

**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

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| **1** | Course title | Digital Logic |
| **2** | Course number | 5401204 |
| **3** | Credit hours (theory, practical) | 3 |
| Contact hours (theory, practical) | 3 |
| **4** | Prerequisites/corequisites | Discrete Mathematics |
| **5** | Program title | Computer Information Systems |
| **6** | Program code | 1 |
| **7** | Awarding institution | The University of Jordan |
| **8** | Faculty | Faculty of Information Technology and Systems |
| **9** | Department | Computer Information Systems |
| **10** | Level of course | 2 |
| **11** | Year of study and semester (s) | 2017/2018 – First Semester |
| **12** | Final Qualification | Bachelor degree |
| **13** | Other department (s) involved in teaching the course | N/A |
| **14** | Language of Instruction | English |
| **15** | Date of production/revision |  |
| **16** | Required/ Elective | Required |

16. Course Coordinator:

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| *Dr. Mua'ad Abu-Faraj*  *Office numbers: Main Building 323*  *Office Hours:*  *Sun, Tue, Thu 09:00-10:00*  *Mon 9:30-10:30*  *Phone number: 36087*  *Email addresses: m.abufaraj@ju.edu.jo* |

17. Other instructors:

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| *N/A* |

**18. Course Description:**

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| *Main concepts of Logic Design; Boolean Algebra; Basic Definitions; Basic Theorems and Properties; Boolean Functions; Canonical and Standard Forms; Digital Logic Gates; Minimization Methods; Combinational Logic; Sequential Logic. Numbering Systems; Binary Codes; Boolean Algebra; Gate-Level Minimization; Algebraic Simplifications; Karnaugh Maps; Don't-Care conditions; NAND and NOR Implementation; Combinational Logic; Adders and subtractors; Decoders and Encoders; Multiplexers and Demultiplexors; ROMS and PLAs; Sequential Logic; Flip Flops; Registers, Counters, and Serial adder* |

**19. Course aims and outcomes:**

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| **A- Aims:**  *The main goal of this course is to equip students with required mathematical knowledge to analyze and design a logical circuit.*  **B- Intended Learning Outcomes (ILOs):** Upon successful completion of this course students will be able to …  A- Knowledge and Understanding  *A1) Understand the Boolean algebra theorems and properties.*  *A2) Understand the main concepts of gate-level minimization.*  *A3) Understand the combinational logical circuits.*  *A4) Understand the sequential logical circuits.*  *B- Intellectual skills: with the ability to …*  *B1) Simplify and implement Boolean Functions*  *B2) Analyze Problems and Design circuits.*  *C- Subject specific skills – with ability to …*  *C1) Designing of combinational circuits.*  *C2) Designing of sequential circuits* *D- Transferable skills – with ability to* *D1) Discuss and work in a group in order to design the main logic circuits.*  *D2) Discuss and work in a group in order to design and implement assigned combinational and sequential circuits.*  *D3) Demonstrate designed circuits.* |

