Republic of Iraq
Ministry of Higher Education & Scientific Research Supervision and Scientific Evaluation
Directorate Quality Assurance and Academic Accreditation International Accreditation Dept.

Academic Program Specification Form for The Academic

University: Diyala
College: Engineering
Number Of Departments in The College: 02
Date Of Form Completion :17/9/2023

Prof. Dr. Anees A. Khadom
The Dean
Date :17/9/2023
Signature

Assist. prof. Dr. Jabbar Q. Jabbar
Dean's Assistant for Scientific Affairs
Date :17/9/2023
Signature

Assist. prof. Dr. Salah N Farhan
The College Quality Assurance and University Performance Manager
Date :17/9/2023
Signature

Quality Assurance And University Performance Manager Date : / /
Signature

TEMPLATE FOR PROGRAMME SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It is supported by a specification for each course that contributes to the program.

1. Teaching Institution	University of Diyala
2. University Department/Centre	College of Engineering
3. Program Title	Electronic Engineering
4. Title of Final Award	BSc in Electronic Engineering
5. Modes of Attendance offered	Courses
6. Accreditation	N/A
7. Other external influences	None
8. Date of production/revision of this specification	17/09/2023

9. Aims of the Program

- Preparing the student scientifically to work in the field of electronic engineering
- Build and prepare the student psychologically to play his role as a reliable engineer in this field.
- Building students capable of competing with other engineers for job opportunities and obtaining the required seats to complete postgraduate studies.
- Ability to submit to external tests by local, regional or international bodies for the purpose of completing studies or appointment.
- Urging the student to be creative and think about specialization projects and keep pace with developments in this field.
- Providing students with scientific, practical and personal skills that enable them to solve practical problems and deal with them using scientific concepts.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Cognitive goals A1- Teaching the student the principles of how electronic circuits work and how to deal with algorithms.
A2- Enabling students to obtain knowledge and understanding in working on and designing electronic circuits.
A3- Teaching the student the methods of forming electronic components and their interconnection.
A4- Enabling students to obtain knowledge and understanding of designing everything related to electronic circuits.
A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various electronic circuits.
A6- Teaching the student the foundations of solving programming problems, computer networks, and communications.

B. The skills goals special to the program.
B1 - Explanation of electronic circuits principles topics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.
B2 - Providing them with skills to solve practical problems related to various electronic systems and circuits for addressing and solving technical problems in various fields of computerized work.

Teaching and Learning Methods

- Providing students with the basics and additional topics related to previous educational outcomes and skills to solve practical problems.
- Solving a group of practical examples by the academic staff.
- Students participate during the lecture in solving some practical problems.
- The department's scientific laboratories are monitored by the academic staff.

Assessment methods

- Daily exams with practical and scientific questions.
- Participation marks for difficult competition questions among students.
- Assigning grades to homework assignments and reports assigned to them.
- Monthly exams for the curriculum in addition to the final exam.

C. Affective and value goals
C1- Enabling students to think and analyze topics related to the engineering framework, such as various logical circuits.
C2- Enabling students to think and analyze topics related to electronic devices related to the engineering framework.
C3- Enabling students to think and analyze topics related to solving practical problems.

Teaching and Learning Methods

- Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.
- Forming discussion circles during or outside lectures to discuss scientific engineering topics that require thinking and analysis.
- Asking students, a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.
- Giving students homework and periodic reports.

Assessment methods

- Daily exams with practical and scientific questions.
- Participation marks for difficult competition questions among students.
- Assigning grades to homework assignments and reports assigned to them.
- Semester exams for the curriculum in addition to the final exam.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1- Enabling students to write reports and notes on various branches of electronic engineering.

D2- Enabling students to know how to use the Internet to obtain important information.

D3- Raising the student's self-confidence by linking theoretical material to practical reality.

D4- Developing students' skills in how to deal with computer hardware and software problems and how to deal with them.

