# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Physics | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG001 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG1 | Semester of Delivery | | 1 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Ehsan H. Sabbar | | e-mail | Ehsan.sabbar@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | | Semester | |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | 1. Introduce fundamental concepts in physics.<br>2. Develop mathematical skills for problem-solving.<br>3. Cover mechanics, oscillations, and waves.<br>4. Introduce thermodynamics and fluid mechanics.<br>5. Explore electric and magnetic fields.<br>6. Cover basic principles of optics.<br>7. Develop practical laboratory skills.<br>8. Apply physics principles to engineering contexts. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Understand fundamental physics concepts.<br>2. Apply mathematics to solve physics problems.<br>3. Analyze motion, forces, and energy in engineering contexts.<br>4. Interpret oscillations and waves in engineering applications.<br>5. Apply thermodynamics and fluid mechanics to engineering problems.<br>6. Apply electric and magnetic field principles in engineering scenarios.<br>7. Explain optical phenomena and apply basic optics principles.<br>8. Conduct experiments, analyze data, and communicate findings.<br>9. Apply physics principles to address engineering challenges.<br>10. Make informed engineering decisions using physics knowledge. |
| Indicative Contents<br>المحتويات الإرشادية | 1. Introduction to Physics and Measurement.<br>2. Mechanics: Motion, Forces, and Energy.<br>3. Oscillations and Waves.<br>4. Thermodynamics.<br>5. Fluid Mechanics.<br>6. Electric and Magnetic Fields.<br>7. Optics.<br>8. Laboratory Sessions.<br>9. Engineering Applications. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem) | 48 | Unstructured SWL (h/w) | 3 |

| | | | |
|---|---|---|---|
| الحمل الدراسي غير المنتظم للطالب خلال الفصل | | الحمل الدراسي غير المنتظم للطالب أسبوعيا | |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO#1, 2, 3 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO#1, 2 |
| | Projects / Lab. | 1 | 10% (10) | | LO#1, 9,7 |
| | Report | 1 | | | LO#1, 2,5 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | |
| | Final Exam | 3hr | 60% (60) | 16 | |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Physics and measurement; Kinematics of motion of a single particle in one and two dimensions; Kinematics of projectile and circular motion. |
| Week 2 | Dynamics of motion of a single particle and multiple objects in one and two dimensions and Newton's Laws; Free body diagrams; various types of mechanical forces; Application on the use of Newton's Laws |
| Week 3 | Work and energy; Conservative systems and the concept of potential energy; Conservation of mechanical energy |
| Week 4 | System of particles; Linear momentum; Conservation of linear momentum and collisions; Elastic and Inelastic collisions; Center of mass. |
| Week 5 | Kinematics and Dynamics of rotational motion; Torque; Moment of inertia; Angular momentum; Static equilibrium of rigid bodies; Elasticity and concepts of stress and strain |
| Week 6 | Phases of matter; Pressure and density, Equations of Fluid static; Equations of fluid dynamics: Continuity and Bernoulli's equations. |
| Week 7 | Oscillating systems; Simple Harmonic Motion (SHM); Energy of SHM; Damped oscillations; Forced oscillations and Resonance. |
| Week 8 | Midterm Exam |
| Week 9 | Types of waves: Transverse and Longitudinal; Traveling waves; Wave speed; The wave equation; Power and intensity in wave motion; |
| Week 10 | Examples & Problems |
| Week 11 | Reflection and transmission of wave; The principle of superposition; Interference of waves; Standing waves; Resonance |
| Week 12 | Macroscopic and microscopic description of matter; |
| Week 13 | Measuring temperature; Thermal expansion. |
| Week 14 | Concept of temperature and thermal equilibrium (zeroth law of thermodynamics) |
| Week 15 | Measuring temperature; Thermal expansion. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Measurements and Data Analysis |
| Week 1 | LAB1: Analyzing the kinematic components of 1Dmotion by using motion sensor |
| Week 2 | LAB2: Determination of the Acceleration of Gravity by studying Free fall |
| Week 3 | LAB3: Verification of Newton's Second Law |
| Week 4 | LAB4: Frequency Modulation |
| Week 5 | LAB5: Conservation of mechanical energy |
| Week 6 | LAB6: Verification of Work – energy theorem |
| Week 7 | LAB7: Static Equilibrium of a rigid object |
| Week 8 | LAB8: Determination of the Acceleration of Gravity using the Simple Pendulum |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • R.D. Knight, Physics for Scientists and Engineers, 2nd ed., Pearson 2008 Laboratory Manual, Compiled by Instructor | No |
| Recommended Texts | *University Physics* , William Moebs, Formerly of Loyola Marymount University<br>Samuel J. Ling, Truman State University<br>Jeff Sanny, Loyola Marymount University | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | Calculus I | | | **Module Delivery** | |
| **Module Type** | B | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ENG003 | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | 150 | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 1 |
| **Administering Department** | | Electrical | **College** | College of Engineering | |
| **Module Leader** | Hamid Radam Hussein | | **e-mail** | hamid.radam@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Dr. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course aims to provide the student with the skill of dealing with mathematical equations, clarifying the concept of differentiation and integration, and the polar, Cartesian, and cylindrical coordinates.<br>2. Demonstrate methods for solving integrals and sequences and series.<br>3. The course aims to study the applications of integration in calculating the lengths of curves, areas, and volumes in different coordinates and some physical applications.<br>4. The course aims to give the student a new background that he can benefit from when studying differential equations. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. To develop mathematical skill so that students are able to sketch the graph of various functions and evaluate Limits by using different techniques including L'Hopital's Rule.<br>2. Apply mathematical methods and principles in solving various derivative problems from Engineering fields, involving applications of derivatives.<br>3. Demonstrate algebraic facility with algebraic topics including linear, quadratic, exponential, logarithmic, and trigonometric functions,<br>4. Compute derivative and anti-derivative of algebraic, trigonometric, inverse trigonometric, exponential, logarithmic, and apply them to solve problems in a wide range of engineering applications. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Functions<br>2. Limits<br>3. Differentiation rules<br>4. The Chain Rule, implicit Differentiation<br>5. Applications of differentiation<br>6. Exponential and logarithmic functions.<br>7. Trigonometric functions and their derivatives<br>8. Hyperbolic functions and their derivatives<br>9. Advanced Applications of differentiation<br>10. Derivative and anti-derivative functions |

