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Ministry of Higher Education and Scientific Research Scientific Supervision and Scientific Evaluation Apparatus Directorate of Quality Assurance and Academic Accreditation Accreditation Department

University of Diyala

College of engineering

Department of Electronic Engineering



**Academic Program and Course Description Guide**

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**Introduction:**



**Concepts and terminology:**



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# TEMPLATE FOR PROGRAMME SPECIFICATION

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| 1. vision |
| The basic vision of the Department of Electronic Engineering is to make the department one of the leading engineering departments in the field of contemporary scientific and technological development. Therefore, the department strives to develop modern scientific curricula in the field of electronic engineering, in addition to completing all requirements for the department’s laboratories. And improving the teaching staff, to provide society with engineering cadres capable of contributing to technological growth. |

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| 1. mission |
| The department offers a high level of knowledge in the field of electronic engineering and its various applications by integrating theoretical knowledge with practical experience. The department strives to advance the process of scientific, engineering and technological research, and to encourage research creativity. The department also provides valuable information to students in their field of specialization, which makes their thinking and ability to solve various technological and scientific problems and meet the needs of society, whether at the public or private sector level, serve our dear country. |

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| 1. Aims of the Program |
| * Train specialized engineers in the field of electronic engineering, with a focus on professional ethics, and prepare them to be distinguished scientifically and practically. |
| * The department supports scientific research to advance knowledge and technology in the field of electronic engineering and its applications. |
| * The department provides a comprehensive training program to equip graduate students with the basic skills needed to be fully prepared to work in community institutions. |
| * Collaborating with all scientific and industrial entities to enhance the engineering education process at the college and elevate its global ranking. |

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| 1. Programmatic accreditation |
| N/A |

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| 1. Other external Supports |
| N/A |

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| 1. Program Structure | | | | |
| Notes | Percentage Notes | of Courses Study | Number of Courses Study | Program Structure |
| متطلبات المؤسسة | 3.9 | 6 | 5 | Institution requirements |
| متطلبات الكلية | 18.7 | 29 | 9 | College requirements |
| متطلبات القسم | 77.4 | 120 | 49 | Requirements of Section |
| There is a summer course | يوجد |  |  | Summer Training |

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| 1. 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 | - |  |
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| 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 |  |
| 3rd Year-1st Semester | EE 314 | Introduction to computer networks | 2 |  |
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| 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 |  |

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| 1. Learning Outcomes, Teaching, Learning and Assessment Methods |
| 1. Cognitive goals   A1- The ability to have knowledge in the fields of mathematics and specialized sciences Engineering expertise in the application of electronic engineering.  A2 Preparing the student to continue self-learning and acquire technology And new skills in the field of electronic engineering.  A3- Enabling students to obtain knowledge and understanding of designing and implementing various electronic systems.  A4- The student will understand the foundations of creating, programming, and simulating electronic circuits in hardware languages and various engineering programs.  A5- Enabling the student to visualize project management and solve the problems he encounters in the factory. |
| B. The skills goals special to the program.  B1 - The ability to select and perform the required examinations and collect their locations. Review and analyze the results of the relevant tests.  B2 The ability to design and supervise the implementation of relevant systems In electronic engineering.  B3 The ability to derive and approach engineering problems in a Recognize and determine the appropriate method to address the emerging engineering problems. This.  B4 - Provides them with skills to solve practical problems related to various electronic systems and computer programs for those systems. |
| Teaching and Learning Methods |
| 1. 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. |
| 1. 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. |

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| 1. Academic staff | | | |
| Number of teaching staff | | **Specialization** | **Scientific degree** |
| 1 | Electronic and communication | | Prof |
| 5 | Electronic | | Asst. Prof |
| 1 | Control | | Asst. Prof |
| 5 | Electronic and communication | | Lect. |
| 3 | Electronic | | Lect. |
| 1 | communication | | Lect. |
| 1 | Power | | Lect. |
| 5 | Electronic and communication | | Asst. LECT |

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| 1. 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. |
| 1. Admission criteria . |
| According to the rules and regulations of Ministry of Higher Education and Scientific Research. |
| 1. Key sources of information about the program |
| * College website. * The department’s website and contact the department by email. |

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| **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 | | | |
| **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **C1** | **C2** | **C3** | **C4** |
| 2nd Year -2nd Semester | E202 | Advance Mathematics –II | C | √ | √ |  |  |  |  |  | √ | √ | √ | √ | √ | √ |
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# TEMPLATE FOR COURSE SPECIFICATION

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

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| 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. |

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|  | 1. Course title | Advance Mathematics –II | |
|  | 2. Course code | E202 | |
|  | 3. Semester/Year | 2nd Semester – 2nd Year | |
|  | 4. Date of production/revision of this specification | March 2024 | |
|  | 5. Modes of Attendance offered | Class Lectures | |
|  | 6. Number of Credit Hours (Total) / Number of Units (Total) | 45 hours /3 units | |
|  | 7. Course administrator's name (mention all, if more than one name) | Ayad Q. Abdulkareem  eyadqais\_eng@uodiyala.edu.iq | |
|  | 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 vectors in space, solving differential equations, Laplace transforms, and Fourier transforms, and solving series and sequences and using them in applications such as electrical circuits by finding the values of the variables required for them. | | |
| - Cognitive objectives  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 properties of logarithmic relationships. | | |
| B- Skill objectives related to the subject  B1- Familiarity with mathematical relationships that represent types of algebraic functions and their graphing. | | |
| C. Affective and value goals  C1- 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.  C2- Familiarity with finding the domain and corresponding domain of a function with one variable and how to graph it in terms of Cartesian coordinates.  C3- Familiarity with the concepts of finding the inverse of a matrix, solving simultaneous equations, and performing algebraic operations on them. | | |
| 9- 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. | | |

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| 11. Course structure | | | | |
| Week | Hours | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| Week 1 | 3 | **Sequences and series**   1. **Sequences :convergence ,test of monotone** 2. **Series : geometric series , nth partial sum , test of convergence , alternating series.** 3. **Power and Taylor's series.** | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 2 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 3 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 4 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 4 | 3 | **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 |
| Week 5 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 6 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 7 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 8 | 3 | 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 9 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 10 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 11 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 12 | 3 | Matrices II   1. System of liner equations (gauss elimination )2- Rank of matrix 3- Eigen values eigen vectors. | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 13 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 14 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |
| Week 15 | 3 | Lectures Notes  PDF  power point  Video | Daily exams + monthly exams |

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| 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…). | All solid scientific journals that are related to the broad concept of mathematics II. |
| B-Electronic references, Internet sites… | 1. Elliott Mendelson, "Calculus", 3rd edition, Schaum’s Outline Series, McGraw-Hill, 2008. 2. Robert Wrede and Murray r. Spiegel "Theory and Problems of Advanced Calculus", 2nd Edition, McGraw-Hill Companies, 2002. 3. John Bird, "Basic Engineering Mathematics, 5th edition, Published by Elsevier Ltd, ", 2010. |