**Course description form**

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| 1. **Course Name**
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| Digital Techniques |
| 1. **Course Code**
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| EPE101 |
| 1. **Semester/Year**
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| Spring Semester/First 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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| 60/3 |
| 1. **Name of the course administrator**
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| 1. **Course objectives**
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| 1.To acquire the basic knowledge of Digital techniques levels and application of knowledge to understand digital electronics circuits.2.Have a thorough understanding of the fundamental concepts and techniques used in digital electronics3.To understand and examine the structure of various number systems and its application in digital design. 4.The ability to understand, analyze and design various combinational and sequential circuits. 5.Ability to identify basic requirements for a design application and propose a cost effective solution. 6.To prepare students to perform the analysis and design of various digital electronic circuits. | **Objectives of the study subject** |
| 1. **Teaching and learning strategies**
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| Type something like: The main strategy that will be adopted in delivering this module is to encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. | **The Strategy**  |
| 1. **Course structure**
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| **Evaluation method** | **Learning method** | **Required learning outcomes** | **Name of the unit or topic**  | **Hours** | **Week** |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | Digital systems basics, the difference between analog and digital signals | Introduction to Digital Techniques | 2 | 1 |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | Digital logic gates ,numbering system, decimal system, binary system, octal system, hexadecimal system. | Canonical & Standard forms Digital Logic Gates | 2 | 2 |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | decimal to binary conversion, decimal to octal conversion, decimal to hexadecimal conversion, binary to decimal conversion, octal to decimal conversion, hexadecimal to decimal conversion, binary-octal conversion, octal-binary conversion, hexadecimal-binary conversion, binary-hexadecimal conversion, hexadecimal -octal conversion, octal- hexadecimal conversion | Number systems conversion  | 2 | 3 |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | decimal to binary conversion, decimal to octal conversion, decimal to hexadecimal conversion, binary to decimal conversion, octal to decimal conversion, hexadecimal to decimal conversion, binary-octal conversion, octal-binary conversion, hexadecimal-binary conversion, binary-hexadecimal conversion, hexadecimal -octal conversion, octal- hexadecimal conversion | Number systems conversion  | 2 | 4 |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | digital arithmetic: binary addition , binary subtraction, binary multiplication, binary division, complements, diminished radex , radix complement, representing signed numbers, singe magnitude system, first complement method, second complement method, binary subtraction using first and second complement, decimal subtraction using $9^{,}$s and $10^{,}$s complement) | Arithmetic Operation in different numbers | 2 | 5 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Binary coded decimal, Gray code | Binary Codes , Binary logic gates | 2 | 6 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Basic definition of Boolean algebra, basic theorem & properties, Boolean functions, Demorgans theorem, Universal gates | Boolean Algebra | 2 | 7 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Basic definition of Karnaugh Map, Types of Karnaugh Map, two variable K-Map, three variable K-Map, four variable K-Map, Don’t care condition  | Karnaugh Map and Don’t care  | 2 | 8 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | product, mini term sum, maxterm, standard form of sum of product, standard form of product of sum  | Sum of Product and Product of Sum | 2 | 9 |
| Daily examsPresentation of the seminarand monthly exams | Lectures |  Binary Adder-Subtractor [Half and Full adders, Half and Full Subtractors] | Combinational Logi**c** Circuits | 2 | 10 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Arithmetic Operations | Combinational Logi**c** Circuits | 2 | 11 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Comparator Circuits | Combinational Logi**c** Circuits | 2 | 12 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Multiplexer & De multiplexer | Combinational Logi**c** Circuits | 2 | 13 |
| Daily examsPresentation of the seminarand monthly exams | Lectures | Decoder & Encoder | Combinational Logi**c** Circuits | 2 | 14 |
| Daily examsPresentation of the seminarand monthly exams  | Lectures | Latches, Flip- Flop and Shift Registers | Sequential Logi**c** Circuits | 2 | 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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| 1. Digital Design By M. Morris Mano2. Digital Fundamentals By T. Floyd | Required textbooks (methodology, if any) |
| [Fundamentals of Digital Circuits By A. Anand Kumar](https://easyengineering.net/fundamentals-of-digital-circuits-by-anand-kumar/)  | Main references (sources) |
| Library locations in some international universities. | Recommended supporting books and references (scientific journals, reports....) |
| Visit scientific websites to view recent developments in the subject matter, including:<https://technology.tki.org.nz/Teacher-education> | Electronic references, Internet sites |