MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information**  معلومات المادة الدراسية | | | | | | | |
| **Module Title** | Digital Electronics | | | | **Module Delivery** | | |
| **Module Type** | Core | | | | **☒ Theory**  **☒ Lecture**  **☒ Lab**   * **Tutorial** * **Practical** * **Seminar** | | |
| **Module Code** | MIE23104 | | | |
| **ECTS Credits** | 5 | | | |
| **SWL (hr/sem)** | 125 | | | |
| **Module Level** | | UGII | **Semester of Delivery** | | | | 4 |
| **Administering Department** | | MIE | **College** | MUC | | | |
| **Module Leader** | Adel Abas | | **e-mail** | adel.abas@muc.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Lecture | **Module Leader’s Qualification** | | | | PhD |
| **Module Tutor** |  | | **e-mail** |  | | | |
| **Peer Reviewer Name** | Dr.Noor Kadhim Meftin | | **e-mail** | noor.kadhim@muc.edu.iq | | | |
| **Scientific Committee Approval Date** | 17/6/2023 | | **Version Number** | | | 1.0 | |

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| **Relation with other Modules**  العلاقة مع المواد الدراسية الاخرى | | | |
| **Prerequisite module** | Electronics Circuits I | **Semester** | UGII-S3 |
| **Co-requisites module** |  | **Semester** |  |

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| **Module Aims, Learning Outcomes and Indicative Contents**  أهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية | |
| **Module Aims**  أهداف المادة الدراسية | 1. To learn the basics of logical circuits which are used in computers. 2. To understand how the logical medical instrumentations to work 3. To program the logical medical instrumentations 4. To design the logical medical instrumentations 5. To learn how to use logical tables to perform the logical medical instrumentations 6. TO maintain the logical medical instrumentations 7. To suggest how to build modern the logical medical instrumentations. |
| **Module Learning Outcomes**  مخرجات التعلم للمادة الدراسية | At ending of course, student will:   1. know the numbers systems, and conversion between them. 2. know binary codes. 3. design binary gates, and use Boolean algebra. 4. design and simplify the arithmetic circuits. 5. define Karnaugh maps. 6. know how flip-flops works. 7. define the work principles of counters and its types. 8. know the shift registers and types. 9-principles of decoders.   10-identify the Multiplexers and De-Multiplexers. 11-conversion of analog to digital circuits. |
| **Indicative Contents**  المحتويات الارشادية | Numbers systems, Binary, Octal, Hexadecimal. (4 hrs) Codes numbers . (8 hrs).  Arithmetic circuits . (6 hrs).  De Margan's theorems . (6 hrs). Karnaugh map . (6 hrs)  Flip – Flop: RS, RST, JK, D, FF . (4 hrs)  Asynchronous counter and synchronous . (6 hrs) Shift registers . (6 hrs)  Multiplexer, De multiplexer . (8 hrs) Decoder . (8 hrs)  Analog conversion (6 hrs) |

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| **Learning and Teaching Strategies**  استراتيجيات التعلم والتعليم | |
| **Strategies** | 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 type of simple experiments involving some sampling activities that are interesting to the students. |

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| **Student Workload (SWL)**  الحمل الدراسي للطالب | | | |
| **Structured SWL (h/sem)**  الحمل الدراسي المنتظم للطالب خلال الفصل | 79 | **Structured SWL (h/w)**  الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**  الحمل الدراسي غير المنتظم للطالب خلال الفصل | 46 | **Unstructured SWL (h/w)**  الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**  الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

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| **Module Evaluation**  تقييم المادة الدراسية | | | | | |
|  | | **Time/Nu**  **mber** | **Weight (Marks)** | **Week Due** | **Relevant Learning**  **Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 3, 9 | LO #1, 2, 4,11 and 12 |
| **Assignments** | 2 | 5% (5) | 3, 13 | LO # 4, 5, 7 and 8 |
| **Projects / Lab.** | 1 | 10% (10) | Continuous |  |
| **Report** | 1 | 10% (10) | 13 | LO # 6, 8 and11 |
| **Summative**  **assessment** | **Midterm Exam** | 2 hr | 20% (20) | 8 | LO # 1-8 |
| **Final Exam** | 4hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

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| **Delivery Plan (Weekly Syllabus)**  المنهاج الاسبوعي النظري | |
|  | **Material Covered** |
| **Week 1** | **Number system: Binary numbers, Octal numbers, Hexadecimal numbers**, |
| **Week 2** | **Binary codes** |
| **Week 3** | **Logic gates, De Margan's theorems, Laws and theorem of Boolean algebra** |
| **Week 4** | **Arithmetic circuit, Simplifying logic circuits:** |
| **Week 5** | **fundamentals products, sum of products, algebraic simplification** |
| **Week 6** | **Truth table to Karnaugh map** |
| **Week 7** | **Mid-term Exam** |
| **Week 8** | **Flip – Flop: RS, RST, JK, D, FF** |
| **Week 9** | **Counters: Asynchronous counter** |
| **Week 10** | **Counters: synchronous counter** |
| **Week 11** | **Shift registers: Serial in -Serial out shift register**  **Serial in -Parallel out shift register** |
| **Week 12** | **Shift registers: Bidirectional Shift Register** |
| **Week 13** | **Multiplexer and De multiplexer** |
| **Week 14** | **Decoder** |
| **Week 15** | **Digital to Analog converter** |
| **Week 16** | **Preparatory week before final exam** |

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| **Delivery Plan (Weekly Lab. Syllabus)**  المنهاج الاسبوعي للمختبر | |
|  | **Material Covered** |
| **Week 1** | Lab 1: Logic Gates (NOT, AND) |
| **Week 2** | Lab 2: Logic Gates (OR, NAND, NOR) |
| **Week 3** | Lab 3: Logic Gates (XOR, XNOR) |
| **Week 4** | Lab 4: Exercises |
| **Week 5** | Lab 5: Universal Gates (NAND, NOR) |
| **Week 6** | Lab 6: Flip-Flop |
| **Week 7** | Lab 7: Adder (Half and Full Adder) |

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| **Week 8** | Lab 8: Subtractor (Half and Full Subtractor) |
| **Week 9** | Lab 9: Comparator |
| **Week 10** | Lab 10: Asynchronous Binary Counter Up |
| **Week 11** | Lab 11: Asynchronous Binary Down Counter |
| **Week 12** | Lab 12: Asynchronous Binary Decade Counter |
| **Week 13** | Lab 13: Asynchronous MOD Counter |
| **Week 14** | Lab 14: Asynchronous Binary Counter (count from number to another) |

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| **Learning and Teaching Resources**  مصادر التعلم والتدريس | | |
|  | **Text** | **Available in the**  **Library?** |
| **Required Texts** | DIGITAL FUNDAMENTALS / FLOYD |  |
| **Recommended Texts** |  |  |
| **Websites** |  | |

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| **Grading Scheme**  مخطط الدرجات | | | | |
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |
| **B -** Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| **C -** Good | جيد | 70 - 79 | Sound work with notable errors |
| **D -** Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| **E -** Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX –** Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| **F –** Fail | راسب | (0-44) | Considerable amount of work required |
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| **Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the  automatic rounding outlined above. | | | | |