

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



Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: 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

Academic System: Course

Description Preparation Date: 13/8/2024

Completion Date: 13/8/2024

Signature:

Head of Department Name:

Assit. prof. Dr. Balasim M. Hussein

Date: 13/8/2024

Signature:

Scientific Associate Name:

ASSL prof. Dr. Jabbar

Date: 13/8/2024



The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khaden

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	
<ul style="list-style-type: none">• 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
<ul style="list-style-type: none"> • 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.
<p>C. Affective and value goals</p> <p>C1- Enhancing the ability to work collectively through practical groups in the laboratory, mini-projects and discussion panels</p> <p>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</p> <p>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</p>
Teaching and Learning Methods
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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 I	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.

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	1 st 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
1 st and 2 nd 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
3 rd and 4 th 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
5 th and 6 th 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
7 th and 8 th	4	Design the and analytical Software Economic Dispatch.	The Kuhn-Tucker Conditions	Lectures+ videos	Weekly & monthly tests+ assignments+ seminars

9 th	2	Be able to apply the mathematical tools to calculation economic Dispatch Including Losses	9 th	2	Be able to apply the mathematical tools to calculation economic Dispatch Including Losses
10 th and 11 th	4	Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients).	10 th and 11 th	4	Be familiar with Penalty Factor and Transmission Loss Formula (B-Coefficients).
12 th and 13 th	4	Be able to apply the Economic Dispatch Including Losses.	12 th and 13 th	4	Be able to apply the Economic Dispatch Including Losses.
14 th and 15 th	4	- Use the techniques, skills, and modern engineering tools necessary for engineering practice in Power System Operation & Control applications.	14 th and 15 th	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...).	<ul style="list-style-type: none"> • 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