| Learning and Teaching Strategies<br>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. |

| | |
|---|---|

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5, 10 | LO#1, 2 and 3 |
| | **Assignments** | 2 | 5% (5) | 2, 12 | LO#1, and 4 |
| | **Projects / Lab.** | | | | |
| | **Report** | | | | LO#4 |
| **Summative assessment** | **Midterm Exam** | 2hr | 30% (30) | 7 | LO#1,2 and 3 |
| | **Final Exam** | 3hr | 60% (60) | 16 | LO#1,2,3 and 4 |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Functions |
| **Week 2** | Functions |
| **Week 3** | Limits |
| **Week 4** | Limits |

| | |
|---|---|
| **Week 5** | Differentiation rules |
| **Week 6** | Differentiation rules |
| **Week 7** | The Chain Rule, implicit Differentiation |
| **Week 8** | Applications of differentiation |
| **Week 9** | Applications of differentiation |
| **Week 10** | Exponential and logarithmic functions |
| **Week 11** | Trigonometric functions and their derivatives |
| **Week 12** | Hyperbolic functions and their derivatives |
| **Week 13** | Advanced Applications of differentiation |
| **Week 14** | Derivative and anti-derivative functions |
| **Week 15** | Derivative and anti-derivative functions |
| **Week 16** | Preparatory week before the final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Stewart, J., Clegg, D. K., & Watson, S. (2020). Calculus: early transcendental. Cengage Learning | |
| **Recommended Texts** | Thomas, G. B., Haas, J., Heil, C., & Weir, M. (2018). Thomas' Calculus. Pearson Education Limited. | |