Teaching and Learning Methods

- Through the Daily lectures by seminar and discussions
- discussion circles during lectures to discuss scientific engineering topics that require thinking and analysis.
- Asking students, a set of thinking questions during lectures, such as (what, how, when, why) for specific topics

Assessment Methods

- Evaluating the seminar and reports that submitted by students and providing them with the necessary feedback to improve their skills and self confidence

11. Program Structure				12. Awards and Credits
Level/Year	Course or Module Code	Course or Module Title	Credit rating	
1st Year-1st Semester	E 101	Mathematics 1	6	Bachelor Degree Requires (155) credits
1st Year-1st Semester	EE 101	Electrical Engineering Fundamentals 1	8	
1st Year-1st Semester	EE 107	Electronic Physics	6	
1st Year-1st Semester	EE 106	Engineering Drawing	4	
1st Year-1st Semester	U 103	Computer Skills	4	
1st Year-1st Semester	U 104	English Language	2	

1st Year-2nd Semester	E 102	Mathematics 2	6
1st Year-2nd Semester	EE 102	Electrical Engineering Fundamentals 2	8
1st Year-2nd Semester	EE 103	Digital techniques	7
1st Year-2nd Semester	EE 105	C++ Programming	4
1st Year-2nd Semester	EE 104	Workshops skills	3
1st Year-2nd Semester	U 101	Human Rights and Democracy	2
2nd Year-1st Semester	E201	Advance Mathematics –I	3
2nd Year-1st Semester	EE 201	Electronics I	2
2nd Year-1st Semester	EE 203	Electric Circuits Analysis I	2
2nd Year-1st Semester	EE 205	Advanced Programming	1
2nd Year-1st Semester	EE 208	Electro-Magnetics I	2
2nd Year-1st Semester	EE 210	Digital Electronic I	2
2nd Year-1st Semester	EE 206	Machines (DC)	2
2nd Year-2nd Semester	E202	Advance Mathematics- II	3
2nd Year-2nd Semester	EE 202	Electronics II	3
2nd Year-2nd Semester	EE 204	Electric Circuits Analysis II	2
2nd Year-2nd Semester	EE 212	Measurement &Instruments	2
2nd Year-2nd Semester	EE 209	Electro-Magnetics II	2
2nd Year-2nd Semester	EE 211	Digital Electronic II	3
2nd Year-2nd Semester	EE 207	Power and AC Machines	4
2nd Year-2nd Semester	EE 213	University Culture Activity	-

3rd Year-1st Semester	EE 301	Digital Signal Processing I	2
3rd Year-1st Semester	EE 309	Advanced Electronics I	3
3rd Year-1st Semester	EE 303	Communication Systems I	3
3rd Year-1st Semester	EE 305	Microprocessor and Microcontroller: Hardware	3
3rd Year-1st Semester	EE 307	Engineering Analysis I	2
3rd Year-1st Semester	EE 311	Antenna	3
3rd Year-2nd Semester	EE 312	Engineering Administration	2
3rd Year-2nd Semester	EE 302	Digital Signal Processing II	3
3rd Year-2nd Semester	EE 310	Advanced Electronics II	3
3rd Year-2nd Semester	EE 304	Communication Systems II	3
3rd Year-2nd Semester	EE 306	Microprocessor-Based System: Programming	2
3rd Year-2nd Semester	EE 308	Engineering Analysis II	2
3rd Year-2nd Semester	EE 313	Optoelectronics	2
Fourth Year-1st Semester	EE 401	Microelectronic I	2
Fourth Year-1st Semester	EE 403	Power Electronics I	3
Fourth Year-1st Semester	EE405	Control System I	3
Fourth Year-1st Semester	EE407	Digital System Design	3
Fourth Year-1st Semester	EE 409	Information Theory	3
Fourth Year-1st Semester	EE411	Hardware Description Language (HDL) Programming	3
Fourth Year-2nd Semester	EE 413	Introduction to AI	2
Fourth Year-2nd Semester	E402	Eng. Graduation Project I	2

Fourth Year- 2nd Semester	EE402	Microelectronic II	2
Fourth Year- 2nd Semester	EE404	Power Electronics II	3
Fourth Year- 2nd Semester	EE406	Control System II	3
Fourth Year- 2nd Semester	EE408	Advanced Digital System Design	3
Fourth Year- 2nd Semester	EE410	Microwave	2
Fourth Year- 2nd Semester	E401	Engineering Profession Ethics	2
Fourth Year- 2nd Semester	EE412	Digital Image Processing	2
Fourth Year- 2nd Semester	E403	Eng. Graduation Project II	2

13. Personal Development Planning
It is planned to develop the students' personalities by holding discussion circles with them and asking them for periodic reports and seminars throughout the four stages and on various topics to develop their personal development.
14. Admission criteria .
According to the rules and regulations of Ministry of Higher Education and Scientific Research.
15. Key sources of information about the program
• College website. • The department's website and contact the department by email.

