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
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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 electronics 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- Understand and teach the student the foundations of electrical and mathematical engineering related to the science of electrical engineering and teach him electrical circuits and everything related to them.

A2- Enabling students to obtain knowledge and understanding in working on modern electronic systems and in analyzing programs related to those systems.

A3- The student will understand the methods of generating the electromagnetic signal, the methods of its propagation in various media, the possibility of transferring it from one place to another, and its impact on the performance of electronic devices.

A4- Enabling students to obtain knowledge and understanding of designing and implementing various electronic systems.

A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various electronic devices.

A6- The student will understand the foundations of creating and programming electronic circuits in different hardware languages.

A7- Enabling the student to visualize project management and solve the problems he encounters in the factory.

A8- Enabling the student to use the calculator and build computer programs for the purpose of simulating electronic systems.

A9- Enabling the student to analyze and design control systems.

B. The skills goals special to the program.

B1 - An explanation of the topics of the foundations of electrical engineering and electronic physics by specialists in the subject, with an emphasis on the use of mathematics as a basis for understanding and learning.

B2 - Provides them with skills to solve practical problems related to various electronic systems and computer programs for electronic systems.

B3 - Topics of wave propagation are presented along with topics of electromagnetic energy transfer, and emphasis is placed on mathematical topics, electrical circuits, and antenna topics together to convey paragraph 1 to the student.

B4 - The focus is on the topics of design and analysis of electronic systems and their development with intelligent industrial minds.

B5- Providing them with skills in choosing the factory location, planning it, and classifying the administrative levels according to the size of the factory.

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 digital systems 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.

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	**EE411**	**Hardware Description Language (HDL) Programming**	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	Hardware Description Language (HDL) Programming – EE 411
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	1st Semester – 4th Year
6. Number of hours tuition (total)	45 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
The Digital System Designs course aims to teach the student methods for designing synchronous and asynchronous digital systems and methods for implementing them using digital gates and programmed digital arrays. In addition to qualifying the student to be a designer of advanced digital systems by developing his engineering sense, starting with the process of building the idea, passing through learning the necessary steps for design, and ending with the final examination of the designed system.	

9· Learning Outcomes, Teaching ,Learning and Assessment Method

A- Cognitive goals.

A1- Knowing the basic components of various digital systems, the mathematical model, and methods of analyzing them.

A2- During the academic year, the student learns methods for designing synchronous and asynchronous digital systems.

A3- Learn and understand the types of programmed digital arrays and ways to use them in implementing digital systems.

A4- Learn to exploit the scientific resources acquired during the academic years and employ them in analyzing and designing digital systems

B. The skills goals special to the course.

B1 - Familiarity with the mathematical models required to design synchronous and asynchronous digital systems.

B2- Familiarity with how to design and programming the digital circuit system.

B3- Familiarity with the design steps that must be followed for the purpose of converting the flow chart into a digital electronic system.

B4- Familiarity with how to implement digital systems using different types of programmed digital arrays, as well as the programming the digital circuit system.

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 understand the purpose of studying the subject in general.

C2- Urging the student to think about the importance of digital systems in facilitating contemporary life.

C3- Urging the student to think about the importance of the impact of digital systems on the development of scientific research methods.

C4- Urging the student to think and follow the rapid development of digital systems.

C5- Urging the student to think about how to develop himself in the field of HDL programming.

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 systems design.
D2- Enabling students to link theories with the practical reality of digital electronic systems.
D3- Enabling students to pass professional tests organized by local or international bodies.
D4- Enabling students to continue self-development after graduation.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	3	Introduction to HDL Programming	Introduction to HDL Language -	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 2	3	Overview HDL programming language VHDL & Verilog	programming language VHDL & Verilog	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 3	3	Verilog HDL Keywords and Syntax, Data Types and Operators	Verilog Introduction	Lectures Notes PDF power point Video	Daily exams + monthly exams

Week 4	3	Verilog Statements, Wire and gate-level Keywords,	Verilog Introduction	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 5	3	Structure of a Verilog Program:	Verilog HDL. Concept	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 6	3	Example of gate instantiation (AND, NAND, OR, NOR, XOR, XNOR), User Defined Primitives,	Coding in Verilog	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 7,8 &9	3	Verilog Examples: (Full Adder, 2-to-1 multiplexer , 2-to-4 decoder, 4-bit comparator),	Coding in Verilog	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 10	3	Modelling Circuit Delay	Verilog HDL. Structure	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 11 &12	3	Verilog: HDL Examples (D Flip-flop, Multiplier, ROM and RAM)	Coding in Verilog	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 13&14	3	Field Programmable Gate Array (FPGA)	FPGA programmable logic components	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 15	3	Test bench Stimulus	Quartus II & ModelSim software	Lectures Notes PDF power point Video	Daily exams + monthly exams

11. Infrastructure	
1. Books Required reading:	1. Fundamentals of Digital Logic with Verilog Design (S. Brown and Z. Vranesic)
2. Main references (sources)	2. The Verilog Hardware Description Language (Thomas, Moorby). 3. Verilog Tutorial .
A- Recommended books and references (scientific journals, reports…).	All scientific books and journals related to the design of digital systems. • Lectures presented by the Lecturer • Books available in the college library
B-Electronic references, Internet sites…	Any other materials available on the web.
12. The development of the curriculum plan: Proposing to change the curriculum from semester to Bologna course contributes to developing the curriculum	