**Course Code**

**Course Name**

**Semester 1, 2019/2020**

**Lecturers Info**

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| **Lecturer’s Name** | Rina Azlin Binti Razali |
| **Room No.** | BW-3-C40 |
| **Office Tel. No.** | 03-89212020 ext 3311 |
| **Email**  | rina@uniten.edu.my |
| **Time Table** | Monday 3.00-5.00pm BC-0-019 (Lab)Thursday 4.00-6.00pm BM-0-018 (Lecture) |
| **Consultation Hours** | Monday - 8.00-9.00amThursday - 8.00-9.00am or by appointment |

**Course Descriptions:**

This aim of this course is to give students an understanding to the design and simplification of combinational logic circuits by introducing the concepts of logic gates and understanding the function representations in truth tables, timing diagrams, logic circuits and Boolean Expression. In addition, this course includes an overview to different elements and properties of sequential logic circuits. Visualizations of different logic circuits designs Karnaugh map simplifications are demonstrated in practical labs through the use of simulation tools.

**Course Outcomes:**

At the end of this course, students should be able to:

1. Identify and explain the theory in digital logic circuit. (C2,PO1)
2. Utilize the Boolean Algebra or Karnaugh Map to simplify the Boolean Expression . (C1,PO2)
3. Demonstrate the ability to choose suitable combination of logic gates to solve problem given. (C2, PO6)

**PROGRAM EDUCATIONAL OBJECTIVES (PEO)**

**Programme Educational Objectives (PEO) for Bachelor of Computer Science (Hons.)**

**The programme should prepare graduates who:**

|  |  |
| --- | --- |
| PEO1 | Are able to apply knowledge and technical competencies in Computer Science that is suitable to the task being performed. |
| PEO2 | Are competent in analyzing, modeling, designing, developing and evaluating computing solutions. |
| PEO3 | Uphold professional and ethical attitudes, and able to demonstrate skills in communication, leadership and teamwork with awareness towards the responsibility to the Almighty and the society. |
| PEO4 | Possess strong analytical and critical thinking to solve problems by applying the knowledge and skills acquired in Computer Science. |
| PEO5 | Possess skills for lifelong learning, research and career development. |
| PEO6 | Have entrepreneurial skills and a broad business and real world perspective. |

**PO for Bachelor of Computer Science (Hons.) (System and Networking) programme:**

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| --- | --- |
| PO1 | Describe and demonstrate advanced and comprehensive knowledge and relevant skills in Information Systems. |
| PO2 | Demonstrate intellectual independence by applying critical, analytical, and evaluation skills and managing complex issues. |
| PO3 | Apply various methods and procedures to solve a broad range of complex problems as well as review, tune, and supervise related practices and processes concerning Information Systems |
| PO4 | Convey written or oral forms of ideas with confidence, accuracy, and coherence, and work together with diverse people of various groups. |
| PO5 | Use a broad range of information, media and technology applications and combine numerical and graphical/visual data for study/work. |
| PO6 | Display leadership and professionalism, undertake related responsibilities, and demonstrate decision-making skills. |
| PO7 | Engage effectively in lifelong learning and demonstrate entrepreneurial competency and appreciation towards socio-political, economic, and cultural issues. |
| PO8 | Demonstrate professionalism and social and ethical considerations in accordance with ethical and legal principles.  |

**Course Content and Weekly activity**

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| --- | --- | --- | --- |
| ***Week*** | ***Topic*** | ***Chapter*** | ***Activities***  |
| Week 1  | **Number System*** Arithmetic Operation
* Number base Conversion
 | Module 1 |  |
| Week 2 | * Complement
 | Module 2 |  |
| Week 3 | SEMESTER BREAK |
| Week 4 | **Logic Gates*** Logic gates & logic functions representation
* Truth table & timing diagram
 | Module 3 | Quiz 1 – cover module 1 & 2 |
| Week 5 & 6 | **Boolean Algebra and Logic Simplification** * Basic Properties & Theorems of Boolean algebra
* Simplification using Boolean algebra
 | Module 4 |  |
| Week 7 | **Boolean Expression Representation*** Standard forms of Boolean expression (Sum of Products & Product of Sum)
* Canonical forms of Boolean expression (Sum of Minterms & Product of Maxterms)
* Conversion between standard to canonical forms of Boolean Expression
 | Module 5 |  |
| Week 8 | **Simplification using Karnaugh Maps*** The Karnaugh Map minimization techniques
* Don’t care terms in K-Map
 | Module 6 | Midterm Examination – cover module 3-6 |
|  |  |
| Week 9 | **Combinational Logic Analysis** * Basic combinational logic circuits
* Conversion to NAND/NAND and NOR/NOR network
 | Module 7 & Module 8 |  |
| Week 10 | **Combinational Logic Circuits** * Half Adder
* Full Adder
 | Module 9 |  |
| Week 11 | **Combinational Logic Circuits** * Multiplier
* Magnitude comparator
 | Module 10 |  |
| Week 12 | **Combinational Logic Circuits** * Encoder
* Decoder
 | Module 11 | Quiz 2 – cover module 9 & 10 |
| Week 13 | **Sequential Logic Circuits*** Latches
* Edge-triggered flip-flop
* Characteristics tables
 | Module 12 |  |
| Week 14 |  |  | Revision |
| Week 15  | FINAL EXAM WEEKS |

**Text Book**

**Compulsory:**

" Digital Design: With an Introduction to the Verilog HDL, VHDL, and SystemVerilog,", 6th Edition by Morris Mano, Michael D. Ciletti, 2018, Pearson (Course Textbook)

**Additional:**

“Introduction to Logic Design”, 3rd Edition by Alan B. Marcovitz, 2010, Mgraw- Hill.

**Lecture Notes & Announcement**

The Lecture Notes can be downloaded from the following website: <http://metalab.uniten.edu.my/~rina/CSNB163/>

**Assessment**

Midterm 20%

Quizzes 10%

Labs 20%

Final Examination 50%

Total 100%

**Course outcome:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course outcome | MQF1 | MQF2 | MQF3a | MQF3b | MQF3c | MQF3d | MQF4 | MQF5 |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 |
| (CO1) Identify and explain the theory in digital logic circuit.  | X |  |  |  |  |  |  |  |
| (CO2) Utilize the Boolean Algebra or Karnaugh Map to simplify the Boolean Expression. |  | X |  |  |  |  |  |  |
| (CO3) Differentiate the functions of key protocols in the TCP/IP protocol stack |  |  |  |  |  | X |  |  |

**Assessment – course outcome Matrix:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Assessment | MQF1 | MQF1 | MQF3a | MQF3c |
| PO1 | PO1 | PO2 | PO6b |
| CO1 | CO2 | CO3 | CO4 |
| Quiz | X | X | X | X |
| Assignments | X |  |  | X |
| Mid-Term Test | X | X |  |  |
| Final Exam | X | X | X | X |

Class Policies:

1. Dress in proper attire corresponding to Universiti Tenaga Nasional dress code.
2. If you are absent from lecture due to
* Sickness : MC is required
* Emergency : letter of guardian is required

Any MC or letter should be given to the lecturer on the next day.

Failure to do so will result to no make up for any quizzes or exam.

1. The lecturer reserves the right to give pop-quizzes whenever deemed appropriate. Latecomers will not get extended time.
2. Cheating and any attempt thereto will not be tolerated and penalized according to the seriousness of the offense.
3. All assignments/exercises must be submitted on time. Deducted of 25% of marks or ZERO mark will be given for the late submitter (based on case by case basis).