

*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*

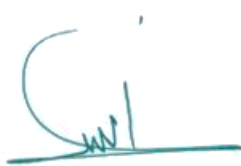
*University: Diyala*  
*College: Engineering*  
*Number Of Departments in The College: 02*  
*Date Of Form Completion :17/9/2023*

*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	
<ul style="list-style-type: none"><li>• Preparing the student scientifically to work in the field of computer engineering</li><li>• Build and prepare the student psychologically to play his role as a reliable engineer in this field.</li><li>• Building students capable of competing with other engineers for job opportunities and obtaining the required seats to complete postgraduate studies.</li><li>• Ability to submit to external tests by local, regional or international bodies for the purpose of completing studies or appointment.</li><li>• Urging the student to be creative and think about specialization projects and keep pace with developments in this field.</li><li>• Providing students with scientific, practical and personal skills that enable them to solve practical problems and deal with them using scientific concepts.</li></ul>	

## 10. Learning Outcomes, Teaching, Learning and Assessment Methods

- A. Cognitive goals
- A1- Teaching the student the principles of how computers work and how to deal with computer algorithms.
  - A2- Enabling students to obtain knowledge and understanding in working on and designing electronic computers.
  - A3- Teaching the student the methods of forming computer parts and their interconnection.
  - A4- Enabling students to obtain knowledge and understanding of designing everything related to computer microprocessors.
  - A5- Enabling students to obtain knowledge and understanding of diagnosing faults and maintaining various computer devices.
  - 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 computer 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 computer systems and computer programs 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 computer 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.

**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 computer 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**

Level/Year	Course or Module Code	Course or Module Title	Credit rating	12. Awards and Credits
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	E 101	Mathematics 1	6	
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	EE 101	Electrical Engineering Fundamentals 1	8	
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	EE 107	Electronic Physics	6	
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	EE 106	Engineering Drawing	4	
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	U 103	Computer Skills	4	
1 <sup>st</sup> Year-1 <sup>st</sup> Semester	U 104	English Language	2	

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

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

Fourth Year- 2 <sup>nd</sup> Semester	EE402	Microelectronic II	2
Fourth Year- 2 <sup>nd</sup> Semester	EE404	Power Electronics II	3
Fourth Year- 2 <sup>nd</sup> Semester	EE406	Control System II	3
Fourth Year- 2 <sup>nd</sup> Semester	EE408	Advanced Digital System Design	3
Fourth Year- 2 <sup>nd</sup> Semester	EE410	Microwave	2
Fourth Year- 2 <sup>nd</sup> Semester	E401	Engineering Profession Ethics	2
Fourth Year- 2 <sup>nd</sup> Semester	EE412	Digital Image Processing	2
Fourth Year- 2 <sup>nd</sup> 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
2 <sup>nd</sup> Year-1 <sup>st</sup> Semester	EE201	Analogue Electronics I	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	Analogue Electronics I/ EE 201
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	1 <sup>st</sup> Semester – 2 <sup>nd</sup> 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 Analogue Electronics I course aims for the student to learn how to install the electronic elements that are used in building amplifiers, how they work, how they are used in many applications, the most important of which is amplification, and how to use different biasing methods in order to be used in the desired application. The analysis of these amplifiers and how to calculate the mathematical relationships through which the amount of amplification is found and quantities related to the amplification process are also studied. It is also studied to analyze and measure the amount of amplification of electronic circuits consisting of several amplifiers and how they are connected in different ways in order to give the required features and through those features they are used. Finally, the student studies the electronic elements, which consist of four elements, how they work, and their various characteristics, which gives the student knowledge and a wide range of electronic applications.

## 9· Learning Outcomes, Teaching ,Learning and Assessment Method

#### 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 course.

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 a factory location, planning it, and classifying administrative levels according to the size of the factory.

#### 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 understand the operation of each function or code within the language.
- C2- Urging the student to think about how to develop himself in the field of computers.
- C4- Making the student able to deal with the calculator and how to use the programs.

#### 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 analogue electronics.
- D2- Enabling students to link theories to the practical reality of electrical circuits.
- D3- Enabling students to pass professional tests organized by local or international bodies.
- D4- Enabling students to continue self-development after graduation.
- D5- Establishing special seminars for students for the purpose of self-development of their personalities.

