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| **ISHIK UNIVERSITY FACULTY OF SCIENCE Department of INFORMATION TECHNOLOGY,2017-2018 Spring Course Information for IT 231 LOGIC DESIGN** |

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| --- | --- |
| **Course Name:** | LOGIC DESIGN |
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| --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Course type** | **Regular Semester** | **Theoretical** | **Practical** | **Credits** | **ECTS** |
| IT 231 | 2 | 3 | 3 | - | 3 |  |

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| **Name of Lecturer(s)-Academic Title:** | Abbas Mohammad - |
| **Teaching Assistant:** | - |
| **Course Language:** | English |
| **Course Type:** | Non-area Elective |
| **Office Hours** |  |
| **Contact:** | Email:abs20002000@gmail.com Tel:07504793738  |
| **Teacher's academic profile:** |  |
| **Course Objectives:** | The objectives of the course can be categorized as understanding the basics of Boolean algebra and the operation of logic components, combinational, and sequential circuits, and getting familiar to the design of digital circuits and systems. |
| **Course Description (Course overview):** | Basic concepts and tools (number-base systems, switching algebra, logic gates). Design and analysis of combinational and sequential logic blocks, (adder, subtractor, decoders, encoders, multiplexer, flip-flop, register, counter etc.). Introduction to Hardware Descriptive Language, Computer aided design, analysis and synthesis of digital circuits, use of Verilog simulator. Introduction to FPGAs (Field Programmable Gate Arrays). |
| **COURSE CONTENT**

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| --- | --- | --- | --- |
| **Week** | **Hour** |               **Date**               | **Topic** |
| **1** | 3 | 8-12/10/2017 | Number systems, binary systems, base conversion, representation of numbers and characters using binary codes, and binary arithmetic. |
| **2** | 3 | 15-19/10/2017 | Boolean algebra and its laws, axioms, theorems, and operations. |
|  |  |  |  |
| **3** | 3 | 22-26/10/2017 | Manipulation and simplification of Boolean algebraic expressions and functions using Boolean theorems and K-maps. |
| **4** | 3 | 29/10-2/11/2017 | Manipulation and simplification of Boolean algebraic expressions and functions using Boolean theorems and K-maps. |
|  |  |  |  |
| **5** | 3 | 5-9/11/2017 | Latches and flip-flops (SR, JK, D, and T). |
| **6** | 3 | 12-16/11/2017 | Latches and flip-flops (SR, JK, D, and T). |
|  |  |  |  |
| **7** | 3 | 19-23/11/2017 | Midterm Exam |
| **8** | 3 | 26-30/11/2017 | Analysis and design of combinational circuits using basic gates and/or combinational devices. |
|  |  |  |  |
| **9** | 3 | 3-7/12/2017 | Combinational devices such as multiplexers, decoders, and adders. |
| **10** | 3 | 10-14/12/2017 | Combinational devices such as multiplexers, decoders, and adders. |
|  |  |  |  |
| **11** | 3 | 17-21/12/2017 | Analysis and design of synchronous sequential logic circuits. |
| **12** | 3 | 24-28/12/2017 | Analysis and design of synchronous sequential logic circuits. |
|  |  |  |  |
| **13** | 3 | 31/12/2017-4/1/2018 | Registers and counters: Their design and use in implementing specific operations. |
| **14** | 3 | 7-11/1/2018 | Registers and counters: Their design and use in implementing specific operations. |
|  |  |  |  |
| **15** | 3 | 14-18/1/2018 | Final Exam |
| **16** | 3 | 21-25/1/2018 | Final Exam |
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| **COURSE/STUDENT LEARNING OUTCOMES**

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| --- | --- |
|  |  |
| **1** | Convert between number-base systems and handle basic binary operations. |
| **2** | Work with logic functions with gates, expressing them via terms and truth tables |
| **3** | Design and synthesize a combinational or sequential logic circuit to perform a desired function. |
| **4** | Design/Use combinational-logic building blocks such as adders, subtractors, decoders, encoders, multiplexers, demuxes. |
| **5** | Design/Use sequential-logic building blocks including latches, flip-flops, counters, and registers. |

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| **COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES**(Blank : no contribution, I: Introduction, P: Profecient, A: Advanced )

|  |  |  |
| --- | --- | --- |
|  | **Program Learning Outcomes** | **Cont.** |
| **1** | An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution | P |
| **2** | An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs | I |
| **3** | An ability to function effectively on teams to accomplish a common goal | P |
| **4** | An understanding of professional, ethical, legal, security, social, and economic issues and responsibilities |  |
| **5** | An ability to analyze the local and global impact of computing on individuals, organizations, and society | I |
| **6** | An ability to use current techniques, skills, and tools necessary for computing practice | A |
| **7** | An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies | I |
| **8** | An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems |  |
| **9** | An ability to effectively integrate IT-based solutions into the user environment |  |
| **10** | An ability apply problem solving skills, core IT concepts, best practices and standards to information technologies | P |
| **11** | An ability to identify and evaluate organizational requirements and current and emerging technologies |  |
| **12** | An ability to select, design, integrate and administer IT-based solutions into the organizational environment | I |

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| **Prerequisites (Course Reading List and References):** | Math-101,102 Calculus-I and II; IT-105, 106 Intro to IT-I and II; |
| **Student's obligation (Special Requirements):** | They are requested to be following the regulations of the university, faculty, department and student hand book. They might be asked to perform some practical tasks, projects, assignments on their own, or as groups. If needed they might be called for tutorial sessions or any other required task relevant to the course. |
| **Course Book/Textbook:** | Digital Design M. Morris Mano and Michael D. Ciletti Prentice Hall 4th edition / 2007 |
| **Other Course Materials/References:** | “Digital Design: Principles and Practices”, John F. Wakerly, Prentice Hall. “Computer Engineering Hardware Design”, M. Morris Mano, Prentice Hall. “Fundamentals of Logic Design”, Charles Roth, Jr., Brooks Cole. |
| **Teaching Methods (Forms of Teaching):** | Lectures, Practical Sessions, Excersises, Presentation, Assignments |
| **COURSE EVALUATION CRITERIA**

|  |  |  |
| --- | --- | --- |
| **Method** | **Quantity** | **Percentage (%)** |
| Quiz | 1 | 10 |
| Homework | 1 | 10 |
| Midterm Exam(s) | 1 | 20 |
| Lab/Practical Exam(s) | 1 | 20 |
| Final Exam | 1 | 40 |
| **Total** | **100** |
| **Examinations:**Essay Questions, Fill in the Blanks, Short Answers |  |  |

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| **Extra Notes:** |
| **ECTS (ALLOCATED BASED ON STUDENT) WORKLOAD**

|  |  |  |  |
| --- | --- | --- | --- |
| **Activities** | **Quantity** | **Duration (Hour)** | **Total Work Load** |
| Course Duration (Including the exam week: 16x Total course hours) |  |  | 0 |
| Hours for off-the-classroom study (Pre-study, practice) |  |  | 0 |
| Assignments Mid-terms |  |  | 0 |
| Final examination |  |  | 0 |
| Other |  |  | 0 |
| **Total Workload** | **0** |
| **ECTS Credit (Total workload/25)** | **0** |

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**Peer review**

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| --- | --- | --- |
| Signature: | Signature: | Signature: |
| Name: | Name: | Name: |
| Lecturer                                                                       | Head of Department                                                         | Dean |

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