MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| **Module Information****معلومات المادةالدراسية** |
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| **Module Title** | Electrical Circuits I | **Module Delivery** |
| **Module Type** | Basic | * **☒ Theory**
* **☒ Lecture**
* **☒ Lab**
* **☐ Tutorial**
* **☐ Practical**
* **☐ Seminar**
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| **Module Code** | WBM-11-08 |
| **ECTS Credits**  | 6 |
| **SWL (hr/sem)** | 150 |
| **Module Level** | UGI | **Semester of Delivery** | 1 |
| **Administering Department** | Biomedical Eng. |  **College** |  College of Engineering |
| **Module Leader** | Harith Nawfal | **e-mail** | Harith.na@uowa.edu.iq |
| **Module Leader’s Acad. Title** | Assist. Lecturer | **Module Leader’s Qualification** | M.Sc. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Name | **e-mail** | E-mail |
| **Scientific Committee Approval Date** | 01/06/2023 | **Version Number** | 1.0 |

| **Relation with other Modules****العلاقة مع المواد الدراسية الأخرى** |
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| **Prerequisite module** | None | **Semester** |  |
| **Co-requisites module** | None | **Semester** |  |

| **Module Aims, Learning Outcomes and Indicative Contents****أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** |
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|  **Module Aims****أهداف المادة الدراسية** | 1. To develop problem solving skills and understanding of circuit theory through the application of techniques.
2. To understand voltage, current and power from a given circuit.
3. This course deals with the basic concept of electrical circuits.
4. This is the basic subject for all electrical and electronic circuits.
5. To understand Kirchhoff's current and voltage Laws problems.
6. To perform mesh and Nodal analysis.
7. To perform some circuits theorem such as Thevenin’s theorem, Norton’s theorem and superposition theorem.
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| **Module Learning Outcomes****مخرجات التعلم للمادة الدراسية** | 1. Recognize how electricity works in electrical circuits.
2. List the various terms associated with electrical circuits.
3. Summarize what is meant by a basic electric circuit.
4. Discuss the reaction and involvement of atoms in electric circuits.
5. Describe electrical power, charge, and current.
6. Define Ohm's law.
7. Identify the basic circuit elements and their applications.
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| **Indicative Contents****المحتويات الإرشادية** | Indicative content includes the following.Circuit TheoryDC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff’s laws and Ohm’s law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis and circuits theorem. Revision problem classes  |

| **Learning and Teaching Strategies****استراتيجيات التعلم والتعليم** |
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| **Strategies** | Type something like: 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. |

| **Student Workload (SWL)****الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا** |
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| **Structured SWL (h/sem)****الحمل الدراسي المنتظم للطالب خلال الفصل** | 93 | **Structured SWL (h/w)****الحمل الدراسي المنتظم للطالب أسبوعيا** | 6 |
| **Unstructured SWL (h/sem)****الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 57 | **Unstructured SWL (h/w)****الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 4 |
| **Total SWL (h/sem)****الحمل الدراسي الكلي للطالب خلال الفصل** | 150 |

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

| **Delivery Plan (Weekly Syllabus)****المنهاج الاسبوعي النظري** |
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| **Week**  | **Material Covered** |
| **Week 1** | DC Principles, Ohm’s law, power. |
| **Week 2** | efficiency and energy, Series DC Circuits. |
| **Week 3** | Kirchhoff's voltage law, voltage divider rule, relative potential.  |
| **Week 4** | Parallel DC Circuits, Kirchhoff's current law  |
| **Week 5** | current divider rule, open and short circuits.  |
| **Week 6** | Series-Parallel Networks, series-parallel DC networks. |
| **Week 7** | Mid-term Exam  |
| **Week 8** | Electrical Circuit Analysis Methods, current source  |
| **Week 9** | sources conversion, Branch-Current Method  |
| **Week 10** | Mesh Analysis Method  |
| **Week 11** | Nodal Analysis Method |
| **Week 12** | bridge networks, star-delta and delta-star circuits  |
| **Week 13** | conversion Superposition Theorem  |
| **Week 14** | Thevenin's Theorem  |
| **Week 15** | Norton's Theorem,Maximum Power Transfer Theorem |
| **Week 16** | Preparatory week before the final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)****المنهاج الاسبوعي للمختبر** |
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| **Week**  | **Material Covered** |
| **Week 1** | Lab 1: Introduction to electrical circuit |
| **Week 2** | Lab 2: series circuit |
| **Week 3** | Lab 3: parallel circuit |
| **Week 4** | Lab 4: Series-parallel circuit |
| **Week 5** | Lab 5: super position method |
| **Week 6** | Lab 6: Thevenin method |
| **Week 7** | Lab 7: Norton method |

| **Learning and Teaching Resources****مصادر التعلم والتدريس** |
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|  | **Text** | **Available in the Library?** |
| **Required Texts** | Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education | Yes |
| **Recommended Texts** | DC Electrical Circuit Analysis: A Practical ApproachCopyright Year: 2020, dissidents. | No |
| **Websites** | <https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering> |

|  **Grading Scheme****مخطط الدرجات** |
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| **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 |
|  |  |  |  |  |
| **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. |