| | | |
|---|---|---|
| | Stroud, K. A., & Booth, D. J. (2020). Engineering mathematics. Bloomsbury Publishing. | |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Engineering Drawing | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG007 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | 1 | | Semester of Delivery | 1 | |
| Administering Department | Electrical | | College | College of Engineering | |
| Module Leader | Yasir Abdulhafedh Ahmed | | e-mail | Yasir.ahmed@uoanbar.edu.iq | |
| Module Leader's Acad. Title | Mr. | | Module Leader's Qualification | Ms.C | |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | 30/June/2023 | | Version Number | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | | Semester | |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course discusses the basic concepts of engineering drawings. It also provides an introduction to the AutoCAD software and covers |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Define and interface of designing.<br>2. Define and interface of AutoCAD.<br>3. Draw with aide of AutoCAD . |
| Indicative Contents<br>المحتويات الإرشادية | ● Make the student able to draw and complete designs for electrical works8. Describe the principles of 10.<br>● Giving exercises related to the topic and various electrical works.<br>● Define and interface of designing.<br>● Define and interface of AutoCAD.<br>● Draw with aide of AutoCAD . |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 92 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 58 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO#1,2 and 3 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO#2, 3 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 3 |
| | Report | 1 | | | LO# 3 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 2 and 3 |
| | Final Exam | 3hr | 60% (60) | 16 | LO#1,2 and 3 |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Starting AutoCAD, Units |
| Week 2 | , Units, features overview |
| Week 3 | AutoCAD basics, commands |
| Week 4 | commands, the status bar |
| Week 5 | coordinate system, and zooming |
| Week 6 | Layers: creation, properties |
| Week 7 | management, setting line weights. |
| Week 8 | Objects commands. program help |
| Week 9 | point, line, dimensions, circle |
| Week 10 | rectangle, arc, ellipse, polygon |
| Week 11 | donut, hatch, construction line, poly line, text. |
| Week 12 | Modify commands. erase, copy, |
| Week 13 | copy, move, offset, mirror, trim, extend |
| Week 14 | break, rotate, scale, lengthen, stretch, fillet, chamfer, array, explode |
| Week 15 | Examples of electrical project. |
| Week 16 | Final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Autodesk, “AutoCAD 2015: Complete Guide to What’s New”, 2015 | No |
| Recommended Texts | . | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Fundamentals of Electrical Engineering I | | | Module Delivery | |
| Module Type | C | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG005 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG1 | Semester of Delivery | | 1 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Naser Al-Falahy | | e-mail | Naser.falahy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Assist. Prof | Module Leader's Qualification | | PhD |
| Module Tutor | Sameh Jassam Mohammed | | e-mail | samehjassam@uoanbar.edu.iq | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | | Semester | |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<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. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Recognize how electricity works in electrical circuits.<br>2. List the various terms associated with electrical circuits.<br>3. Summarize what is meant by a basic electric circuit.<br>4. Discuss the reaction and involvement of atoms in electric circuits.<br>5. Describe electrical power, charge, and current.<br>6. Define Ohm's law.<br>7. Identify the basic circuit elements and their applications.<br>8. Discuss the operations of sinusoid and phasors in an electric circuit.<br>9. Discuss the various properties of resistors, capacitors, and inductors.<br>10. Explain the two Kirchoff's laws used in circuit analysis.<br>11. Identify the capacitor and inductor phasor relationship with respect to voltage and current |
| Indicative Contents<br>المحتويات الإرشادية | DC 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. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 73 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO#1,2,3,7,9 and 11 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO#2,5 and 8 |
| | Projects / Lab. | 1 | 10% (10) | | LO#2,5 and 8 |
| | Report | 1 | | | LO#10 and 11 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO#1to 9 |
| | Final Exam | 3hr | 60% (60) | 16 | LO#2,to 11 |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction - Difference between Circuit Theory and Field Theory |
| Week 2 | Basics of Network Elements |
| Week 3 | Charge, Current and Voltage |
| Week 4 | Power and Energy |
| Week 5 | Resistance and Resistivity and Ohm's Law |
| Week 6 | Kirchhoff's Laws |
| Week 7 | Series Resistors and Voltage Division |
| Week 8 | Parallel Resistors and Current Division |
| Week 9 | Midterm Exam 1 |
| Week 10 | Wye-Delta Transformations |
| Week 11 | Circuit Analysis - Nodal and Mesh |
| Week 12 | Linearity and Superposition |
| Week 13 | Source Transformations |
| Week 14 | Thévenin and Norton Equivalents |
| Week 15 | Maximum Power Transfer |
| Week 16 | Midterm Exam 2 |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | Lab 1: Equipment Familiarization |
| Week 2 | Lab 2: Ohm's Law |
| Week 3 | Lab 3: Kirchhoff's Laws |
| Week 4 | Lab 4: Series Resistors and Voltage Division |
| Week 5 | Lab 5: Parallel Resistors and Current Division |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | 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 Approach<br>Copyright Year: 2020, dissidents. | No |
| Websites | https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Human Rights & Democracy** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UOA005** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 1 |
| **Administering Department** | | | **College** | | |
| **Module Leader** | Muanna w naji | | **e-mail** | muanna.naji@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | | **Semester** | |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course is designed to give the student a definition of human rights and democracy idiomatically, the legitimacy of the origin of the right in the view of Islamic law, the pillars of the right and its types, personal freedom, intellectual freedom, economic rights and freedoms, Islam and slavery, the goals of human rights, the use of freedom and the general legitimate right, the right of a Muslim to His Muslim brother, the rights of parents, the right neighbor, the right of women, human rights in the divine religions, religious tolerance in Islam.<br>thinking skills<br>1. Work on developing the intellectual property of the student.<br>2. Ensuring the student's personal development at the academic level.<br>3. Drawing ways of intellectual success to achieve personality building on the (family, social, academic, and professional) levels.<br>4. Learn the art of dealing with the above character building levels. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. 1. Explain the concept of "human rights and democracy"<br>2. 2. The status of human rights and freedoms in Islam<br>3. 3. Define and describe the relationship between human rights and democracy |
| **Indicative Contents**<br>المحتويات الإرشادية | **Course Topics:**<br>1. Introducing human rights, democracy and the principle of freedoms. [Two hours]<br>2. The origin of right and freedom from the point of view of Islamic law, and the general concept. [3 hours]<br>3. Elements and types of human rights and freedoms. [ 8 hours]<br>4. Economic and political rights and freedoms. [ 3 hours]<br>5. Islam and slavery. [1 hour]<br>6. The objectives of human rights and democracy. [4 hours]<br>7. The project of using freedom and public right. [2 hours]<br>8. The right of a Muslim and humanity. [2 hours] |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 32 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |

| | | | |
|---|---|---|---|
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 18 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

## Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | Raise the intellectual level of students, which is the importance of human rights when it is reflected on the individual, society and the state |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 3, 10 | LO #1 |
| | **Assignments** | 0 | | | |
| | **Projects / Lab.** | 0 | | | |
| | **Report** | 2 | 10% (10) | 13 | LO 1,2 and 13 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 20% (20) | 7 | LO # 1-3 |
| | **Final Exam** | 3hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | The Universal Declaration of Human Rights and other countries speak of human rights over the individual, society and the state.<br>Clarifying the meaning of right, duty, responsibility and guarantees of human rights before the judiciary. |

| | |
|---|---|
| **Week 2** | Sections of human rights in law and Sharia, statement of the rights of God Almighty and guarantees of human rights.<br>It includes sections of the rights of the individual over society such as the right to protect life, honor and mind, and the right to protect money and property. |
| **Week 3** | The right to equality before the law and the right to equality and justice among individuals.<br>The right of the individual to work, learn, express his opinion and freedom of thought. |
| **Week 4** | Clauses of preserving the freedoms contained in the Universal Declaration of Human Rights, and the impact of the study.<br>Explanation of the meaning of freedom and democracy and the types and divisions of freedoms. |
| **Week 5** | Freedoms related to the material rights of an individual, including personal freedom.<br>Freedoms related to the material rights of an individual, including civil liberties. |
| **Week 6** | Freedom of movement, residence and ownership.<br>Freedoms related to the moral rights of the individual. |
| **Week 7** | Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit. |
| **Week 8** | Statement of the sanctity of the home and the right of the individual to move.<br>The rights of society over the individual include the right to freedom of belief and life, the right to honor protection, work and education. |
| **Week 9** | Ensuring equality before the law and the judiciary, freedom of opinion and thought, and protection of the mind<br>The right to protection of property and travel. |
| **Week 10** | The rights of the individual over the individual, including social rights.<br>Financial rights and its importance in ensuring social life. |
| **Week 11** | Finally, emphasizing the importance of commitment to applying human rights and their impact on the individual, society and the state. |
| **Week 12** | Freedom of belief, freedom of opinion and expression, and freedom of education.<br>Political freedom, the culture of dialogue and its impact on proving freedom of opinion. |
| **Week 13** | One of the heroes of enslaving people and proving freedom for individuals.<br>Highlighting the freedom of women and beautifying them in adhering to the teachings of faith and proving the importance of applying the principle of freedoms among individuals. |
| **Week 14** | Individual and international interest in applying the principle of freedoms.<br>Rights and freedoms are two interrelated principles. The role of the individual, society and the state in establishing the principle of human rights and freedoms. And a statement of the negatives in the event of non-application of the principle of freedoms. |
| **Week 15** | Iraq and international treaties in the field of human rights and Iraq's position in eliminating dictatorship and racism and work to preserve public rights and public money and eliminate financial and administrative corruption. |
| **Week 16** | Preparatory week before the final Exam. |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | Material Covered |
|---|---|
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Lectures on human rights, freedoms and democracy | Yes |
| **Recommended Texts** | 1. Human rights and freedoms. Prof. Dr. Mustafa Al-Zalmi.<br>2. Some contemporary published research involving human rights and books on the Universal Declaration of Human Rights | Yes |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Genral Chemistry** | | | **Module Delivery** | |
| **Module Type** | **Support** | | | ☒**Theory**<br>☒**Lecture**<br>☒**Lab**<br>☐**Tutorial**<br>☐**Practical**<br>☐**Seminar** | |
| **Module Code** | **ENG002** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | | **Semester of Delivery** | 1 | |
| **Administering Department** | Type Dept. Code | | **College** | Type College Code | |
| **Module Leader** | Abbas Hassan Faris | | **e-mail** | abbashasan@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Dr. Hamad Khalifa | | **e-mail** | habdulkadir56@uoanbar.edu.iq | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Objectives**<br>أهداف المادة الدراسية | The goals of this course are to enable students to:<br>1. Scientific reasoning and quantitative analysis. Our majors will be able to apply chemical concepts to solve qualitative and quantitative problems.<br>2. Laboratory practice and safety. In order to learn the ways in which new scientific knowledge is created, our majors will experience how chemists interpret chemical and physical phenomena through experimental investigation. They will develop and apply the appropriate lab skills and instrumentation to solve chemical problems. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | By the end of successful completion of this course, the student will be able to:<br>1. Define the structure of atoms in terms of the nucleus with protons, neutrons, & electrons.<br>2. Write and balance chemical equations, name inorganic compounds and ions and describe the properties of the main group elements.<br>3. Carry out chemical calculations, including mass relations in chemical reactions, limiting reagent & reaction yield calculations, and calculations of reactions taking place in solution.<br>4. Understand the concept of oxidation-reduction, calculate oxidation numbers, and balance redox reactions.<br>5. Apply the ideal gas law in solving problems involving the gas phase<br>6. Solve problems in chemical thermodynamics and calorimetry.<br>7. Predict the electronic structure of atoms and ions from quantum theory, and9) relate the position of an element in the periodic table to its electronic structure and to the physical and chemical properties of the elements.<br>8. Describe the principles of chemical bonding and write Lewis structures.<br>9. Predict the geometry of the electron pairs and the shape of molecules using VSEPR theory, predict bond polarity and molecular dipoles.<br>10. Describe the valence bond theory, predict the hybridization of atoms in molecules, and describe bonding in molecules with single, double and triple bonds in terms of and π bonds, and delocalized molecular orbitals. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Part A:<br>1- Handling Numbers. Dimensional Analysis in Solving Problems Recognize chemical safety and hazardous materials icons<br>2- Atomic Number. Mass Number. and isotopes. The Periodic Table. Molecules and Ions. Describe laboratory instruments and some basic techniques used in the chemistry laboratory, including balances and standard volumetric equipment<br>3- Chemical Formulas. Naming Compounds. Atomic Mass. Vogadro's number and Molar Mass of an Element.<br>4- Chemical Reactions and Chemical Equations.<br>5- Describe how to Prepare accurate laboratory reports of their experimental results; Amounts of Reactants and Products; limiting Reagent Calculations; Reaction Yield; General Properties of Aqueous Solutions. Precipitation Reactions. Acid-Base Reactions; Oxidation-Reduction Reactions; Concentration of Solutions.<br>6- Acid-Base Titrations, Cases Pressure.<br>7- The ideal Gas Equation; Gas Stoichiometry; Partial Pressures; The Nature of Energy and types of energy<br>8- Energy Changes in Chemical Reactions; introduction to Thermodynamics. Enthalpy of Chemical Reactions; Calorimetry;<br>9- Standard Enthalpy of Formation and Reaction From Classical Physics to Quantum Theory; Bohr's Theory of the Hydrogen Atom; Quantum Numbers; Atomic OrbitalsElectron Configuration;<br>10- Development of the Periodic Table; Periodic Classification of the Elements; Periodic Variation in Physical Properties;<br>Ionization Energy; Electron Affinity Lewis Dot Symbols; The ionic Bond; The Covalent Bond; Electro negativity; Writing Lewis structure Formal Charge and Lewis Structures.<br>11- The Concept of Resonance. Exceptions to the Octet Rule Bond Energy<br>12- Molecular Geometry; Dipole Moment; Spectrophotometric Analysis of tetracycline; Valence Bond Theory.<br>Hybridization of Atomic Orbital's. Hybridization in Molecules Containing Double and Triple Bonds. Delocalized Molecular Orbital's<br><br>Part B:<br>1- Types of analysis in analytical chemistry and their uses. Units for expressing concentration.<br>2- preparing solutions,standard solution,amounts of reactants and products.<br>3- Chemical equilibrium and reversible reactions,thermodynamics & chemical equilibrium<br>4- Equilibrium constants for chemical reactions.<br>5- Describe how to Prepare accurate laboratory reports of their experimental results<br><br>6- Equilibrium constants for chemical reactions<br>7- Electrochemistry, relationship between cell potential and the equilibrium constants relationship between ΔG, K,and E0cell . the Nernst equation.<br>8- Volumetric analysis their uses and classification, titrimetric analysis calculations.<br>9-Acid-base titration |

