University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

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	Electrical Power and Machines Engineering
4. Title of Final Award	BSc in Electrical Power and Machines 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	
• Prepare the students to engage theoretically and practically in Electrical Power and Machines Engineering profession in public and private sectors including, but not limited to, relevant governmental sectors, consulting firms, contracting companies, marketing and real estate investments.	
• Prepare the students to Engage in ongoing professional development activities by pursuing graduate studies and/or other learning opportunities to respond to the arising challenges.	
• Advance in responsibility and leadership in their careers and compete with their peers according to the profession ethics.	
• Promote students with the necessary scientific and practical skills in the discipline for solving engineering problems and treating them logically and scientifically.	
• Promote students with the necessary skills administration, time management, team-work, communication and language skills, soft computing and programming skills.	

- 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 1- Acquiring knowledge of mathematics, computers, engineering and customary sciences, employing them and preparing the student for scientific research.

A 2- The ability to diagnose engineering problems within the jurisdiction and know their causes and appropriate solutions.

A 3- To familiarize students with the basic theories of power engineering, machines, electrical machines, power plants, and various industrial applications and applications.

A4 - The student will be familiar with the basics of communication and control systems, electronics, digital technologies and their applications.

B. The skills goals special to the program.

B1 - Empowering students with the basics of working on power systems, electromagnetic fields, high pressure, and skills of analysis and design programs for electrical networks.

B2 - Skills of analyzing and designing electrical networks for transmission and distribution and designs of building networks, as well as enabling students to obtain knowledge of the practical framework in the field of energy types, energy transmission and distribution, operation and control.

B3 - Enable students to obtain knowledge and understanding of conventional electric power generation, renewable energy of all kinds, and thermal power plants.

B4 - Enabling students to obtain knowledge and understanding of fault diagnosis, protection and maintenance of devices and applications of machines, equipment and electric drivers.

Teaching and Learning Methods

- Studying the theoretical and practical academic program for the specialty lessons
- The theoretical program is taught using the smart board, whiteboard or data show connected to the personal computer, discussing ideas and facts with the students.
- Adopting the study through virtual electronic classes as an aid to the real classes.
- The practical program of specialization lessons is carried out by conducting laboratory or field experiments, collecting measurements by small groups of students, and analyzing, discussing and displaying the measurements.

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- Enhancing the ability to work collectively through practical groups in the laboratory, mini-projects and discussion panels

C2- Comparing, criticizing, checking and developing the ideas of the proposed designs and modern technologies, while respecting the efforts of others and avoiding scientific theft

C3 - The ability to suggest alternatives to approach engineering problems in an honest and sustainable manner, taking into account human rights and the environment and avoiding pollution and accidents

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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- 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- Ability to work with others disciplined within one work team, presenting ideas and discussing them orally, in writing and electronically

D2 - A full awareness of the moral and practical responsibility for the work that the student will practice after graduation

D3 - The ability to understand and communicate in English within the technical level related to the field of competence and the use of related engineering software.

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

Course No.	*Course Title*	*Cr. Hours*	*Weekly hours*				
			Lec.	*Tut.*	*Lab.*		
EP101	*Digital Techniques I*	*3*	*2*	*-*	*2*		
EP102	*Digital Techniques II*	*3*	*2*	*-*	*2*		
EP103	*Electrical Engineering Fundamentals I*	*4*	*3*	*1*	*3*		
EP104	*Electrical Engineering Fundamentals II*	*4*	*3*	*1*	*3*		
EP105	*Engineering Mechanics I (Statics)*	*2*	*2*	*-*	*-*		
EP106	*Engineering Mechanics II (Dynamics)*	*2*	*2*	*-*	*-*		
EP107	*Physical Electronics*	*2*	*2*	*-*	*-*		
EP108	*Entertainment & Culture Activity*	*0*	*-*	*-*	*1*		
	TOTAL for 1st Year	*20*	*16*	*2*	*11*		
EP201	*Electronics I*	*3*	*2*	*-*	*2*		
EP202	*Electronics II*	*3*	*2*	*-*	*2*		
EP203	*Electric Circuits Analysis I*	*2*	*2*	*1*	*-*		
EP204	*Electric Circuits Analysis II*	*2*	*2*	*1*	*-*		
EP205	*Advanced Programming*	*2*	*1*	*-*	*2*		
EP206	*Machines I (DC)*	*3*	*2*	*-*	*2*		
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EP208	*Electro-Magnetics I*	*2*	*2*	*1*	*-*		
EP209	*Electro-Magnetics II*	*2*	*2*	*1*	*-*		
EP210	*Thermodynamics*	*2*	*2*	*-*	*-*		
EP211	*Power Plants*	*2*	*2*	*-*	*-*		
EP212	*Software Eng. Application*	*2*	*1*	*-*	*2*		