20. Topic Outline and Schedule:

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| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Topic | Week | Instructor | Achieved ILOs | Evaluation Methods | Reference | | **Boolean Algebra:** operators of Boolean Algebra, Boolean functions (truth table, implementation of Boolean functions). | 1 | Dr. Mua'ad Abu-Faraj | A1, B1 | Quiz, Midterm, Final | Sections 2.3 and 2.5 | | **Boolean Algebra:** Simplification and complement | 2 | Dr. Mua'ad Abu-Faraj | A1, A2, B1 | Quiz, Project, Midterm, Final | Sections 2.4, 2.5 | | **Boolean Algebra:** Standard Forms (Sum of Products, and Product of Sums) | 3 | Dr. Mua'ad Abu-Faraj | A1, B1 | Quiz, Midterm, Final | Section 2.6 | | **Boolean Algebra:** Canonical Forms (sum of minterms, and product of maxterms)  **K-Map:** 2-variables, 3-variables, 4-variables. | 4 | Dr. Mua'ad Abu-Faraj | A1, A2, B1 | Quiz, Project, Midterm, Final | Sections 2.6, 3.1-3.3 | | **Quiz**  **K-Map:** Product of sum simplification, Do not care conditions | 5 | Dr. Mua'ad Abu-Faraj | A2, B1 | Midterm, Final | Sections 3.4, 3.5 | | NAND and NOR Implementation | 6 | Dr. Mua'ad Abu-Faraj | A1, B1 | Midterm, Final | Section 3.6 | | **Combinational Circuits:** Analysis and Design  **Binary Adder** | 7 | Dr. Mua'ad Abu-Faraj | A3, B2, C1 | Project, Midterm, Final | Sections 4.3,4.4,4.5 | | Binary Subtractor and Multiplication  Decimal Adder  Comparator | 8 | Dr. Mua'ad Abu-Faraj | A3, D1, D2, D3 | Project and Final | Sections 4.5-4.8 | | Decoder  Encoder | 9 | Dr. Mua'ad Abu-Faraj | A3, D1 | Final | Sections 4.9, 4.10 | | Midterm exam | 10 | Dr. Mua'ad Abu-Faraj |  |  |  | | Multiplexers  Demultiplexers  ROM | 11 | Dr. Mua'ad Abu-Faraj | A3, D1 | Final | Sections 4.11, 7.5 | | Flip-Flop  Analyzing Sequential Circuit | 12 | Dr. Mua'ad Abu-Faraj | A4, B2, C2, D2 | Final | Sections 5.3-5.5 | | Design Sequential Circuit | 13 | Dr. Mua'ad Abu-Faraj | A4, B2, C2, D2 | Final | Section 5.8 | | Registers  Serial adders | 14 | Dr. Mua'ad Abu-Faraj | A4, D1 | Final | Section 6.1 | | Final | 15 | Dr. Mua'ad Abu-Faraj |  |  |  | |

21. Teaching Methods and Assignments:

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| *Development of ILOs is promoted through the following teaching and learning methods:*  *Teaching (T) Strategies: The Course will be delivered using different means like lecture, discussion and presentation of applications.*  *Learning (L) Methods: Students attend classes, ask questions and participate in discussions, do the home works, solve suggested questions. Students will access the e-learning platform for more instruction and supported learning materials.* |

22. Evaluation Methods and Course Requirements:

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| Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:  *There will be several assessment methods of evaluation the performance of the students such as attending and class participation, grading the quizzes; developing and discussing a project; conducting the Midterm and the Final Exams.* |

23. Course Policies:

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| A- Attendance policies:  *Deliberate abstention from attending 1901204 classes and any other similar acts will lead to student deprivation from the course according to the UJ regulations*  B- Absences from exams and handing in assignments on time:  *If you miss the midterm, then a makeup exam will not be provided unless you submit a valid absence excuse, within three days from the midterm, to your lecturer. This excuse must be signed and stamped from the UJ hospital in order to be valid. If your lecturer accepts the excuse then you will be able to take the midterm makeup. You need to follow up the departmental announcements regarding the makeup date and time. Please note that the lecturer may either accept or reject your excuse based on UJ regulations*  C- Health and safety procedures:  N/A  D- Honesty policy regarding cheating, plagiarism, misbehavior:  *All students in this course must read the University policies on plagiarism and academic honesty*  E- Grading policy:  *- Midterm Exam: 30%*  *- Quiz: 10%*  *- Project: 10%*  *- Final Exam: 50%*  F- Available university services that support achievement in the course:  N/A |

24. Required equipment:

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**25. References:**

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| 1. Required book (s), assigned reading and audio-visuals:  *Logic & Computer Design Fundamentals. M. Mano, at. al, Pearcon, 2016.*   1. Recommended books, materials, and media:  * *Logic and Discrete Mathematics A Computer Science Perspective, Winfried K. Grassman and Jean Paul Tremblay, Prentice Hall, 1996.* * *Discrete and Combinatorial Mathematics: An Applied Introduction, Ralph P. Grimaldi, 5th edition, Addison Wesley, 2003.* |

26. Additional information:

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Name of Course Coordinator: Dr. Mua’ad Abu-Faraj Signature: ------------------------- Date: 17-09-2017 Head of curriculum committee/Department: ------------------------- Signature: ---------------------------------

Head of Department: ------------------------- Signature: ---------------------------------

Head of curriculum committee/Faculty: ------------------------- Signature: ---------------------------------

Dean: ------------------------------------------- -Signature: ---------------------------------

Copy to:

Head of Department

Assistant Dean for Quality Assurance

Course File