| | |
|---|---|
| | 10- Precipitation titration<br>11- Complexometric titration<br>12- Oxidation-reduction titration<br>13- Gravimetric analysis.<br>14- Introduction and applications of industrial analysis method. |

| Learning and Teaching Strategies<br>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 types of simple experiments involving some sampling activities that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 93 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 82 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 3 and 10 | LO #1, #2 and #3, #4 |
| | **Assignments** | 1 | 10% (10) | 2 and 12 | LO #5, #6 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | LO #1, #2 and #3, #4 |
| | **Report** | 0 | 0 % (0) | - | - |

| | | | | | |
|---|---|---|---|---|---|
| **Summative assessment** | **Midterm Exam** | 2hr | 20% (20) | 7 | LO #1, #2 and #3, #4, #5 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | MEASUREMENTS IN CHEMISTRY |
| **Week 2** | Problem Solving in Chemistry - Dimensional Analysis |
| **Week 3** | Atoms, Molecules and Ions |
| **Week 4** | Mass Relationships in Chemical Reactions |
| **Week 5** | Reactions in Aqueous Solutions |
| **Week 6** | Gasses |
| **Week 7** | Thermochemistry |
| **Week 8** | Quantum Theory and the Electronic Structur of Atoms |
| **Week 9** | Chemical Bonding |
| **Week 10** | Electrochemistry |
| **Week 11** | Volumetric Methods of Analysis |
| **Week 12** | Titrations Based on Acid-Base Reactions |
| **Week 13** | Titrations Based on Precipitation Reactions |
| **Week 14** | Titrations Based on Complexation Reactions |
| **Week 15** | **Titrations Based on Redox reactions** |
| **Week 16** | **Gravimetric Methods of Analysis** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: |
| **Week 2** | Lab 2: |
| **Week 3** | Lab 3: |
| **Week 4** | Lab 4: |
| **Week 5** | Lab 5: |

