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|  | Ministry of Higher Education and Scientific Research - IraqUniversity of DiyalaCollege of EngineeringDepartment of Materials Engineering | D:\منهج بولونيا\تنزيل.jpg |

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information****معلومات المادة الدراسية** |
| **Module Title** | Insulating materials | **Module Delivery** |
| **Module Type** |  | * **☐ Theory**
* **☒ Lecture**

 **☐ Lab** * **☐ Tutorial**
* **☐ Practical**
* **☒ Seminar**
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| **Module Code** | MAE435‎ |
| **ECTS Credits**  | 2 |
| **SWL (hr/sem)** | 30 |
| **Module Level** | UGx1 4  | **Semester of Delivery** | 2  |
| **Administering Department** | Materials Engineering  |  **College** |  College of Engineering |
| **Module Leader** |  |  **e-mail** |  |
| **Module Leader’s Acad. Title** | Lecturer | **Module Leader’s Qualification** |  |
| **Module Tutor** | None |  **e-mail** | None |
| **Peer Reviewer Name** | None |  **e-mail** | None |
| **Scientific Committee Approval Date** | 19/10/2023 | **Version Number** | 1.0 |

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

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| **Module Aims, Learning Outcomes and Indicative Contents****أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** |
| **Module Objectives****أهداف المادة الدراسية** | This module aims to1. To develop an understanding of the fundamental laws and elements of electrical circuits.
2. To learn the energy properties of electric elements and the techniques to measure voltage and current.
3. To develop the ability to apply circuit analysis to DC and AC circuits.
4. Another objective is to prepare students to take some more advanced courses in the area of circuits and electronics.
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| **Module Learning Outcomes****مخرجات التعلم للمادة الدراسية** | 1. Knowledge of basic terms in electrical engineering.
2. Learn about Ohm's law and the relationship of current with voltage
3. Learn about Kirchhoff's laws
4. Learn about the properties of conductors and insulators
5. Apply the knowledge of basic circuital laws and simplify the dc and ac networks using reduction techniques.
6. analyse the dc and ac circuits using mesh and nodal analysis and network simplification theorems.
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| **Indicative Contents****المحتويات الإرشادية** | This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description |

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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 seminars and by considering types of simple experiments involving some sampling activities that are interesting to the students. |

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| **Module Evaluation****تقييم المادة الدراسية** |
| **As** | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 6 | 5% (5) | 2, 4, 6, 8, 10, 12 | LO #1 to #11 |
| **Assignments** | 3 | 5% (5) | 3, 7, 13 | LO #1 to #10 |
| **Projects / Lab.** | /  | / | / |  / |
| **Group Presentation** | 1 | 10% (10) | 15 | LO #1 - #14 |
| **Summative assessment** | **Midterm Exam** | 2hrs.  | 20% (20) | 6 and 12 | LO #1 - #14 |
| **Final Exam** | 3hrs.  | 60% (60) | 16 | All |
| **Total assessment** | 100% (100 Marks) |  |  |

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| **Delivery Plan (Weekly Syllabus)****المنهاج الاسبوعي النظري** |
| **Week**  | **Material Covered** |
| **Week 1** | Principle and theory of Insulating materials |
| **Week 2** | Principle properties of Insulating materials |
| **Week 3** | Classification of Insulating materials |
| **Week 4** | Introduction to insulating materials |
| **Week 5** | Effect of frequency on dielectric constant, effect of temperature on polarization |
| **Week 6** | Ferroelectric materials ,paraelectric materials , hysteresis curve. |
| **Week 7** | Pizoelectricity, important requirements of good insulating materials |
| **Week 8** | Frequency dependence of electronic polarization ,Ionic polarization |
| **Week 9** | Dielectric loses, significance of the loss tangent, depending of the loss tangent on temperature and frequency |
| **Week 10** | Frequency and temperature depending of the dielectric constant of polar dielectric properties of polymeric systems |
| **Week 11, 12**  | Atomic origin of magnetism materials, magnetic permeability , magnetic susceptibilityClassification of magnetic materials |
| **Week 13** | Magnetization and Saturation, Domain theory of ferromagnetism, effect of temperature |
| **Week 14** | Hysteresis curves , Hard and Soft magnetic materials |
| **Week 15** | Applications of magnetic materials / Final Exam  |

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| **Learning and Teaching Resources****مصادر التعلم والتدريس** |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | 1) Insulation materials science and application, SoLAs, 20142) The complete guide to electrical insulation, Megger, 2006 | Yes |
| **Recommended Texts** | 1. Radiation shielding for clinics and small Hospitals, Hanson G.,2013
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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. |