



## MODULE DESCRIPTION FORM

### نموذج وصف المادة الدراسية

| Module Information                 |                            |                               |  |
|------------------------------------|----------------------------|-------------------------------|--|
| معلومات المادة الدراسية            |                            |                               |  |
| Module Title                       | <b>Electrical Circuits</b> |                               | Module Delivery  |
| Module Type                        | <b>Support</b>             |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | <b>NSCC114</b>             |                               |  |
| ECTS Credits                       | <b>5</b>                   |                               |  |
| SWL (hr/sem)                       | <b>125</b>                 |                               |  |
| Module Level                       | First Class                | Semester of Delivery          |  |
| Administering Department           | NSD                        | College                       | CSIT   |
| Module Leader                      |                            | e-mail                        |  |
| Module Leader's Acad. Title        |                            | Module Leader's Qualification |  |
| Module Tutor                       |                            | e-mail                        |  |
| Peer Reviewer Name                 |                            | e-mail                        |  |
| Scientific Committee Approval Date |                            | Version Number                |  |

| 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

|  |  |
|--|--|
| <p><b>Module Aims</b><br/>أهداف المادة الدراسية</p>                      | <p>Introduce students to the fundamental concepts of electrical circuits, including voltage, current, resistance, and power. Develop a solid understanding of Ohm's Law and basic circuit analysis techniques.</p>                 |
| <p><b>Module Learning Outcomes</b><br/>مخرجات التعلم للمادة الدراسية</p> | <p>Demonstrate a clear understanding of fundamental concepts in electrical circuits, including voltage, current, resistance, power, and energy. Apply Ohm's Law to analyze simple circuits.</p>                                    |
| <p><b>Indicative Contents</b><br/>المحتويات الإرشادية</p>                | <p>Introduction to Electrical Circuits<br/>DC Circuit Analysis<br/>AC Circuit Analysis<br/>Circuit Theorems and Network Analysis<br/>Operational Amplifiers (Op-Amps)<br/>Three-Phase Circuits<br/>Network analysis techniques</p> |

### Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

|                          |  |
|--------------------------|--|
| <p><b>Strategies</b></p> | <p>Conceptual Understanding<br/>Active Learning<br/>Problem-Solving Approach<br/>Laboratory Experience<br/>Computer-Aided Analysis<br/>Collaborative Learning<br/>Visualization Techniques<br/>Progress Monitoring</p> |
|--------------------------|--|



### Student Workload (SWL)

الحمل الدراسي للطالب

|  |     |  |     |
|--|-----|--|-----|
| <b>Structured SWL (h/sem)</b><br>الحمل الدراسي المنتظم للطالب خلال الفصل       | 63  | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطالب أسبوعياً       | 4.2 |
| <b>Unstructured SWL (h/sem)</b><br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطالب أسبوعياً | 4.1 |
| <b>Total SWL (h/sem)</b><br>الحمل الدراسي الكلي للطالب خلال الفصل              | 125 |  |     |

### Module Evaluation

تقييم المادة الدراسية

|                             |                        | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
|-----------------------------|------------------------|-------------|----------------|------------|---------------------------|
| <b>Formative assessment</b> | <b>Quizzes</b>         | 2           | 10% (10)       | 5,10       | LO #1,2, 3 and 5          |
|                             | <b>Assignments</b>     | 2           | 10% (10)       | 2,12       | LO # 3, 4 and 5           |
|                             | <b>Projects / Lab.</b> | 1           | 10% (10)       | Continuous |                           |
|                             | <b>Report</b>          | 1           | 10% (10)       | 13         | LO # 5,8 and 10           |
| <b>Summative assessment</b> | <b>Midterm Exam</b>    | 2 hr        | 10% (10)       | 7          | LO # 1-6                  |
|                             | <b>Final Exam</b>      | 3 hr        | 60% (60)       | 16         | All                       |
| <b>Total assessment</b>     |                        |             |                |            |                           |

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

|               | Material Covered   |
|---------------|--|
| <b>Week 1</b> | Electric Circuits: Components, Types, and Related Concepts |
| <b>Week 2</b> | Parallel and Series-Parallel Configurations                |
| <b>Week 3</b> | Full-Wave Rectification                                    |
| <b>Week 4</b> | Clampers and Clippers                                      |
| <b>Week 5</b> | Transistor Construction and Transistor Operation           |
| <b>Week 6</b> | Common-Base Configuration and Common-Emitter               |
| <b>Week 7</b> | Operating Point and Fixed-Bias Circuit                     |
| <b>Week 8</b> | Voltage-Divider Bias:<br>-DC Bias with Voltage Feedback    |



|                |  |
|----------------|--|
|                | - A bipolar Junction Transistor Constructed - PNP Transistor   |
| <b>Week 9</b>  | Construction and characteristics of JFETs -Depletion-Type MOSFET   |
| <b>Week 10</b> | Semiconductor Field-Effect Transistor (MOSFET)<br>-Virtual Machine Android App (V MOS)<br>-Complementary Metal–Oxide–Semiconductor ( CMOS) |
| <b>Week 11</b> | Transition and Diffusion Capacitance- Reverse Recovery Time  |
| <b>Week 12</b> | Diode Equivalent Circuit- <a href="#">Extrinsic Semiconductors</a> ( <a href="#">p-n Junction</a> )  |
| <b>Week 13</b> | Energy level: Definition, Diagram, & Facts   |
| <b>Week 14</b> | Amplification in AC Domain   |
| <b>Week 15</b> | A bipolar Junction Transistor- BJT Modeling  |
| <b>Week 16</b> | <b>Final Exam</b>  |

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

|               | Material Covered   |
|---------------|--|
| <b>Week 1</b> | Introduction to laboratory equipment and safety procedures                             |
| <b>Week 2</b> | Familiarization with basic electrical components: resistors, capacitors, and inductors |
| <b>Week 3</b> | Measurement techniques: using multimeters and oscilloscopes                            |
| <b>Week 4</b> | Circuit analysis techniques: Ohm's Law, Kirchhoff's Laws                               |
| <b>Week 5</b> | Node voltage method and mesh current method for circuit analysis                       |
| <b>Week 6</b> | Power calculations in DC circuits  |
| <b>Week 7</b> | Laboratory experiments on DC circuit analysis  |

### Learning and Teaching Resources

مصادر التعلم والتدريس

|  | Text | Available in the Library? |
|--|------|---------------------------|
|  |      |                           |



|                   |  |  |
|-------------------|--|--|
| Required Texts    | Integrated Electronics Analog and Digital & System.<br>Author – Jacob Millman. Christos C. Halkias |  |
| Recommended Texts |  |  |
| Websites          |  |  |

| Grading Scheme<br>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  |
| <p><b>Note:</b> 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.</p> |                  |                     |           |                                       |