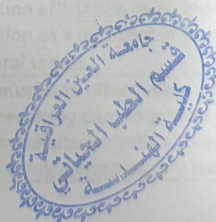


# MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                              |                               |                                                                                                                                                                                                                                                                           |
|------------------------------------|------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                              |                               |                                                                                                                                                                                                                                                                           |
| Module Title                       | <b>Electrical Circuits I</b> |                               | Module Delivery                                                                                                                                                                                                                                                           |
| Module Type                        | Basic                        |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input checked="" type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>MDER111</b>               |                               |                                                                                                                                                                                                                                                                           |
| ECTS Credits                       | 5                            |                               |                                                                                                                                                                                                                                                                           |
| SWL (hr/sem)                       | 125                          |                               |                                                                                                                                                                                                                                                                           |
| Module Level                       | 1                            | Semester of Delivery          | 1                                                                                                                                                                                                                                                                         |
| Administering Department           | Type Dept. Code              | College                       | Type College Code                                                                                                                                                                                                                                                         |
| Module Leader                      | Dr Basam                     | e-mail                        |                                                                                                                                                                                                                                                                           |
| Module Leader's Acad. Title        |                              | Module Leader's Qualification | M.SC                                                                                                                                                                                                                                                                      |
| Module Tutor                       | M.SC Muntadher hasan         | e-mail                        | Phd.muntadher@gmail.com                                                                                                                                                                                                                                                   |
| Peer Reviewer Name                 |                              | e-mail                        |                                                                                                                                                                                                                                                                           |
| Scientific Committee Approval Date |                              | Version Number                | 1.0                                                                                                                                                                                                                                                                       |



### Relation with other Modules

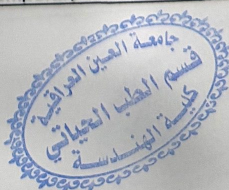
العلاقة مع المواد الدراسية الأخرى

|                      |      |          |  |
|----------------------|------|----------|--|
| Prerequisite module  | None | Semester |  |
| Co-requisites module | None | Semester |  |

### Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

|                                                                  |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Aims</b><br>أهداف المادة الدراسية                      |                  | 1. To develop problem solving skills and understanding of circuit theory through the application of techniques.<br>2. To understand voltage, current and power from a given circuit.<br>3. This course deals with the basic concept of electrical circuits.<br>4. This is the basic subject for all electrical and electronic circuits.<br>5. To understand Kirchhoff's current and voltage Laws problems.<br>6. To perform mesh and Nodal analysis.                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Module Learning Outcomes</b><br>مخرجات التعلم للمادة الدراسية | <b>Knowledge</b> | A2 2.1: Define of electrical devices and circuits<br>2.2: Understanding series DC circuits and parallel DC circuits, including Ohm's law, power, and Kirchhoff's laws<br>2.3: Classify of series and parallel DC circuits<br>2.4: Apply of basic DC principles (Ohm's law, Kirchhoff's laws, voltage divider rules, and current divider rules) and theorems (superposition, Thevenin, Norton, and maximum power transmission)<br>A3 A3-1: Measure physiological signals and parameters using major medical instruments and laboratory devices, ensuring accurate operation, calibration, and maintenance in accordance with technical standards.<br>A3-2: Analyze measurement results, device performance, and theoretical principles, integrating them with practical clinical applications while maintaining safety procedures. |
|                                                                  | <b>Skills</b>    | B1 B1.1 Function efficiently as an individual<br>B1.2 Function as a member of multidisciplinary and multicultural teams<br>B2 B2.1 Communicate effectively – graphically with a range of audiences using contemporary tools.<br>B2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |





|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                              |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------------------------------------------------------------------|
|                                            | Ethics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | C2 | C1-1: Commit to quality standards.<br>C1-2: Adhere to deadlines.<br>C1-3: Strive for continuous improvement. |
|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |                                                                                                              |
| Indicative Contents<br>المحتويات الإرشادية | <p>Indicative content includes the following.</p> <ul style="list-style-type: none"> <li>Fundamentals of Electrical Circuits (Electrical Quantities, Measurements and Components). [6 hrs]</li> <li>Ohm's law, Energy, and Power. [3 hrs]</li> <li>Kirchhoff's &amp; divider's Laws. [4 hrs]</li> <li>Series, Parallel, and Series-Parallel Circuits. [10 hrs]</li> <li>Theorems: Norton, Nodal, Mesh, Source Transformation, Maximum Power Transfer, Thevenin and Superposition. [20 hrs]</li> <li>Delta-Star Networks. [4 hrs]</li> <li>Revision problem classes [6 hrs]</li> <li>Laboratory [45 hrs]</li> </ul> |    |                                                                                                              |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |                                                                                                                      |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Strategies                                                      | Assessment is based on hand-in assignments, written exam, Case study, Quizzes, Practical testing and Online testing. |