| | |
|---|---|
| **Week 6** | Lab 6: |
| **Week 7** | Lab 7: |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Introductory Chemistry Essentials, Nivaldo J. Tro | |
| **Recommended Texts** | Chemistry. Steven S. Zumdahl, Susan A. Zumdahl, Donald J. DeCoste | |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Arabic Language** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UOA001** | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | UG1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | Electrical Engineering | **College** | Engineering | |
| **Module Leader** | Muanna W Naji | | **e-mail** | muanna.naji@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course aims to build students' knowledge and competence in the Arabic language, rhetoric, and Arabic literature of all kinds, to increase their ability to appreciate literature and develop their awareness of its concepts through the study of poetry, novels, and short stories. story.<br>C- thinking skills:<br>1. Work on developing the intellectual property of the student.<br>2. Ensuring the personal development of the student at the academic level. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Develop academic essay writing proficiency<br>2. Apply reading skills<br>3. Expand academic vocabulary through reading<br>4. Improve critical thinking skills<br>5. Developing the student's intellectual property in the field of the Arabic language, to acquire verbal and actual ability and skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Study the text of the Quran and analyze its language, spelling, and rules. [5 hrs]<br>the rules of writing the hamza, Written verbatim by Arab and of number and numerical adjective. [10 hrs]<br>punctuation. [5 hrs]<br>the method of detection for words in Arabic Dictionaries,<br>the applications of grammar and language- the actor and his deputy,<br>Debutante and the news Acts missing, The case and exception. [10 hrs]<br>Ancient literary studies, Definition of literature and its importance, Ages historical Arabic literature – Modern Literary Studies, Study the texts of poetic eras (pre-Islamic, Islamic, Umayyad, Abbasid, Andalusia), Study of ancient prose texts (speeches, messages), examine the texts of modern poetry and contemporary, examine the texts of modern prose (drama, novel, article). [10 hrs]<br>Rhetoric study . [10 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Raise the students' linguistic level, and build their intellectual progress by highlighting the importance of the Arabic language in their lives as their mother tongue. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 32 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 18 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 5 | 25% (25) | 3,7, 10 | LO #4, 6, 8 and 10 |
| | **Assignments** | 2 | 5% (6) | 7 | LO # 2 |
| | **Projects / Lab.** | 0 | | | |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 7 and 13 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Arabic grammar |
| **Week 2** | Arabic grammar |
| **Week 3** | Arabic grammar, Arabic grammar, its importance and place in the language. |
| **Week 4** | Arabic grammar, Hamza al-Wasl sites and parts. |
| **Week 5** | Dictionaries of the Arabic language, And ways to reveal the meanings of words in dictionaries |
| **Week 6** | The rules of number and number, the rule of distinguishing the number and its formulation, the definition of the number and how to read it |
| **Week 7** | Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit |
| **Week 8** | Arabic literature / the most prominent features and characteristics of Arabic literature. |
| **Week 9** | Arabic literature / Historical eras of Arabic literature. |
| **Week 10** | Arabic literature / **The novel and its elements.** |
| **Week 11** | Rhetoric/ Truth and metaphor. |
| **Week 12** | Rhetoric/ The arts of rhetoric |
| **Week 13** | Rhetoric/ The arts of rhetoric |
| **Week 14** | Rhetoric/ Poetry / Muallaqat poets and some contemporary poets. |
| **Week 15** | Rhetoric/ Poetry / Muallaqat poets and some contemporary poets. |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |

