

وزارة التعليم العالي والبحث العلمي
جهاز الاشراف والتقويم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للعام الدراسي ٢٠٢٥-٢٠٢٦ للكليات والمعاهد

الجامعة : جامعة شط العرب الاهلية

الكلية \المعهد : الكلية التقنية الهندسية

القسم العلمي : قسم هندسة تقنيات الحاسوب

تاريخ ملء الملف : ٢٠٢٥/٩/١١

التوقيع

اسم المعاون العلمي : م. د. عصام خليل ابراهيم

التاريخ : ٢٠٢٥/٩/١١

م. عصام خليل ابراهيم
معاون العميد للشؤون العلمية

التوقيع

اسم رئيس القسم : م. د. عبد الجبار عبد الله

التاريخ : ٢٠٢٥ / ٩ / ١١

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي

٢٠٢٥ / ٩ / ١١

مصادقة السيد العميد

أ.م.د. هازن عبداللّه علوان

عميد الكلية التقنية الهندسية

Ministry of Higher Education and Scientific Research

Supervision and Scientific Evaluation Body

Quality Assurance and Academic Accreditation Office

Course Description Sample

Subject:

Information Theory and Coding.

1. Educational Institution	Shatt Al Arab University
2. Department / Center	Computer Engineering Techniques.
3. Course Title /Code	Information Theory and Coding
4. Lecturer Name	MSC. Mays Ali Al-Shabaab
5. Type of Teaching	Theory – Lab – Tutorial
6. Academic Year /Term	2024/2025
7. Total No. of Teaching Hours	120
8. Date of Preparing this Course Description	10/9/2025

9. Course Objectives

To define and apply the basic concepts of information theory (entropy, channel capacity etc.)
To study different types of channels in communication
To learn the principles and applications of information theory in communication systems
To study various data compression methods and describe the most common such methods
To understand the theoretical framework upon which error-control codes are built

10. Course Output, Methodology and Evaluation

(A) Cognitive Objectives

1. quantify the notion of information in a mathematically sound way
2. explain what is the significance of this quantitative measure of information in the communications systems
3. calculate entropy, joint entropy, relative entropy, conditional entropy, and channel capacity of a system
4. differentiate between lossy and lossless compression techniques
5. decide an efficient data compression scheme for a given information source
6. explain the impact of feedback and/or many senders or receivers on the communication systems

(B) Skill Objectives Related to the Program:

3. 1-Knowing the construction and quantitative measures of information in the communications systems
- 2-Knowing how to calculate entropy, joint entropy, relative entropy, conditional entropy, and channel capacity of a
- 3- Knowing to learn the principles and applications of information theory in communication systems ,To study various data compression methods and describe the most common such methods →To understand the theoretical framework upon which error-control codes are built

Methods of Teaching and Learning

- 1-Lecturers.
- 2-Class discussion.
- 3-Lab Experiments.
- 4-Researchs.
- 5-Homework.

Methods of Evaluation

Number	calendar element	degree
1-Examinations.		
2-Lab Experiments.		
3-Quizz.		
4-Oral Exam.		
5-Researchs.		

(C) Sentimental and Value Objectives

- 1- Observation and perception.
- 2- Analysis and interpretation.
- 3- Conclusion and evaluation.
- 4- Numbers and evaluation.
- 5- Testing students' attention through sudden questions during the explanation.
- 6- Breaking the stereotypical aspect of the lecture with different methods to transform the student from the role of passive recipient to the role of active participant

Methods of Teaching and Learning

- 1- Explanation and clarification (lecture).
- 2- Method of presenting selected models of illustrative questions and their solutions.
- 3- Lecture in which students participate in preparing.
- 4- Method of self-learning (assigning students to complete learning some skills after giving them their basics).

Methods of Evaluation

- 1- Regular and surprise theoretical tests.
- 2- Practical assignments and tests.
- 3- Reports and studies (non-mandatory).

D) General and Qualitative Skills (other skills related to the ability of employment and personal development)

- 1- Developing the student's leadership skills.
- 2- Developing the student's mental fitness during the lecture by continuously directing questions.
- 3- Developing mathematical and design computational skills in the field of digital computer components.
- 4- Developing the student's language skills to increase the ability to express his ideas.

11. Course Structure

(In the table of course weekly outline)

Week	No of Hours	Required Learning Output	Title of Subject	Teaching Method	Evaluation
1-5	20	Information rate and entropy, Measure of Information, Properties of entropy of a binary memoryless source	Introduction to information theory	Lecture/Laboratory	Daily Participation/Tests
6-9	16	Joint entropy, Conditional entropy, relative entropy, Mutual information, Discrete memoryless channels-BSC, BEC, noise-free channel, Channel with independent I/	Entropy, Relative Entropy, and Mutual Information	Lecture/Laboratory	Daily Participation/Tests
10-13	16	Channel capacity, Shannon limit, Source Coding, Shannon Fano coding, Shannon Fano Elias coding, Huffman coding, Minimum variance Huffman coding, Adaptive Huffman coding, Arithmetic coding.	Lossless Compression	Lecture/Laboratory	Daily Participation/Tests
14-17	16	Hamming weight, Hamming distance, Minimum distance decoding–Single parity codes, Hamming codes	Communication and Channel Capacity	Lecture/Laboratory	Daily Participation/Tests
18-23	24	Repetition codes–Linear block codes, Cyclic codes–Syndrome calculation, Encoder and decoder	Encoding Decoding Schemes	Lecture/Laboratory	Daily Participation/Tests
24-30	28	Principle of coding, Interleaved convolutional codes, Special topics in information.	Special Top in coding	Lecture/Laboratory	Daily Participation/Tests

12. Infrastructure

a. Textbooks	Coding and Information Theory by Steven
b. References	1. Coding and Information Theory (Book by Richard Hamming).

	2. Information Theory & Coding by J.S.Chitode
c. Recommended books and periodicals (journals, reports, etc.)	
d. Electronic references, internet websites, etc	Google

13. The Plan of Improving the Course

Supporting and enhancing the lectures with the developments in the subject's specialization, which concern microprocessors and their modern uses in the fields of data processing.