EP213	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 2nd Year	***28***	***22***	***4***	***13***		
EP301	***Electric Power Engineering I***	***3***	***2***	***1***	***2***		
EP302	***Electric Power Engineering II***	***3***	***2***	***1***	***2***		
EP303	***Measurement & Instruments***	***2***	***2***	***-***	***-***		
EP304	***Electronic Systems and Signals***	***2***	***2***	***1***	***-***		
EP305	***Communication Systems***	***2***	***2***	***-***	***-***		
EP306	***High Voltage Engineering***	***3***	***2***	***-***	***2***		
EP307	***AC-Machines I (Synchronous)***	***3***	***2***	***1***	***2***		
EP308	***AC-Machines II (Induction)***	***3***	***2***	***1***	***2***		
EP309	***Power Electronics I***	***3***	***2***	***-***	***2***		
EP310	***Power Electronics II***	***3***	***2***	***-***	***2***		
EP311	***Control Theory I***	***3***	***2***	***-***	***2***		
EP312	***Control Theory II***	***3***	***2***	***-***	***2***		
EP313	***Electric Power Generation***	***2***	***2***	***-***	***-***		
EP314	***Microcontroller***	***2***	***2***	***-***	***-***		
EP315	***Engineering Analysis***	***3***	***3***	***-***	***-***		
EP316	***Engineering Numerical Methods***	***3***	***3***	***-***	***-***		
EP317	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 3rd Year	***43***	***34***	***5***	***19***		
EP401	***Power System Analysis 1***	***3***	***2***	***-***	***2***		
EP402	***Power System Analysis II***	***3***	***2***	***-***	***2***		
EP403	***Power System Protection***	***3***	***2***	***-***	***2***		
EP404	***Electric Power Distribution***	***2***	***2***		***-***		
EP405	***Electrical Design & sustainability***	***2***	***2***	***-***	***-***		
EP406	***Special Machines***	***3***	***2***	***-***	***2***		
EP407	***Electrical Drives***	***3***	***2***	***-***	***2***		
EP408	***Administration &Leadership skills***	***2***	***2***	***-***	***-***		
	TOTAL for 4th Year	***21***	***16***	***0***	***10***		
TOTAL		***112***	***88***	***11***	***53***		
			151				

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.

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific 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**	**D1**	**D2**	**D3**
2nd Year-2nd Semester	**EP405**	**Electrical Design & sustainability**	o	√	√	√	√	√	√	√	√		√	√	√	√	√

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	EP404/ Electric Power Distribution
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	2nd Semester – 4thYear
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
Study the basic principles of design and the most important theories used	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- During the school year, the student learns the basics of design.

A2- Understanding the basics of circuit breaker.

A3- Learn how to think about how a cable works and its applications.

A4- The student learns other types of cable and applications

B. The skills goals special to the course.

B1 - Learn how to deal with design and applications.

B2- Learn about the types of design.

B3- Familiarity with the basic concepts of the types of cable,

Teaching and Learning Methods

- The lecturer prepares lectures on the subject in paper and desginform 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 electronics.

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.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1 to Week 3	6	The student learns an introduction to the types of bjt	Definitions, Regulations and Standards : Basic design concepts, IEE wiring regulations, National Electrical Code (NEC), national & international standards, Iraqi wiring Installation Code, Iraqi Specification of Electrical Equipment	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 4 to Week 7	8	The student learns the characteristics of the metal-oxide-semiconductor field	graphical electrical symbols for architectural plans. Interior Lighting Design: Definition of terms, lamp types, light fittings, mounting methods, fitting layout, photometric data, lighting calculations, economical considerations. Computer aided lighting design.	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 8 to Week 13	12	Learn the details of Electronic circuits	Wiring Methods & Regulations: Light and power circuit wiring, circuit loading, conduit types, switches, socket outlets, telephone outlets, junction boxes, low-voltage circuit protection, fuses and miniature circuit breakers, cable routes, cable trays. Power Distribution	Lectures Notes PDF power point Video	Daily exams + monthly exams

Week 14 to Week 15	4	Learn how a Amplifiers works and its applications	. Main Sub-main and Final Distribution Boards: Selection and sizing of main, sub-main, & final distribution boards, board location. Specifications and Bill of Quantities: Preparation of electrical specifications and bill s of quantities for contract documents. Sustainability features consideration in electrical desig	Lectures Notes PDF power point Video	Daily exams + monthly exams

11. Infrastructure	
1. Books Required reading:	1- Turan Gonen, Electric Power Distribution System Engineering, McGraw-Hill 1986.
2. Main references (sources)	1 1- Gunter G. Seip, Electrical Installation Handbook, John Wiley, 3rd Ed, 2000.. Robert B. Hickey, P.E., Electrical Engineer's Portable Handbook, McGraw-Hill 2001.. T. L. Short, Electric Power Distribution Handbook, CRC Press, 2004 المدونات العالمية وخاصة البرطانية BS-Stdوالأمريكية IEEE, ANSIوالألمانية VDE circuit; By By Dr. R.S. Sedha
A- Recommended books and references (scientific journals, reports…).	• المدونات العالمية وخاصة البرطانية BS-Stdوالأمريكية IEEE, ANSIوالألمانية VDE
B-Electronic references, Internet sites…	Any other materials available on the web.

12. The development of the curriculum plan
The Development of the curriculum consists of various practical examples of using diodes in daily used devices and gadgets

University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

Course description form

1. Course Name	
Engineering profession ethics	
2. Course Code	
E104	
3. Semester/Year	
Spring Semester/Fourth Year	
4. The date this description was prepared	
2023 / 9 / 17	
5. Available forms of attendance	
Face-to-Face theoretical lectures	
6. Number of study hours (total) / number of units (total)	
15/2	
7. Name of the course administrator	
Name: Assist. Lect. Ibrahim I. Ibrahim Email: ibrahem_a@uodiyala.edu.iq	
8. Course objectives	
Objectives of the study subject	1. Introducing the student to the concept of engineering ethics and identifying why it is important to study engineering ethics. 2. Understand the distinction between professional and personal ethics, and know how ethical problem solving and engineering design are similar. 3. Find out if engineering is a profession, understand what codes of ethics are, and study some of the codes of ethics of professional engineering societies. 4. Introducing the student to the concept of management and the activities that individuals carry out to carry out the necessary work for the purpose of achieving goals, in addition to discussing production, ways to develop it, its types, and how to achieve optimal efficiency in production management. Also in this topic, choosing the most appropriate locations for the factory and its planning is discussed through studying the factors influencing its selection. Using

	the break-even point to compare between types of planning.