Curriculum Skills Map																	
please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed																	
				Programme Learning Outcomes													
Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific skills				Thinking Skills				General and Transferable Skills (or) Other skills relevant to employability and personal development			
				A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
4th Year-1st Semester	**EE 409**	Information Theory	C	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Diyala
2. University Department/Centre	College of Engineering
3. Course title/code	Information Theory– EE 409
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	1st Semester – 4th Year
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
The subject of Information Theory aims for the student to learn during the academic year how to convert analogue signals into digital signals, and how to transmit these digital signals through several types of transmission channels used in digital communications systems. The student also learns information compression techniques to obtain high transmission efficiency and error detection and correction techniques. During this subject, the student deals with digital signals and applies all techniques practically using the MATLAB program.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals.

A1- the student learns how to deal with the electrical signal statistically.

A2- Learn and understand the process of converting analogue signals into digital data.

A3- Learn and understand the foundations of the information process with high transmission capacity.

A4- Learn and understand the foundations of detection and correction errors.

B. The skills goals special to the course.

B1 - Learn how to deal with signal and statistics

B2- Learn about the information.

B3- Familiarity with the basic concepts of the types of channels.

Teaching and Learning Methods

- The lecturer prepares lectures on the subject in paper and electronic form and presents them to the students.
- The lecturer delivers lectures in detail.
- The lecturer requests periodic reports and homework assignments on the basic topics of the subject.

Assessment methods

- Daily discussion to determine the extent of students' understanding of the material and to evaluate the daily contributions.
- Daily exams with various short scientific questions to understand the extent of their understanding of the material.
- Giving part of the semester's grade to homework assignments.
- Daily exams (Quiz) and monthly exams for the curriculum and the final exam

C. Affective and value goals

C1- Urging the student to make a profit from statistics.

C2- Urging the student to think about the importance of dealing with digital data.

C3- Urging the student to think and understand transformatively in an alternative way to digital.

C4- Urging the student to think and understand the old method of compressing the discovered information and correcting it for that

Logarithms using MATLAB describe these operations.

C5- Urging the student to think about choosing leading and contributing digital communications departments

Implementing the process of transmitting and receiving electromagnetic waves

Teaching and Learning Methods

- Providing students with the basics, additional topics, and field experiences related to the outcomes of thinking and analysis.
- Forming discussion circles during or outside lectures to discuss scientific engineering topics that require thinking and analysis.

- Asking students, a set of thinking questions during lectures, such as (what, how, when, why) for specific topics.

Assessment methods

- Daily exams with practical and scientific questions.
- Participation marks for difficult competition questions among students.
- Assigning grades to homework assignments and reports assigned to them.
- Semester exams for the curriculum in addition to the final exam.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1- Enabling students to write reports on topics related to digital communications.
D2- Enabling students to link theories to the practical reality of electrical circuits.
D3- Enabling students to self-develop after graduation.
D4- Establishing special seminars for the civil service for self-defense.

Week	Hours	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	3	Introduction: Basic Elements of Digital Communication Systems	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 2	3	Review of probability and random variables: Elementary Concepts in Probability,	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 4	3	Introduction to information measurement, the types of entropies and channel capacity.	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 5	3	Introduction to information measurement,	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 6	3	the types of entropies and channel capacity: Source of information; Uncertainly; Information & entropy;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 7	3	joint and conditional entropies; mutual information; Discrete memory-less channels;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 8	3	Memory channel; Channel model BSC; Channel capacity.	Lectures Notes PDF	Daily exams + monthly exams

			power point Video	
Week 9	3	The techniques of source coding and data compression: Mathematical model of information source; Huffman coding; Shannon-Fano codes;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 10	3	Types of errors. Error control coding (channel coding):	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 1 1	3	Source of errors; Information rate; Galois field modem algebra;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 1 2	3	Taxonomy of codes; linear block codes;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 13	3	Minimum distance & correction; Hamming code; cyclic code;	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 14	3	Convolution encoder; (connection of convolution, representation, code tree, trellis diagram, state diagram);	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 15	3	Maximum likelihood decoding; Viterbi algorithm.	Lectures Notes PDF power point Video	Daily exams + monthly exams

11. Infrastructure	
1. Books Required reading:	Information Theory and Coding Dr J S Chitode -
2. Main references (sources)	• Lectures presented by the Lecturer • Books available in the college library
A- Recommended books and references (scientific journals, reports…).	

B-Electronic references, Internet sites…	Any other materials available on the web.