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: 2
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 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- 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 a factory location, planning it, and classifying 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 electrical circuits.

C2- Enabling students to think and analyze topics related to computer systems related to the engineering framework.

C3- Imagine the shapes of electrical waves and their propagation in physical environments.

C4- 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 electronic 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
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**
2nd Year- 2nd Semester	**E202**	**Advance Mathematics- II**	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	E202/ Advance Mathematics- II
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	2nd Semester – 2nd 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 advanced mathematics topic aims to clarify the practical and philosophical challenges of current engineering mathematics that have stimulated this continuous development, as well as to provide a mechanism for using calculus in useful applications for further study of engineering sciences and applied mathematics in the scientific and practical field. This is done starting from studying matrix analysis, multiple integration and its theories, Fourier transforms, solving series and sequences and using them in applications such as electrical circuits by finding the values of the variables required for them.	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals.

A1- Making the student able to demonstrate real knowledge of mathematical concepts during the academic year and their applications in the field of communications science.

A2- Learn and understand the basic definitions used in engineering mathematics, such as coordinates of real values, exponents and roots, equations, inequalities, and graphs.

A3- Learn and understand solution methods and time applications in calculus.

A4- Learn and apply the laws and formulas that result directly from mathematical concepts such as quadratic equations, exponential functions, and the properties of logarithmic relationships.

B. The skills goals special to the course.

B1 - Familiarity with mathematical relationships that represent types of algebraic functions and their graphing.

B2- Familiarity with the laws of finding the derivative using the definition and returning it to the basic function under the influence of the properties of integration.

B3- Familiarity with finding the domain and corresponding domain of a function with one variable and how to graph it in terms of Cartesian coordinates.

B4- Familiarity with the concepts of finding the inverse of a matrix, solving simultaneous equations, and performing algebraic operations on them.

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 think about ways to solve simultaneous equations and draw functions of all kinds.

C2- Urging the student to think about the importance of applications of derivative and integration in solving engineering problems.

C3- Urging the student to integrate knowledge in terms of benefiting from mathematical information in other theoretical and practical academic fields and the dependence of the study subjects on each other.

C4- Urging the student to acquire advanced mathematics skills in terms of language, symbols, information, and thinking methods.

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 mathematical.

D2- Enabling students to solve algebraic equations in a way that can match the practical reality of communications systems.

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 to Week 3	6	The student Study advanced theories in matrix analysis	Matrices II 1-System of linear equations (gauss elimination) 2- Rank of matrix 3- Eigen values eigen vectors.	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 4 to Week 7	8	The student Study of multiple integration and its theories	Multiple Integrals 1-Double integral 2-Areas and volumes 3-Double integral in polar coordinates 4-Evaluation of volume and triple 5-Evaluation of surface & surface integral.	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 8 to		Studying	Sequences and series	Lectures Notes	Daily exams

Week 13	12	the theories of series and sequences and their applications in electrical and electronic engineering	i) Sequences :convergence ,test of monotone ii)- Series : geometric series , nth partial sum , test of convergence , alternating series. iii) Power and Taylor's series	PDF power point Video	+ monthly exams
Week 14 to Week 15	4	Analyzing signals into their components according to Fourier's theory	Fourier Series 1-Periodic functions 2- Fourier series – Euler formulas 3- Even and odd functions (Half – Range expansion) 4- Applications in electrical engineering	Lectures Notes PDF power point Video	Daily exams + monthly exams

11. Infrastructure	
1. Books Required reading:	George B. Thomas, Jr., "Thomas 'Calculus", 12th edition, Addison Wesley, Pearson Education, Inc, 2010.
2. Main references (sources)	• Lectures presented by the Lecturer • Books available in the college library
A- Recommended books and references (scientific journals, reports…).	• Elliott Mendelson, "Calculus", 3rd edition, Schaum's Outline Series, McGraw-Hill, 2008. • Robert Wrede and Murray r. Spiegel "Theory and Problems of Advanced Calculus", 2nd Edition, McGraw-Hill Companies, 2002. • John Bird, "Basic Engineering Mathematics, 5th edition, Published by Elsevier Ltd, ", 2010.
B-Electronic references, Internet sites…	Any other materials available on the web.
12. The development of the curriculum plan	