9. Teaching and learning strategies

The Strategy	□ Weekly lectures included providing students with the basics and topics related to the concept of the engineering profession from an ethical standpoint. □ Presenting a seminar to the student in front of his fellow students to enhance his self-confidence.

10. Course structure

Week	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Evaluation method
1-3	2	Introduction to the ethical and professional responsibilities and develops engineering skills	The student learns an introduction to engineering ethics and why it is important to study engineering ethics. And its applications in all engineering specializations.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
4-6	2	The Engineer and engineering disciplines, Engineering Ethics Problem Solving, Introduction to engineering design, Engineering Communications Literature search skills.	The student learns how to distinguish between professional and personal ethics and learn how ethical problem solving and engineering design are similar.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
7-10	2	Code of Ethics, Types of Codes of Ethics	The student learns codes of ethics, and studies some codes of ethics of professional engineering societies. .	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
11-15	2	Definition of management, management duties, scientific management, management and other sciences, deployment activities, advertisements, products transfer, products storing, financial resources and risks, production factors, types of	During the academic course, the student learns an idea about engineering and scientific management and its relationship to the concept of industrial engineering and other sciences and learns about its duties in addition to marketing and	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports

		productions, markets, incomes and costs of productions.	marketing activities for the product.		

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.

12. Learning and teaching resources

Required textbooks (methodology, if any)	Engineering Ethics, 4th Edition, Charles B., (2011).
Main references (sources)	Lectures provided by the subject teacher. Books available in the college library
Recommended supporting books and references (scientific journals, reports....)	
Electronic references, Internet sites	All websites that explain the ethics of the engineering profession

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• Prepare the students to Engage in ongoing professional development activities by pursuing graduate studies and/or other learning opportunities to respond to the arising challenges.	
• Advance in responsibility and leadership in their careers and compete with their peers according to the profession ethics.	
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EP302	***Electric Power Engineering II***	***3***	***2***	***1***	***2***		
EP303	***Measurement & Instruments***	***2***	***2***	***-***	***-***		
EP304	***Electronic Systems and Signals***	***2***	***2***	***1***	***-***		
EP305	***Communication Systems***	***2***	***2***	***-***	***-***		
EP306	***High Voltage Engineering***	***3***	***2***	***-***	***2***		
EP307	***AC-Machines I (Synchronous)***	***3***	***2***	***1***	***2***		
EP308	***AC-Machines II (Induction)***	***3***	***2***	***1***	***2***		
EP309	***Power Electronics I***	***3***	***2***	***-***	***2***		
EP310	***Power Electronics II***	***3***	***2***	***-***	***2***		
EP311	***Control Theory I***	***3***	***2***	***-***	***2***		
EP312	***Control Theory II***	***3***	***2***	***-***	***2***		
EP313	***Electric Power Generation***	***2***	***2***	***-***	***-***		
EP314	***Microcontroller***	***2***	***2***	***-***	***-***		
EP315	***Engineering Analysis***	***3***	***3***	***-***	***-***		
EP316	***Engineering Numerical Methods***	***3***	***3***	***-***	***-***		
EP317	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 3rd Year	***43***	***34***	***5***	***19***		
EP401	***Power System Analysis 1***	***3***	***2***	***-***	***2***		
EP402	***Power System Analysis II***	***3***	***2***	***-***	***2***		
EP403	***Power System Protection***	***3***	***2***	***-***	***2***		
EP404	***Electric Power Distribution***	***2***	***2***		***-***		
EP405	***Electrical Design & sustainability***	***2***	***2***	***-***	***-***		
EP406	***Special Machines***	***3***	***2***	***-***	***2***		
EP407	***Electrical Drives***	***3***	***2***	***-***	***2***		
EP408	***Administration &Leadership skills***	***2***	***2***	***-***	***-***		
	TOTAL for 4th Year	***21***	***16***	***0***	***10***		
TOTAL		***112***	***88***	***11***	***53***		
			151				

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.

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific 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**	**D1**	**D2**	**D3**
2nd Year-2nd Semester	**EP404**	**Electric Power Distribution**	o	√	√	√	√	√	√	√	√		√	√	√	√	√

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	EP404/ Electric Power Distribution
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	1st Semester – 4thYear
6. Number of hours tuition (total)	30 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
Study the basic principles of power distribution and the most important theories used	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- During the school year, the student learns the basics of power distribution.

A2- Understanding the basics of transformer

A3- Learn how to think about how transformer works and its applications.

A4- The student learns other types of diodes and applications of power distrbution

B. The skills goals special to the course.

B1 - Learn how to deal with power distribution and applications.

B2- Learn about the types of power plant .

B3- Familiarity with the basic concepts of the types of transformer, design , and insulator materials.

B4- Familiarity with how the power distribution works and its applications

Teaching and Learning Methods

- The lecturer prepares lectures on the subject in paper and power distribution 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 electronics.

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.

