**Course description form**

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| 1. **Course Name**
 |
| Advanced Programming |
| 1. **Course Code**
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| EP205 |
| 1. **Semester/Year**
 |
| 2n’d Semester/Third Year |
| 1. **The date this description was prepared**
 |
| 17 / 9 / 2023  |
| 1. **Available forms of attendance**
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| Face-to-Face theoretical lectures |
| 1. **Number of study hours (total) / number of units (total)**
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| 45/2 |
| 1. **Name of the course administrator**
 |
| Name: Lect. Hayder Salim HameedEmail:haydersalim@uodiyala.edu.iq  |
| 1. **Course objectives**
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| 1. Providing the student with basic information about the various well-known engineering programs.2. Familiarity with the famous mathematical and engineering analysis program (MATLAB).3. The student’s knowledge of the programming statements of the MATLAB language and how to benefit from them in writing programs to solve mathematical problems of the basics of electrical engineering for which there are no programs in ready-made systems.4. Obtain sufficient information about using the program in mathematical analysis, programming, and the use of matrices, as well as solving and drawing complex mathematical equations. | **Objectives of the study subject** |
| 1. Solution of non-linear equations and root findings.
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| * The student is directed in the practical laboratory and is tasked with analyzing and programming a simple engineering system or application using MATLAB codes and programming expressions and presenting the results of the analysis and programming.
* Important notes about the importance of programming in our lives and the extent of progress of some countries in the field of software. Important programs in our lives are also reviewed and widely used such as medical or agricultural applications and other applications programmed by engineers, analysts and programmers.
* Through discussion, students participate in solving some practical problems.
* Asking the student to visit the library and the international information network (the Internet) to obtain additional knowledge of the academic subjects.
* Presenting a seminar to the student in front of his fellow students to enhance his self-confidence..
 | **The Strategy**  |
| 1. Numerical integration and differentiation.
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| Interpolation and solving differential equations. | **Learning method** | **Required learning outcomes** | **Name of the unit or topic**  | **Hours** | **Week** |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Teach the student how to get started with Matlab. | Starting with MATLAB | 3 | 1 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to how to define variables. | DEFINING SCALAR VARIABLES | 3 | 2 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to creating a one-dimensional matrix. | **Creating Arrays** | 3 | 3 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the use of colons in the matrix title. | USING A COLON : IN ADDRESSING ARRAYS | 3 | 4 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to explaining mathematical operations on the matrix. | **Mathematical Operations with Arrays** | 3 | 5 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to explaining the built-in function for matrix analysis. | BUILT-IN FUNCTIONS FOR ANALYZING ARRAYS. | 3 | 6 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to explain how to access the file to write the program | INPUT TO A SCRIPT FILE , OUTPUT COMMANDS. | 3 | 7 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the explanation of two-dimensional drawing. | **Two-Dimensional Plots**. | 3 | 8 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to how to place several drawings on the same page | **PUTTING MULTIPLE PLOTS ON THE SAME PAGE** | 3 | 9 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to how to adjust drawing settings. | **FORMATTING A PLOT** . | 3 | 10 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of processing relational and logical operators. | **RELATIONAL AND LOGICAL OPERATORS** | 3 | 11 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of conditional statements. | **CONDITIONAL STATEMENTS**  | 3 | 12 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to the concept of iterative loops and the tools used to program them. | **LOOPS( for-end Loops , while-end Loops , NESTED LOOPS AND NESTED CONDITIONAL STATEMENTS**. | 3 | 13 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Introducing the student to how to deal with constructing unavailable functions and how to program them. | User-Defined Functions and Function | 3 | 14 |
| Daily, oral, monthly, written examinations and reports | Whiteboard and Data show | Explain how functions and files are stored, and illustrate examples of Matlab applications | - SAVING A FUNCTION FILE, USING A USER-DEFINED FUNCTION- EXAMPLES OF MATLAB APPLICATIONS | 3 | 15 |
| 1. **Course Evaluation**
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| 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. |
| 1. **Learning and teaching resources**
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| MATLAB Programming for Engineers | Required textbooks (methodology, if any) |
| 1- MATLAB An Introduction with Applications**2- ELECTRONICS and CIRCUIT ANALYSIS using MATLAB** | Main references (sources) |
| All solid scientific journals that are related to the broad concept of programming using MATLAB. | Recommended supporting books and references (scientific journals, reports....) |
| **https://www.mathworks.com/** | Electronic references, Internet sites |