## 10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1- Week 2	6	<ol style="list-style-type: none"> <li>1. Describe the structure of an atom.</li> <li>2. Discuss insulators, conductors, and semiconductors and how they differ.</li> <li>3. Describe how current is produced in a semiconductor.</li> <li>4. Describe the properties of n-type and p-type semiconductors.</li> <li>5. Describe how a pn junction is formed.</li> </ol>	Introduction to Electronics	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 3- Week 4	6	<ol style="list-style-type: none"> <li>1. Use a diode in common applications.</li> <li>2. Analyze the voltage-current (<math>V-I</math>) characteristic of a diode.</li> <li>3. Explain how the three diode models differ.</li> <li>4. Explain and analyze the operation of half-wave rectifiers.</li> <li>5. Explain and analyze the operation of full-wave rectifiers.</li> <li>6. Explain and analyze power supply filters and regulators.</li> <li>7. Explain and analyze the operation of diode limiters and clampers.</li> <li>8. Explain and analyze the operation of diode voltage multipliers.</li> </ol>	Diodes and applications	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 5- Week 6	6	<ol style="list-style-type: none"> <li>1. Describe the characteristics of a zener diode and analyze its operation.</li> <li>2. Apply a zener diode in voltage regulation.</li> <li>3. Describe the varactor diode characteristic and analyze its operation</li> <li>4. Discuss the characteristics, operation, and applications of LEDs, quantum dots, and photodiodes.</li> <li>5. Discuss the basic characteristics of several types of diodes.</li> </ol>	Special-Purpose Diodes	Lectures Notes PDF power point Video	Daily exams + monthly exams

Week 7- Week 9	9	<ol style="list-style-type: none"> <li>1. Describe the basic structure of the BJT.</li> <li>2. Discuss basic BJT operation.</li> <li>3. Discuss basic BJT parameters and characteristics and analyze transistor circuits.</li> <li>4. Discuss how a BJT is used as a voltage amplifier.</li> <li>5. Discuss how a BJT is used as a switch.</li> <li>6. Discuss the phototransistor and its operation.</li> <li>7. Identify various types of transistor packages.</li> </ol>	Bipolar Junction Transistors (BJT)	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 10- Week 12	9	<ol style="list-style-type: none"> <li>1. Discuss and determine the dc operating point of a linear amplifier.</li> <li>2. Analyze a voltage-divider biased circuit.</li> <li>3. Analyze an emitter bias circuit, a base bias circuit, an emitter-feedback bias circuit, and a collector-feedback bias circuit.</li> </ol>	Transistor Bias Circuits	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 13- Week15	9	<ol style="list-style-type: none"> <li>1. Describe amplifier operation.</li> <li>2. Discuss transistor models.</li> <li>3. Describe and analyze the operation of common-emitter amplifiers.</li> <li>4. Describe and analyze the operation of common-collector amplifiers.</li> <li>5. Describe and analyze the operation of common-base amplifiers.</li> <li>6. Describe and analyze the operation of multistage amplifiers.</li> <li>7. Discuss the differential amplifier and its operation.</li> </ol>	BJT Amplifiers	Lectures Notes PDF power point Video	Daily exams + monthly exams

## 11. Infrastructure

### 1. Books Required reading:

- 1) R. Boylestad., and L. Nashelsky, Electronic Devices and Circuit Theory. 11th edition, Pearson Education Limited, London, 2014.
- 2) Bogart, Electronic Devices and Circuit, Mc Graw – Hill.



2. Main references (sources)	<p>1- Thomas L. Floyd, Electronic Devices: Electron Flow Version, 9th edition, Pearson Education, Inc., Upper Saddle River, New Jersey, 2012.</p> <p>2- Lectures presented by the Lecturer</p> <p>3- Books available in the college library</p>
A- Recommended books and references (scientific journals, reports...).	All solid scientific journals that are related to the broad concept of engineering analyses.
B-Electronic references, Internet sites...	<ol style="list-style-type: none"> <li>1. Albert Malvino, David J Bates, Electronic Principles, McGraw Hill 7th Edition. 2012.</li> <li>2. <a href="https://www.ibiblio.org/kuphaldt/electricCircuits/Semi/index.html">https://www.ibiblio.org/kuphaldt/electricCircuits/Semi/index.html</a></li> <li>3. <a href="http://www.learnabout-electronics.org/index.php">http://www.learnabout-electronics.org/index.php</a></li> <li>4. <a href="https://web.archive.org/web/20090224160225/http://www.siliconfareast.com:80/">https://web.archive.org/web/20090224160225/http://www.siliconfareast.com:80/</a></li> </ol>
12. The development of the curriculum plan	
<p>Adding vocabulary to the curriculum within the development of the course and at a rate not exceeding 10%. It is absolutely necessary to provide a laboratory for the subject because of its importance in deepening the understanding of the aforementioned vocabulary.</p>	