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1 to Week 3	6	The student learns an introduction to the types of bjt	Distribution System Configuration, Introduction, Various distribution system circuit components Electrical Design of Distribution Systems	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 4 to Week 7	8	The student learns the characteristics of the metal-oxide-semiconductor field	Various distribution system circuit components Electrical Design of Distribution Systems, Voltage level, selecting various system components transformers, cables, overhead lines)	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 8 to Week 13	12	Learn the details of Electronic circuits	Voltage level, selecting various system components transformers, cables, overhead lines), voltage drop and loss calculations and economical considerations, Reactive Power Control methods and compensation Various problems solutions, Industrial Power Distribution Distribution Inside Large Buildings, Load management programs	Lectures Notes PDF power point Video	Daily exams + monthly exams
Week 14 to Week 15	4	Learn how a Amplifiers works and its	Industrial Power Distribution Distribution Inside Large Buildings, Load management programs, Electrical	Lectures Notes PDF power point Video	Daily exams + monthly exams

		applications	design Standards and international codes Wiring Regulations Systems		

11. Infrastructure	
1. Books Required reading:	1- Turan Gonen, Electric Power Distribution System Engineering, McGraw-Hill 1986.
2. Main references (sources)	1 1- Gunter G. Seip, Electrical Installation Handbook, John Wiley, 3rd Ed, 2000.. Robert B. Hickey, P.E., Electrical Engineer's Portable Handbook, McGraw-Hill 2001.. T. L. Short, Electric Power Distribution Handbook, CRC Press, 2004 المدونات العالمية وخاصة البرطانية BS-Stdوالأمريكية IEEE, ANSIوالألمانية VDE circuit; By By Dr. R.S. Sedha
A- Recommended books and references (scientific journals, reports…).	• المدونات العالمية وخاصة البرطانية BS-Stdوالأمريكية IEEE, ANSIوالألمانية VDE
B-Electronic references, Internet sites…	Any other materials available on the web.

12. The development of the curriculum plan
The Development of the curriculum consists of various practical examples of using diodes in daily used devices and gadgets



University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

Course description form

13.Course Name	
Digital signal processing	
14.Course Code	
EP411	
15.Semester/Year	
1st Semester/Fourth Year	
16.The date this description was prepared	
2023 / 9 / 17	
17.Available forms of attendance	
Face-to-Face theoretical lectures	
18.Number of study hours (total) / number of units (total)	
30/2	
19.Name of the course administrator	
Name: Lect. Saja Mazin Sami Email: **S.M.sami**@uodiyala.edu.iq	
20.Course objectives	
Objectives of the study subject	The digital signal processing curriculum aims to introduce the student to the skills of the digital signal processing subject and how to design types of filters .
9. Teaching and learning strategies.	
The Strategy	1 - Providing students with the basics and additional topics related to the previous educational outcomes and skills to solve practical problems. 2- Solving a group of practical examples by the academic staff. 3- During the lecture, students participate in solving some practical problems. .
10. Course Structure.	

Wek	Hours	Name of the unit or topic	Required learning outcomes	Learning method	Interpolation and solving differential equations.
Week 1 to 2Week	4	Introduction to digital signal processing : Basic elements of DSP, DSP vs. ASP, application of DSP, Continues time signals vs. discrete time signals	The student learns an introduction to the subject and applications of the digital signal processor	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
3Week to 6Week	8	Standard of discrete time signals (sequences): Unit sample sequence, Unit step sequence, Unit ramp sequence, Exponential sequence (classification of discrete time signals)System properties: Static and dynamic system, shift invariant and shift variant system, Causal and non-causal system, linear and nonlinear system, stable and unstable system. Convolution : Direct form method, graphical	The student learns the basic types of signs	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports

		method, slide rule method Discrete Fourier transform (DFT), Linear convolution using DFT			
Week to 7 Week 11	10	Inverse Discrete Fourier transform (IDFT) Fast Fourier transform(FFT): Butterfly computation , Invers Fast Fourier transform (IFFT) Introduction to Z transform: Definition of Z transform and ROC, Properties of Z transform, Inverse Z transform Digital Filters	The Fourier transform and Z transform, as well as digital filters, are explained.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
Week to 12 Week 15	8	Realization of digital filter: Basic FIR filter structure, direct form of FIR structure, Cascaded form of FIR structure	FIR &IIR filter is explained	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
11.Course Evaluation					

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.	
12.Learning and teaching resources	
Required textbooks (methodology, if any)	• B. A. Shenoi, Introduction to Digital Signal processing and filter Design, Wiley-Inter science, 2006.
Main references (sources)	• Digital Signal Processing: principles, algorithms, and applications, third edition, by John G. Proakis and Dimitris G. Manolakis. • Digital Signal Processing, fundamentals and applications, 2008, by Li Tan.
Recommended supporting books and references (scientific journals, reports....)	British BS-Std American IEEE, ANSI and German VDE.
Electronic references, Internet sites	Any other materials available on the web.

University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

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	Electrical Power and Machines Engineering
4. Title of Final Award	BSc in Electrical Power and Machines 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	
• Prepare the students to engage theoretically and practically in Electrical Power and Machines Engineering profession in public and private sectors including, but not limited to, relevant governmental sectors, consulting firms, contracting companies, marketing and real estate investments.	
• Prepare the students to Engage in ongoing professional development activities by pursuing graduate studies and/or other learning opportunities to respond to the arising challenges.	
• Advance in responsibility and leadership in their careers and compete with their peers according to the profession ethics.	
• Promote students with the necessary scientific and practical skills in the discipline for solving engineering problems and treating them logically and scientifically.	
• Promote students with the necessary skills administration, time management, team-work, communication and language skills, soft computing and programming skills.	

