**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.  |

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| University of Baghdad | 1. Teaching Institution |
| Electrical Engineering Department | 2. University Department/Centre |
| Digital Techniques/EE105 | 3. Course title/code |
| B.Sc. Electrical engineering | 4. Program(s) to which it contributes |
| Weekly | 5. Modes of Attendance offered |
| First Year Class | 6. Semester/Year |
| 56 Hours | 7. Number of hours tuition (total) |
| 2015-2016 | 8. Date of production/revision of this specification  |
| 9. Aims of the Course: Introduce the fundamentals of digital techniques and digital systems, including Numbering systems, Binary codes, Arithmetic circuits, Logic gates, simplification of Boolean Algebra, Design a combinational logic circuits and Design a sequential circuit. |
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methods |
| 1. Knowledge and Understanding

A1. Demonstrate the difference between numbering systems used in digital techniques.A2. Ability to use all arithmetic operation in the Binary, BCD code, ..etc.A3. Simplification of Boolean expressions using basic laws. A4.Simplify any Boolean algebra up to 5 variables using the K-map method.A5. Simplify any Boolean algebra from 5 variables using Quine McCluskey method.A6. Demonstrate any simplified Boolean algebra using logic gates & universal gates. A7. Design all types of arithmetic, comparator & code conversion circuits.A8.Design a multiplexer & demultiplexer circuits , encoder, decoder & priority encoder circuits.A9. Illustrate all the types of flip-flops.A10.Design sequential circuits, such as counters (up, down & up/down) and shift register counters. |
|  B. Subject-specific skillsB1. Ability to deal with all numbering systemsB2. Ability to simplify any Boolean algebraB3. Expertise to use the logic gates in practicalB4.Design any combinational and sequential digital circuits |
|  Teaching and Learning Methods |
| -Lectures and Exercises-Laboratory Experiments |
|  Assessment methods  |
| * Exams
* Quizzes
* Homework
* Laboratory reports
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| C. Thinking Skills C1. Being able to use different digital circuitsC2. Implement the logic circuits in order to improve experimental skillsC3. Being to design the logic circuits in industry applications  |
|  Teaching and Learning Methods  |
| -Lectures and class discussions-Laboratory |
|  Assessment methods |
| -exams that involve problem solving skill-quizzes-experiments |

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| D. General and Transferable Skills (other skills relevant to employability and personal development) D1. Laboratory GroupsD2.Ability in design different logic circuitsD3. Ability to use digital circuits in practical |

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| 11. Course Structure |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam  | Lecturing exercises | Demonstrate the difference between systems of number used in digital techniques | A | 2 | 1 |
| Exam | Lecturing , exercises, experiments |  Arithmetic operation of Binary numbers including 1’s & 2’s complements | A, B,C | 2 | 2 |
| Exam | Lecturing , exercises, experiments | BCD & Digital codes. | A,B,C,D | 2 | 3 |
| Exam | Lecturing , exercises, experiments | .BCD Arithmetic | A,B,C,D | 2 | 4 |
| Exam | Lecturing , exercises, experiments | Logic gates | A,B,C,D | 2 | 5 |
| Exam | Lecturing , exercises, experiments | Universal building blocks | A,B,C,D | 2 | 6 |
| Exam | Lecturing , exercises, experiments | Implementation of any Boolean algebra using logic gates & universal gates. | A,B,C,D | 2 | 7 |
| Exam | Lecturing , exercises, experiments | Design different combinational logic circuits. | A,B,C,D | 2 | 8 |
| Exam | Lecturing , exercises, experiments | S.O.P & P.O.S methods | A,B,C,D | 2 | 9 |
| Exam | Lecturing , exercises, experiments |  Boolean Algebra (theorems) | A,B,C,D | 2 | 10 |

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| Exam  | Lecturing , exercises, experiments | Simplification using basic laws of Boolean algebra | A,B,C,D | 2 | 11 |
| Exam | Lecturing , exercises, experiments | Simplify any Boolean algebra up to 5 variables using the K-map method. | A,B,C,D | 2 | 12 |
| Exam | Lecturing , exercises, experiments | Simplify any Boolean algebra from 5 variables using Quine McCluskey method. | A,B,C,D | 2 | 13 |
|  |  | **Mid-Year Break** |  |  | 14 & 15 |
| Exam | Lecturing , exercises, experiments | Design of arithmetic circuits. | A,B,C,D | 2 | 16 |
| Exam | Lecturing , exercises, experiments | Design of arithmetic circuits. | A,B,C,D | 2 | 17 |
| Exam | Lecturing , exercises, experiments |  Comparator & code conversion circuits. | A,B,C,D | 2 | 18 |
| Exam | Lecturing , exercises, experiments | .Multiplexer & Demultiplexer circuits | A,B,C,D | 2 | 19 |
|  |  | Encoder, decoder, decoder with enable & priority encoder | A,B,C,D | 2 | 20 |
| Exam | Lecturing , exercises, experiments |  Applications of multiplexer & demultiplexer | A,B,C,D | 2 | 21 |
| Exam  | Lecturing , exercises, | Sequential circuits | A,B,C,D | 2 | 22 |
| Exam | Lecturing , exercises, experiments | Illustrate all types of flip-flops. | A,B,C,D | 2 | 23 |
| Exam | Lecturing , exercises, experiments | Flip flops truth and excitation tables | A, B,C,D | 2 | 24 |

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| Exam | Lecturing , exercises, experiments | Design of asynchronous s counters | A,B,C,D | 2 | 25 |
| Exam | Lecturing , exercises, experiments | Design of synchronous counter***s (*** up, down & up/down) | A,B,C,D | 2 | 26 |
| Exam | Lecturing , exercises, experiments | Design of synchronous counter***s (*** up, down & up/down) | A,B,C,D | 2 | 27 |
| Exam | Lecturing , exercises, experiments | Introduction to shift register | A,B,C,D | 2 | 28 |

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| 12. Infrastructure |
| *-Digital Design. By M. Mano**-Laboratory Booklet*  | Required reading:· CORE TEXTS· COURSE MATERIALS· OTHER |
| Internet websites deal with digital techniques | Special requirements (include for example workshops, periodicals, IT software, websites) |
| None | Community-based facilities(include for example, guestLectures , internship , field studies) |

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| 13. Admissions |
| ---- | Pre-requisites |
| 35 | Minimum number of students |
| 40 | Maximum number of students |