| | |
|---|---|
| **Week 6** | |
| **Week 7** | |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Lectures in the Arabic language. | Yes |
| **Recommended Texts** | Meanings of grammar / Prof. Dr. Fadel Al-Samarrai | No |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | Calculus II | | | **Module Delivery** | |
| **Module Type** | B | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ENG004 | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | Electrical | **College** | College of Engineering | |
| **Module Leader** | Hamid Radam Hussein | | **e-mail** | hamid.radam@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Dr. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ENG003 | **Semester** | 1 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course aims to provide the student with the skill of dealing with mathematical equations, clarifying the concept of differentiation and integration, and the polar, Cartesian, and cylindrical coordinates.<br>2. Demonstrate methods for solving integrals and sequences and series.<br>3. The course aims to study the applications of integration in calculating the lengths of curves, areas, and volumes in different coordinates and some physical applications.<br>4. The course aims to give the student a new background that he can benefit from when studying differential equations. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Evaluate definite, indefinite, and improper integrals by using different integration techniques.<br>2. To determine arc length, surface area and volume by using the applications of integration techniques.<br>3. Define polar coordinate graphs and solve related problems including area, arc length and volume.<br>4. Identify the properties of sequences and their limits with identifying standard convergent operations of power series. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Principles of Integration<br>2. Integral Methods<br>3. Integration Techniques-Integration by Parts<br>4. Integration Techniques-Trigonometric Integrals<br>5. Integration Techniques-Partial Fractions.<br>6. Applications of Integrals-Infinite Integral Areas<br>7. Applications of Integrals-Arc Length, Surface area<br>8. Applications of Integrals-Volumes (Disk, Washer, Shell)<br>9. Polar Coordinates - Common Polar Coordinate Graphs<br>10. Polar Coordinates - Tangents with Polar Coordinates, Curves defined by parametric equations.<br>11. Sequences and Series |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5, 10 | LO# 1, LO# 2and LO# 4 |
| | **Assignments** | 2 | 5% (5) | 2, 12 | LO# 2and LO# 4 |
| | **Projects / Lab.** | | | | |
| | **Report** | | | | |
| **Summative assessment** | **Midterm Exam** | 2hr | 30% (30) | 7 | LO# 1 and LO# 2 |
| | **Final Exam** | 3hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Principles of Integration |
| **Week 2** | Integral Methods |
| **Week 3** | Integration Techniques-Integration by Parts |
| **Week 4** | Integration Techniques-Trigonometric Integrals |

| | |
|---|---|
| **Week 5** | Integration Techniques-Partial Fractions. |
| **Week 6** | Integration Techniques-Partial Fractions |
| **Week 7** | Applications of Integrals-Infinite Integral Areas |
| **Week 8** | Applications of Integrals-Arc Length, Surface area |
| **Week 9** | Applications of Integrals-Volumes (Disk, Washer, Shell) |
| **Week 10** | Polar Coordinates - Common Polar Coordinate Graphs |
| **Week 11** | Polar Coordinates - Tangents with Polar Coordinates, Curves defined by parametric equations. |
| **Week 12** | Polar Coordinates - Tangents with Polar Coordinates, Curves defined by parametric equations. |
| **Week 13** | Sequences and Series |
| **Week 14** | Sequences and Series |
| **Week 15** | Sequences and Series |
| **Week 16** | Preparatory week before the final Exam |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | Stewart, J., Clegg, D. K., & Watson, S. (2020). Calculus: early transcendental. Cengage Learning | |
| **Recommended Texts** | Thomas, G. B., Haas, J., Heil, C., & Weir, M. (2018). Thomas' Calculus. Pearson Education Limited. | |

| | | |
|---|---|---|
| | Stroud, K. A., & Booth, D. J. (2020). Engineering mathematics. Bloomsbury Publishing. | |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computer Science I** | | | **Module Delivery** | |
| **Module Type** | **Related** | | | ☒ **Theory**<br>☐ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UOA007** | | | | |
| **ECTS Credits** | **3** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | | UG1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | Electrical | College | College of Engineering | |
| **Module Leader** | Maath Jasem Mahammad | | **e-mail** | maath.mahammad@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Ass. Professor Dr. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | Adnan Salih Suhail | **e-mail** | adnan.sahel@uoanbar.edu.iq | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | | **Semester** | |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course presents an overview of fundamental computer science topics. Overview topics include an introduction to computer components, computer hardware, operating systems, digitization of data, and application program (Microsoft office). |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Analyze, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.<br>2. Identify problems and formulate solutions for systems.<br>3. Communicate effectively with a range of audience.<br>4. Work effectively as part of a team to develop and deliver quality software artifacts.<br>5. Design solutions using approaches that integrate ethical, social, legal, and economic responsibilities. |
| **Indicative Contents**<br>المحتويات الإرشادية | - General Definitions System, Computer System, Hardware, Software, …etc.<br>- Hardware Components. CPU, Main Memory, Input / output Devices.<br>- Operating system Windows<br>- Microsoft Word<br>- Microsoft PowerPoint |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 27 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)** | 75 | | |