- 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 1- Acquiring knowledge of mathematics, computers, engineering and customary sciences, employing them and preparing the student for scientific research.

A 2- The ability to diagnose engineering problems within the jurisdiction and know their causes and appropriate solutions.

A 3- To familiarize students with the basic theories of power engineering, machines, electrical machines, power plants, and various industrial applications and applications.

A4 - The student will be familiar with the basics of communication and control systems, electronics, digital technologies and their applications.

A 5 - Knowledge of projects and leadership of work groups within the ethics of the profession and the principles of engineering economics.

B. The skills goals special to the program.

B1 - Empowering students with the basics of working on power systems, electromagnetic fields, high pressure, and skills of analysis and design programs for electrical networks.

B2 - Skills of analyzing and designing electrical networks for transmission and distribution and designs of building networks, as well as enabling students to obtain knowledge of the practical framework in the field of energy types, energy transmission and distribution, operation and control.

B3 - Enable students to obtain knowledge and understanding of conventional electric power generation, renewable energy of all kinds, and thermal power plants.

B4 - Enabling students to obtain knowledge and understanding of fault diagnosis, protection and maintenance of devices and applications of machines, equipment and electric drivers.

B5 - Empowering the student to manage, lead, and economic engineering projects and organize time, while adhering to the ethics of the engineering profession in solving problems encountered in the workplace and developing the ability for continuous self-learning.

Teaching and Learning Methods

- Studying the theoretical and practical academic program for the specialty lessons
- The theoretical program is taught using the smart board, whiteboard or data show connected to the personal computer, discussing ideas and facts with the students.
- Adopting the study through virtual electronic classes as an aid to the real classes.
- The practical program of specialization lessons is carried out by conducting laboratory or field experiments, collecting measurements by small groups of students, and analyzing, discussing and displaying the measurements.

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- Enhancing the ability to work collectively through practical groups in the laboratory, mini-projects and discussion panels C2- Comparing, criticizing, checking and developing the ideas of the proposed designs and modern technologies, while respecting the efforts of others and avoiding scientific theft C3 - The ability to suggest alternatives to approach engineering problems in an honest and sustainable manner, taking into account human rights and the environment and avoiding pollution and accidents
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- Ability to work with others disciplined within one work team, presenting ideas and discussing them orally, in writing and electronically

D2 - A full awareness of the moral and practical responsibility for the work that the student will practice after graduation

D3 - The ability to understand and communicate in English within the technical level related to the field of competence and the use of related engineering software.

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

Course No.	*Course Title*	*Cr. Hours*	*Weekly hours*				
			Lec.	*Tut.*	*Lab.*		
EP101	*Digital Techniques I*	*3*	*2*	*-*	*2*		
EP102	*Digital Techniques II*	*3*	*2*	*-*	*2*		
EP103	*Electrical Engineering Fundamentals I*	*4*	*3*	*1*	*3*		
EP104	*Electrical Engineering Fundamentals II*	*4*	*3*	*1*	*3*		
EP105	*Engineering Mechanics I (Statics)*	*2*	*2*	*-*	*-*		
EP106	*Engineering Mechanics II (Dynamics)*	*2*	*2*	*-*	*-*		
EP107	*Physical Electronics*	*2*	*2*	*-*	*-*		
EP108	*Entertainment & Culture Activity*	*0*	*-*	*-*	*1*		
	TOTAL for 1st Year	*20*	*16*	*2*	*11*		
EP201	*Electronics I*	*3*	*2*	*-*	*2*		
EP202	*Electronics II*	*3*	*2*	*-*	*2*		
EP203	*Electric Circuits Analysis I*	*2*	*2*	*1*	*-*		
EP204	*Electric Circuits Analysis II*	*2*	*2*	*1*	*-*		
EP205	*Advanced Programming*	*2*	*1*	*-*	*2*		
EP206	*Machines I (DC)*	*3*	*2*	*-*	*2*		
EP207	*Machines (Transformer) II*	*3*	*2*	*-*	*2*		
EP208	*Electro-Magnetics I*	*2*	*2*	*1*	*-*		
EP209	*Electro-Magnetics II*	*2*	*2*	*1*	*-*		
EP210	*Thermodynamics*	*2*	*2*	*-*	*-*		
EP211	*Power Plants*	*2*	*2*	*-*	*-*		
EP212	*Software Eng. Application*	*2*	*1*	*-*	*2*		

