Exam + HW
1	2	Overview of telephone network and modems	**Telephone Network**	Lectures, Tutorials	Quiz + Exam + HW

2	4	Types of multiple access techniques	**Multiple access techniques**	Lectures, Tutorials	Quiz + Exam + HW
2	4	Analyses the types performance of wire LAN	**Wire LAN**	Lectures, Tutorials	Quiz + Exam + HW
2	4	Analyses the types performance of wireless LAN	**Wireless LAN**	Lectures, Tutorials	Quiz + Exam + HW
1	2	Study the Intenet protocols	**Internet and TCP/IP**	Lectures, Tutorials	Quiz + Exam + HW

11.Course Evaluation

Term Exam	Quizzes + HW	Final Exam	
As(30%)	As(10%)	As(60%)	

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Behrouz A. Forouzan "Data communication and networking " Fourth Edition 2007.
Recommended books and references (scientific journals, reports...)	William Stallings " Data and Computer Communications" Fifth edtion 2003
Electronic References, Websites	N/A