*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 name... Diyala University...

 College/Institute: College of...Engineering...

 Scientific Department: Department of ......Electronic Engineering.......

 Name of the academic or professional program: Bachelor of Electronic Engineering

 Name of final degree: Bachelor of Electronic Engineering

 Academic system: semester

 Description preparation date: 3/7/2024

 Date of filling the file: 3/7/2024

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

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| 1. vision
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| 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
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| 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
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| * Train specialized engineers in the field of electronic engineering, with a focus on professional ethics, and prepare them to be distinguished scientifically and practically.
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| * 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
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| N/A |

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

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| 1. Program Structure
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| 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 ModuleCode | 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 and Numerical 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 and Numerical Analysis II | 2 |  |
| 3rd Year-2nd Semester | EE 313 | Optoelectronics | 2 |  |
| 3rd Year-2nd Semester | EE 314 | Introduction to Computer Networks | 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 |  |

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| 1. Learning Outcomes, Teaching, Learning and Assessment Methods
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| 1. Cognitive goals

A1- During the academic year, the student learns an idea about the types of systems, whether they are open or equipped with reverse recovery.A2- Learn and understand the phase diagram and its abbreviation.A3- Learn and understand the review of the Laplace transform and its inverse.A4- Learn and understand the foundations of the Roth-Hurwitz stability criterion.A5- Learn and understand theories of time change of systems.  |
| B. The skills goals special to the program. B1 - Familiarity with the mathematical relationships present within the subject.B2- Familiarity with all types of systems.B2- Familiarity with how to carry out practical experiments related to the subject.B4- Familiarity with the basic concepts of stability methods, their types, and their practical applications. |
| C1- Urging the student to think about finding models for systems, whether mechanical or electrical.C2- Urging the student to think about the importance of finding and analyzing the frequency field of the control system.C3- Urging the student to think about the factors affecting the stability of systems.C4- Urging the student to think about choosing the appropriate components and contributing to the design process of transmitting and receiving circuits for electromagnetic waves. |
| 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
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| * 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
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|  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
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| 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 .
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| According to the rules and regulations of Ministry of Higher Education and Scientific Research. |
| 1. Key sources of information about the program
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| * 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** |
| 4thYear-1st Semester | **EE 405** | Control Engineering | 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 | Information Theory  |
| 2. Course code |  EE 405  |
| 3. Semester/Year | 2nd Semester – 4thYear |
| 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) | Lafta Esmaeel JumaaLafta.Alkurawy@uodiyala.edu.iq |
| 8. Aims of the Course |
| The curriculum aims to teach the topics of control and mathematical model for systems and analyze control linear and teach the student how to do the electrical and mechanical model for equation and transfer it to frequency response in control system and teach the students the stability of systems to understand the students the theoretical principles that is using in electrical circuits.  |
| A- Cognitive goals. A1- During the semester of the academic year, the student learns how to know the types of systems if it is closed or open block diagram.A2- Understanding and studying the signal flow for block diagram.A3- The students learns the topic of Laplace transform and its applications.A4- The student learns the topic of routh criteria . |
| B. The skills goals special to the course. B1 - Learn how to deal with mathematical relationships that represent in control systems. B2- Learn about the kinds of systems.B3- Learn the students is to submit the practical experiments.B4- Learn the students how to do the stability for systems. |
| C. Affective and value goals C1- Urging the student to understand the studying how to find the mathematical model if it is electrical or mechanical systems.C2- Urging the student to understand the students is to analyze the frequency of control systems. C3- Urging the student to think about the factors that effects on stability of systems. C4- Urging the student to think about systems. . C5- Urging the student to think to how to choose the components in designing. |
| 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 | ILOs | Unit/Module or Topic Title | Teaching Method | Assessment Method |
| Week 1  | 3 | The teacher explains the plotting by Bode- Diagram  | Frequency response  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 2 | 3 | Plotting bode by different of frequency  | Frequency response  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 3 | 3 | Plotting bode for frequency  | Frequency response  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 4 | 3 | The stability for compensation | Compensation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 5  | 3  | Lead compensation | Compensation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 6 | 3 | Lag compensation | Compensation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 7 | 3 | Lead- Lag Compensation | Compensation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 8 | 3 | Lead- Lag Compensation | Compensation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 9 | 3 | Study the PID controller | Three term Controller PID | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 10  | 3 | Study the P , PI , PD, PID  | Three term Controller PID | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 11  | 3 | Study the properties of P , PI , PD, PID | Three term Controller PID | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 12  | 3 | Introduction to State Space analysis  | State Space analysis  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 13 | 3 | State equation for dynamic system (electrical system) | State Space analysis  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 14 | 3 | Solution by state equation | State Space analysis  | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |
| Week 15 | 3 | Do the lap experiments by Matlab  | Computer simulation | Lectures NotesPDFpower pointVideo | Daily exams + monthly exams |

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| 12. Infrastructure |
| 1. Books Required reading: | 1.Advanced Engineering Mathematics, 3rd edition, by C. R. Wylie2.Advanced engineering mathematics 10 th edition |
| 2. Main references (sources) | • Lectures presented by the Lecturer• Books available in the college library |
| A- Recommended books and references (scientific journals, reports…). | * All sciences journals that is related to Engineering and Numerical analysis.
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| B-Electronic references, Internet sites… | 1. Mathematics for Engineers and Applied Scientists, 2nd edition, by Stanley.

Introductory Digital Signal Processing, 2nd edition by P. A. Lynn. |
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