EP213	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 2nd Year	***28***	***22***	***4***	***13***		
EP301	***Electric Power Engineering I***	***3***	***2***	***1***	***2***		
EP302	***Electric Power Engineering II***	***3***	***2***	***1***	***2***		
EP303	***Measurement & Instruments***	***2***	***2***	***-***	***-***		
EP304	***Electronic Systems and Signals***	***2***	***2***	***1***	***-***		
EP305	***Communication Systems***	***2***	***2***	***-***	***-***		
EP306	***High Voltage Engineering***	***3***	***2***	***-***	***2***		
EP307	***AC-Machines I (Synchronous)***	***3***	***2***	***1***	***2***		
EP308	***AC-Machines II (Induction)***	***3***	***2***	***1***	***2***		
EP309	***Power Electronics I***	***3***	***2***	***-***	***2***		
EP310	***Power Electronics II***	***3***	***2***	***-***	***2***		
EP311	***Control Theory I***	***3***	***2***	***-***	***2***		
EP312	***Control Theory II***	***3***	***2***	***-***	***2***		
EP313	***Electric Power Generation***	***2***	***2***	***-***	***-***		
EP314	***Microcontroller***	***2***	***2***	***-***	***-***		
EP315	***Engineering Analysis***	***3***	***3***	***-***	***-***		
EP316	***Engineering Numerical Methods***	***3***	***3***	***-***	***-***		
EP317	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 3rd Year	***43***	***34***	***5***	***19***		
EP401	***Power System Analysis 1***	***3***	***2***	***-***	***2***		
EP402	***Power System Analysis II***	***3***	***2***	***-***	***2***		
EP403	***Power System Protection***	***3***	***2***	***-***	***2***		
EP404	***Electric Power Distribution***	***2***	***2***		***-***		
EP405	***Electrical Design & sustainability***	***2***	***2***	***-***	***-***		
EP406	***Special Machines***	***3***	***2***	***-***	***2***		
EP407	***Electrical Drives***	***3***	***2***	***-***	***2***		
EP408	***Administration &Leadership skills***	***2***	***2***	***-***	***-***		
	TOTAL for 4th Year	***21***	***16***	***0***	***10***		
TOTAL		***112***	***88***	***11***	***53***		
			151				

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.

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific 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**	**D1**	**D2**	**D3**
Fourth Year-2nd Semester	**EP417**	**Grounding**	o	√	√	√	√	√	√	√	√		√	√	√	√	√

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	EP417 / **Grounding**
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	2nd Semester – Fourth Year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
Study the basic principles of electronics and the most important theories used	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- Teaching the reasons for the using grounding.

A2- Awareness of the harm of un grounding system and danger of it on human.

A3- Knowing the basic and common types of grounding system and how they work, and comparing their benefits and harms, if any.

A4- Enable students to obtain knowledge and understanding of the design of grounding for generating plant and all parts of power system.

A5 – Learn student's how measuring soil resistivity , their mathematical calculations, and the instruments used with them.

B. The skills goals special to the course.

B1 - The student learns modern skills of measuring soil resistivity

B2 - Providing them with skills to solve practical problems related to the course using measurement instrument to use it in practice.

B3- Acquiring the necessary skills to design system grounding for any part of power system.

B4- Acquire necessary skills to protect human and electrical equipment's from electric shock

Teaching and Learning Methods

1- The teacher gives comprehensive theoretical lectures

2- The teacher requests frequent reports on the basic topics of the subject.

3- Using engineering software to understand the interrelationship of system elements with each other.

4- Using some educational videos and practical visits to the sites of renewable energy plants

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)

D 1- The skill of speaking in English within the specialty

D 2- The skill of using engineering software

D3- Awareness of the effects of the electric power system on humans, the environment, and sustainable alternatives

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st and 2nd weeks	4	To know the needing for neutral and neutral grounding..	Introduction : Grounding concept, need for neutral and neutral grounding.	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars
3rd and 4th weeks	4	Learn about Isolated and solidly grounded systems, resistance and reactance grounding, Peterson's coil grounding. Grounding of different neutral points in power systems..	Neutral Point Grounding : types of grounding	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars
5th and 6th weeks	4	The student learns about Grounding electrodes, resistance of grounding rods.	Grounding electrodes, resistance of grounding rods.	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars
7th and 8th	4	Learn student's how measuring soil resistivity , their mathematical calculations, and the instruments used with them.	Mathematical calculation of grounding resistance	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars
9th	2	Learn about step and touch voltage	Calculation of touch and step voltages. Touch and step voltages according to specifications	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars
10th and		Learn about step	Calculation	Lectures+	Weekly & monthly

11th	**4**	**and touch voltage**	**of touch and step voltages. Touch and step voltages according to specifications**	**videos**	**tests+ assignments+ seminars**
12th and 13th	**4**	**Awareness of the harm of un grounding system and danger of it on human**	**need for neutral and neutral grounding**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**
14th and 15th	**4**	**The student gets to know Practical Grounding Systems in Iraq: Grounding of 11/0.4 kV and 33/11 kV systems. Experience & problems.**	**Practical Grounding Systems in Iraq : Grounding of 11/0.4 kV and 33/11 kV systems. Experience & problems.**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**

11. Infrastructure	
1. Books Required reading:	Jinliang He, Rong Zeng. (2013). "methodology and technology for power system grounding ' IEEE Grean book. (2007). "Grounding of Industrial and Commercial Power Systems
2. Main references (sources)	Principles of power system V. K. Mehta.
A- Recommended books and references (scientific journals, reports…).	Any highly reputation international and local books, journal, or scientific magazine
B-Electronic references, Internet sites…	Recent webpages to updating the trends in technologies relevant to renewable energy
12. The development of the curriculum plan	
The Development of the curriculum consists of various practical examples of using diodes in daily used devices and gadgets	

University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

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	Electrical Power and Machines Engineering
4. Title of Final Award	BSc in Electrical Power and Machines 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	
• Prepare the students to engage theoretically and practically in Electrical Power and Machines Engineering profession in public and private sectors including, but not limited to, relevant governmental sectors, consulting firms, contracting companies, marketing and real estate investments.	
• Prepare the students to Engage in ongoing professional development activities by pursuing graduate studies and/or other learning opportunities to respond to the arising challenges.	
• Advance in responsibility and leadership in their careers and compete with their peers according to the profession ethics.	
• Promote students with the necessary scientific and practical skills in the discipline for solving engineering problems and treating them logically and scientifically.	
• Promote students with the necessary skills administration, time management, team-work, communication and language skills, soft computing and programming skills.	