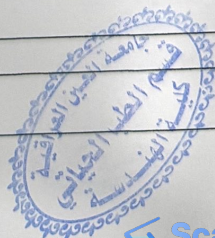
| Student Workload (SWL)<br>الحمل الدراسي للطلاب                          |     |                                                                     |      |
|-------------------------------------------------------------------------|-----|---------------------------------------------------------------------|------|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 94  | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطلاب أسبوعياً       | 6.26 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 31  | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطلاب أسبوعياً | 3.1  |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 125 |                                                                     |      |



| Module Evaluation     |                 |             |                  |            |                           |
|-----------------------|-----------------|-------------|------------------|------------|---------------------------|
| تقييم المادة الدراسية |                 |             |                  |            |                           |
|                       |                 | Time/Number | Weight (Marks)   | Week Due   | Relevant Learning Outcome |
| Formative assessment  | Quizzes         | 3           | 10               | Continuous |                           |
|                       | Assignments     | 2           | 5                | Continuous |                           |
|                       | Projects / Lab. | 3           | 15               | Continuous |                           |
|                       | Report          | 10          | 10               | Continuous |                           |
| Summative assessment  | Midterm Exam    | 3 hr        | 10               |            |                           |
|                       | Final Exam      | 3hr         | 50% (50)         |            | All                       |
| Total assessment      |                 |             | 100% (100 Marks) |            |                           |

| Delivery Plan (Weekly Syllabus) |                                                    |                  |
|---------------------------------|----------------------------------------------------|------------------|
| المنهاج الاسبوعي النظري         |                                                    |                  |
|                                 | Material Covered                                   |                  |
| Week 1                          | Introduction - Fundamentals of Electrical Circuits | A2-1, B1.1, C1-1 |
| Week 2                          | Elements of electrical circuits                    | A2-1, B2.1, C1-3 |
| Week 3                          | Ohm's law, Energy, and Power                       | A2-1, A3-1, C1-1 |
| Week 4                          | Review of Kirchhoff's & divider's Laws             | A2-1, A3-1       |
| Week 5                          | Series, Parallel Circuits                          | A2-1, B1.1, C1-1 |

|         |                                                 |                        |
|---------|-------------------------------------------------|------------------------|
| Week 6  | Series-Parallel Circuits                        | A2-1, A2-3, A3-1, B2.2 |
| Week 7  | Source Transformation and Superposition Theorem | A2-1, A3-1, C1-2       |
| Week 8  | 1 <sup>st</sup> mid exam                        | A2                     |
| Week 9  | Mesh Theorem                                    | A2-2, B2.2, C1-3       |
| Week 10 | Nodal Theorem                                   | A2-2, B2.1, C1-1       |
| Week 11 | Maximum Power Transfer Theorem                  | A2, A3                 |
| Week 12 | Thevenin Theorem                                | A2-1, A2-3, A3-2,      |



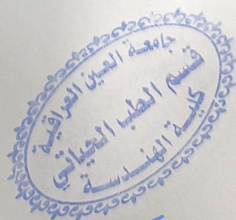


|                |                          |                  |
|----------------|--------------------------|------------------|
|                |                          | B1.2, C1-3       |
| <b>Week 13</b> | Norton Theorem           | A2-2, A3-2, B1.1 |
| <b>Week 14</b> | Delta-Star Networks      | A2-2, A3-2, C1-2 |
| <b>Week 15</b> | 2 <sup>nd</sup> mid exam | A2               |
| <b>Week 16</b> | Final exam               | A2, A3           |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|                | Material Covered                                                     | LOS |
|----------------|----------------------------------------------------------------------|-----|
| <b>Week 1</b>  | Lab 1: Introduction /Basic Laboratory Test and Measurement Equipment | A3  |
| <b>Week 2</b>  | Lab 2: Ohm's Law                                                     | A3  |
| <b>Week 3</b>  | Lab 3: Series DC Circuits                                            | A3  |
| <b>Week 4</b>  | Lab 4: Parallel DC Circuits                                          | A3  |
| <b>Week 5</b>  | Lab 5: Series-Parallel DC Circuits                                   | A3  |
| <b>Week 6</b>  | Lab 6: Superposition Theorem                                         | A3  |
| <b>Week 7</b>  | Lab 7: Thevenin's Theorem                                            | A3  |
| <b>Week 8</b>  | Lab 8: Nodal Analysis                                                | A3  |
| <b>Week 9</b>  | Lab 9: $\Delta$ -Y and Y- $\Delta$ Conversions                       | A3  |
| <b>Week 10</b> | Lab 10: Maximum Power Transfer                                       | A3  |



## Learning and Teaching Resources

مصادر التعلم والتدريس

|                   | Text                                                                                          | Available in the Library? |
|-------------------|-----------------------------------------------------------------------------------------------|---------------------------|
| Required Texts    | Lectures                                                                                      | Yes                       |
| Recommended Texts | Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education     | Yes                       |
| Websites          | <a href="https://eng.alayen.edu.iq/colleges/e/42">https://eng.alayen.edu.iq/colleges/e/42</a> |                           |

## Grading Scheme

مخطط الدرجات

| Group                       | Grade            | التقدير             | Marks (%) | Definition                            |
|-----------------------------|------------------|---------------------|-----------|---------------------------------------|
| Success Group<br>(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<br>(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.

