

**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.

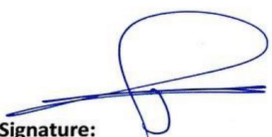
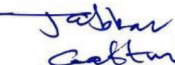
**Learning Outcomes:** A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**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:  
Asst. prof. Dr. Balasim M. Hussein  
Date: 13/8/2024

Signature:   
Scientific Associate Name:  
Asst. prof. Dr.   
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

## Course description form

<b>1. Course Name</b>					
Numerical Engineering Methods					
<b>2. Course Code</b>					
EP316					
<b>3. Semester/Year</b>					
2n'd Semester/Third Year					
<b>4. The date this description was prepared</b>					
2023 / 9 / 17					
<b>5. Available forms of attendance</b>					
Face-to-Face theoretical lectures					
<b>6. Number of study hours (total) / number of units (total)</b>					
45/3					
<b>7. Name of the course administrator</b>					
Name: Lect. Osama Sahib Jafar Email: <a href="mailto:assamasahib@uodiyala.edu.iq">assamasahib@uodiyala.edu.iq</a>					
<b>8. Course objectives</b>					
<b>Objectives of the study subject</b>			To understand the importance of numerical methods in solving engineering problems. Solution of non-linear equations and root findings. Solving sets of linear and non-linear equations. Numerical integration and differentiation. Interpolation and solving differential equations.		
<b>9. Solution of non-linear equations and root findings.</b>					
<b>The Strategy</b>			Solving sets of linear and non-linear equations.		
<b>10. Numerical integration and differentiation.</b>					
<b>Week</b>	<b>Hours</b>	<b>Name of the unit or topic</b>	<b>Required learning outcomes</b>	<b>Learning method</b>	Interpolation and solving differential equations.

1	3	Introduction: why numerical methods	Introducing the student to the numerical methods and the reason and applications of numerical mathematics.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
2	3	Solution of non-linear equations (roots finding): graphical method, bisection method	Finding roots of linear and nonlinear equations using different methods.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
3	3	method of iteration, Newton's method, the secant method.	Using Newton and secant method in finding roots.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
4	3	Solving sets of linear equations: matrix notation, Gaussian elimination method	Solving linear system of equations using Gaussian elimination method.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
5	3	, evaluation of the inverse of a matrix, matrix inverse method, LU factorization method	Finding inverse and LU factorization method.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
6	3	Eigen values and Eigenvectors	Finding eigen-values and eigen-vectors numerically.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
7	3	Numerical interpolation: polynomial interpolation, linear interpolation, quadratic interpolation, higher degree interpolation (LaGrange's interpolation)	Studying interpolation with multiple degrees.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
8	3	Numerical integration(trapezoidal, Simpson 1/3)	Using numerical integration methods to solve integration problems.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports

9	3	Numerical Integration p2(Simpson 3/8)	Using Simpson 3/8 to solve integration method.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
10	3	Numerical differentiation	Using numerical techniques to differentiate different functions.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
11	3	Solving Differential equations using Numerical methods( Euler's Method)	Using Euler's method to solve ODE.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
12	3	Solving Differential equations using Numerical methods(Runge-Kutta) Method	Using Runge-Kutta to solve ODE problems	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
13	3	Curve fitting.	Using numerical techniques to learn curve fittings..	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
14	3	Solving Set of nonlinear Equations.	Using Gauss-Seidel Method to solve system of non-linear equations.	Whiteboard and Data show	Daily, oral, monthly, written examinations and reports
15	3	Taylor Series.	Using Taylor series method to find numerical values of different mathematical functions.	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)	Numerical analysis, Richard L. Burden
Main references (sources)	Numerical methods for engineers and scientists using MATLAB, Ramin S. Esfandiari
Recommended supporting books and references (scientific journals, reports....)	Numerical Methods for engineers, Chapra.



Electronic references, Internet sites	
---------------------------------------	--