- 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 1- Acquiring knowledge of mathematics, computers, engineering and customary sciences, employing them and preparing the student for scientific research.

A 2- The ability to diagnose engineering problems within the jurisdiction and know their causes and appropriate solutions.

A 3- To familiarize students with the basic theories of power engineering, machines, electrical machines, power plants, and various industrial applications and applications.

A4 - The student will be familiar with the basics of communication and control systems, electronics, digital technologies and their applications.

A 5 - Knowledge of projects and leadership of work groups within the ethics of the profession and the principles of engineering economics.

B. The skills goals special to the program.

B1 - Empowering students with the basics of working on power systems, electromagnetic fields, high pressure, and skills of analysis and design programs for electrical networks.

B2 - Skills of analyzing and designing electrical networks for transmission and distribution and designs of building networks, as well as enabling students to obtain knowledge of the practical framework in the field of energy types, energy transmission and distribution, operation and control.

B3 - Enable students to obtain knowledge and understanding of conventional electric power generation, renewable energy of all kinds, and thermal power plants.

B4 - Enabling students to obtain knowledge and understanding of fault diagnosis, protection and maintenance of devices and applications of machines, equipment and electric drivers.

B5 - Empowering the student to manage, lead, and economic engineering projects and organize time, while adhering to the ethics of the engineering profession in solving problems encountered in the workplace and developing the ability for continuous self-learning.

Teaching and Learning Methods

- Studying the theoretical and practical academic program for the specialty lessons
- The theoretical program is taught using the smart board, whiteboard or data show connected to the personal computer, discussing ideas and facts with the students.
- Adopting the study through virtual electronic classes as an aid to the real classes.
- The practical program of specialization lessons is carried out by conducting laboratory or field experiments, collecting measurements by small groups of students, and analyzing, discussing and displaying the measurements.

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- Enhancing the ability to work collectively through practical groups in the laboratory, mini-projects and discussion panels

C2- Comparing, criticizing, checking and developing the ideas of the proposed designs and modern technologies, while respecting the efforts of others and avoiding scientific theft

C3 - The ability to suggest alternatives to approach engineering problems in an honest and sustainable manner, taking into account human rights and the environment and avoiding pollution and accidents

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- Ability to work with others disciplined within one work team, presenting ideas and discussing them orally, in writing and electronically

D2 - A full awareness of the moral and practical responsibility for the work that the student will practice after graduation

D3 - The ability to understand and communicate in English within the technical level related to the field of competence and the use of related engineering software.

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

Course No.	*Course Title*	*Cr. Hours*	*Weekly hours*				
			Lec.	*Tut.*	*Lab.*		
EP101	*Digital Techniques I*	*3*	*2*	*-*	*2*		
EP102	*Digital Techniques II*	*3*	*2*	*-*	*2*		
EP103	*Electrical Engineering Fundamentals I*	*4*	*3*	*1*	*3*		
EP104	*Electrical Engineering Fundamentals II*	*4*	*3*	*1*	*3*		
EP105	*Engineering Mechanics I (Statics)*	*2*	*2*	*-*	*-*		
EP106	*Engineering Mechanics II (Dynamics)*	*2*	*2*	*-*	*-*		
EP107	*Physical Electronics*	*2*	*2*	*-*	*-*		
EP108	*Entertainment & Culture Activity*	*0*	*-*	*-*	*1*		
	TOTAL for 1st Year	*20*	*16*	*2*	*11*		
EP201	*Electronics I*	*3*	*2*	*-*	*2*		
EP202	*Electronics II*	*3*	*2*	*-*	*2*		
EP203	*Electric Circuits Analysis I*	*2*	*2*	*1*	*-*		
EP204	*Electric Circuits Analysis II*	*2*	*2*	*1*	*-*		
EP205	*Advanced Programming*	*2*	*1*	*-*	*2*		
EP206	*Machines I (DC)*	*3*	*2*	*-*	*2*		
EP207	*Machines (Transformer) II*	*3*	*2*	*-*	*2*		
EP208	*Electro-Magnetics I*	*2*	*2*	*1*	*-*		
EP209	*Electro-Magnetics II*	*2*	*2*	*1*	*-*		
EP210	*Thermodynamics*	*2*	*2*	*-*	*-*		
EP211	*Power Plants*	*2*	*2*	*-*	*-*		
EP212	*Software Eng. Application*	*2*	*1*	*-*	*2*		

EP213	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 2nd Year	***28***	***22***	***4***	***13***		
EP301	***Electric Power Engineering I***	***3***	***2***	***1***	***2***		
EP302	***Electric Power Engineering II***	***3***	***2***	***1***	***2***		
EP303	***Measurement & Instruments***	***2***	***2***	***-***	***-***		
EP304	***Electronic Systems and Signals***	***2***	***2***	***1***	***-***		
EP305	***Communication Systems***	***2***	***2***	***-***	***-***		
EP306	***High Voltage Engineering***	***3***	***2***	***-***	***2***		
EP307	***AC-Machines I (Synchronous)***	***3***	***2***	***1***	***2***		
EP308	***AC-Machines II (Induction)***	***3***	***2***	***1***	***2***		
EP309	***Power Electronics I***	***3***	***2***	***-***	***2***		
EP310	***Power Electronics II***	***3***	***2***	***-***	***2***		
EP311	***Control Theory I***	***3***	***2***	***-***	***2***		
EP312	***Control Theory II***	***3***	***2***	***-***	***2***		
EP313	***Electric Power Generation***	***2***	***2***	***-***	***-***		
EP314	***Microcontroller***	***2***	***2***	***-***	***-***		
EP315	***Engineering Analysis***	***3***	***3***	***-***	***-***		
EP316	***Engineering Numerical Methods***	***3***	***3***	***-***	***-***		
EP317	***Entertainment & Culture Activity***	***0***	***-***	***-***	***1***		
	TOTAL for 3rd Year	***43***	***34***	***5***	***19***		
EP401	***Power System Analysis 1***	***3***	***2***	***-***	***2***		
EP402	***Power System Analysis II***	***3***	***2***	***-***	***2***		
EP403	***Power System Protection***	***3***	***2***	***-***	***2***		
EP404	***Electric Power Distribution***	***2***	***2***		***-***		
EP405	***Electrical Design & sustainability***	***2***	***2***	***-***	***-***		
EP406	***Special Machines***	***3***	***2***	***-***	***2***		
EP407	***Electrical Drives***	***3***	***2***	***-***	***2***		
EP408	***Administration &Leadership skills***	***2***	***2***	***-***	***-***		
	TOTAL for 4th Year	***21***	***16***	***0***	***10***		
TOTAL		***112***	***88***	***11***	***53***		
			151				

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.

Year / Level	Course Code	Course Title	Core (C) Title or Option (O)	Knowledge and understanding				Subject-specific 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**	**D1**	**D2**	**D3**
Fourth Year-1st Semester	**EP418**	**Power System Operation & Control**	o	√	√	√	√	√	√	√	√		√	√	√	√	√

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	EP418 / **Power System Operation & Control**
4. Modes of Attendance offered	Class Lectures
5. Semester/Year	1st Semester – Fourth Year
6. Number of hours tuition (total)	60 hours
7. Date of production/revision of this specification	17/09/2023
8. Aims of the Course	
Study the basic principles of electronics and the most important theories used	

9· Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Cognitive goals .

A1- Students also learning basic definitions and introductory concepts of Economic Operation: Input Output Curves and Heat Rate Characteristics.

A2- Calculate; Economic Dispatch Neglecting Losses and no Generator Limits.

A3- Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients)..

A4- Be able to apply the Economic Dispatch Including Losses..

A5 – Design the and analytical Software Economic Dispatch.

A6 – Work in groups and function on multi-disciplinary teams.

B. The skills goals special to the course.

B1 - Identify, formulate and solve engineering related Load Frequency Control(LFC): Generator Model, Load Model, Prime Mover Model and Governor Model problems.

B2 - Be familiar with Voltage and Reactive Power Control(AVR): Amplifier Model, Exciter Model, Generator Model and Sensor Model.

B3- Understand professional, social and ethical responsibilities.

B4- Use the techniques, skills, and modern engineering tools necessary for engineering practice in Power System Operation & Control applications.

Teaching and Learning Methods

1- The teacher gives comprehensive theoretical lectures

2- The teacher requests frequent reports on the basic topics of the subject.

3- Using engineering software to understand the interrelationship of system elements with each other.

4- Using some educational videos and practical visits to the sites of renewable energy plants

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)

D 1- The skill of speaking in English within the specialty

D 2- The skill of using engineering software

D3- Awareness of the effects of the electric power system on humans, the environment, and sustainable alternatives

10. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1st and 2nd weeks	4	**Students also learning basic definitions and introductory concepts of Economic Operation: Input Output Curves and Heat Rate Characteristics.**	**Economic Operation: Input Output Curves and Heat Rate Characteristics**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**
3rd and 4th weeks	**4**	**Calculate; Economic Dispatch Neglecting Losses and no Generator Limits.**	**Modeling of Fuel Costs for Thermal Generation, Operating Cost of a Thermal Plant**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**
5th and 6th weeks	**4**	**Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients).**	**Economic Dispatch Neglecting Losses and no Generator Limits**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**
7th and 8th	**4**	**Design the and analytical Software Economic Dispatch.**	**The Kuhn-Tucker Conditions**	**Lectures+ videos**	**Weekly & monthly tests+ assignments+ seminars**

9th	**2**	**Be able to apply the mathematical tools to calculation economic Dispatch Including Losses**	**9th**	**2**	**Be able to apply the mathematical tools to calculation economic Dispatch Including Losses**
10th and 11th	**4**	**Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients).**	**10th and 11th**	**4**	**Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients).**
12th and 13th	**4**	**Be able to apply the Economic Dispatch Including Losses.**	**12th and 13th**	**4**	**Be able to apply the Economic Dispatch Including Losses.**
14th and 15th	**4**	**- Use the techniques, skills, and modern engineering tools necessary for engineering practice in Power System Operation & Control applications.**	**14th and 15th**	**4**	**- Use the techniques, skills, and modern engineering tools necessary for engineering practice in Power System Operation & Control applications.**

11. Infrastructure	
1. Books Required reading:	1-Power system analysis, H. Sadaat 2- Operation and control in power systems, P. S. R. Murty.
2. Main references (sources)	Principles of power system V. K. Mehta.

A- Recommended books and references (scientific journals, reports…).	• Any highly reputation international and local books, journal, or scientific magazine
B-Electronic references, Internet sites…	Recent webpages to updating the trends in technologies relevant to renewable energy
12. The development of the curriculum plan	
The Development of the curriculum consists of various practical examples of using diodes in daily used devices and gadgets	