| | |
|---|---|
| الحمل الدراسي الكلي للطالب خلال الفصل | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 5 | 25% (25) | 3,5,9, 11,13 | LO #1, 2, 10 and 11 |
| | **Assignments** | 2 | 5% (5) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | | 6% (4) | Continuous | |
| | **Activities** | | 4% (6) | 13 | LO # 5, 8 and 10 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | LO # 1-7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Computer Fundamentals |
| **Week 2** | Computer Components - Hardware |
| **Week 3** | Computer Components - Software |
| **Week 4** | Computer Safety |
| **Week 5** | Operating Systems |
| **Week 6** | Operating System - Windows |
| **Week 7** | **Mid – term Exam** |
| **Week 8** | Introduction of Microsoft Word - File and Home Tab |
| **Week 9** | Page Layout and View Tap |
| **Week 10** | Insert Objects in Microsoft Word |
| **Week 11** | Illustrations and Header & Footer |
| **Week 12** | Introduction of Microsoft Power Point - File and Home Tab |
| **Week 13** | Design and View Tap |
| **Week 14** | Insert Objects Animations in Microsoft Power Point |
| **Week 15** | Animations in Microsoft Power Point |
| **Week 16** | **Final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction to Windows 10 |
| **Week 2** | Lab 2: Introduction of Microsoft Word |
| **Week 3** | Lab 3: Page layout |
| **Week 4** | Lab 4: View Tab |
| **Week 5** | Lab 5: Insert Objects in Microsoft Word |
| **Week 6** | Lab 6: Illustrations and Header & Footer |
| **Week 7** | Lab 7: More Options in Microsoft Word |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | أساسيات الحاسوب وتطبيقاته المكتبية (الجزء الأول) (الجزء الثاني)<br>أ.م.د. زياد محمد عبود ، أ.د.غسان حميد عبد المجيد ، أ.م.د. أمير حسين مراد ، م. بلال كمال أحمد | Yes |
| **Recommended Texts** | | |
| **Websites** | | |

| Grading Scheme<br>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** | **FX** – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |

| | | | | |
|---|---|---|---|---|
| **(0 – 49)** | **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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Digital Techniques** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☐ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE002 | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | Electrical | **College** | College of Engineering | |
| **Module Leader** | Adnan Salih | | **e-mail** | Adnan.@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | Name | **e-mail** | | |
| **Scientific Committee Approval Date** | | 10/06/2023 | **Version Number** | | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course introduces the student to digital fundamentals concepts, which includes: numbers systems. Codes, Types of logic gates, and Boolean expressions of different circuits. The course also examines the design of main logic circuits, along with an introduction to analysis of clocked sequential circuits, Flip-flops, types of flip-flops, there logic symbols, and excitation tables of different flip-flops . |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understand concept of data representation and conversion between number systems.<br>2. Understand Binary arithmetic and other code numbers arithmetic.<br>3. Recognize the different types of codes.<br>4. Operate on Boolean algebra, and simplification of Boolean function.<br>5. Understand different types of logic gates, and here truth tables.<br>6. Apply methods of simplification and minimization of Boolean expressions.<br>7. Be familiar with multi-level gate circuits and combinational circuits.<br>8. construct truth tables of various logic expressions.<br>9. analyze and design procedures of Sequential circuits.<br>10. Implement functions using digital circuit (Sequential).<br>11. design sequential systems through the application of system reduction techniques and the use of sequential system design tools. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Introduce the data,Number Systems, Conversion between Number Systems.<br>2. 2-Complement Arithmetic, Binary Arithmetic, BCD arithmetic.<br>3. Codes and their conversions.<br>4. Definition of Boolean Algebra. Properties and Theorems of Boolean Algebra,Boolean Functions, Simplification of Boolean Expressions.<br>5. Digital Logic Gates. Truth tables of logic gates.<br>6. simplification and minimization of Boolean function using Karnaugh map,<br>7. Multi-level gate circuits. Design of multi levels NAND and NOR gates.<br>8. Combinational circuits design; Adder, Substrate, code conversion, magnitude comparator<br>9. Decoder, Encoder, Multiplexer, Demultiplexer, parity generator.<br>10. Latches and Flip-flops Types of Flip-flops, Clocked S-R Flip-flop, J-K Flip-flop,<br>11. Triggering of Flip-flops, Excitation Table of a Flip-flop, Sequential Circuit Model, |

| | |
|---|---|
| | Classification and Analysis of Sequential Circuits<br>12. Registers and Shift Registers,<br>13. Counters, Synchronous Counters (Ripple,Up-down mode N) counters<br>14. Design Procedure of counters Circuits. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4.2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 38 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2.5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 100 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO# 2, LO# 5and LO# 9 |
| | **Assignments** | 2 | 5 % (10) | 2, 12 | LO# 6 and LO# 11 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | LO# 4, LO5 5and LO# 6 |
| | **Report** | 1 | 10% (10) | | LO# 8 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 15% (10) | 8 | LO#1 to LO# 8 |
| | **Final Exam** | 2hr | 60% (50) | 16 | all |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

| المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to data ,Number system and background to the combinational logic cct . |
| **Week 2** | Introduction to Complement Arithmetic, Signed Binary Numbers, Binary Arithmetic, BCD arithmetic. |
| **Week 3** | Introduction to Codes ,types and their conversions. |
| **Week 4** | Definition of Boolean Algebra. Properties and Theorems of Boolean Algebra |
| **Week 5** | Analysis of Boolean Functions, Simplification of Boolean Expressions |
| **Week 6** | Introduction to Digital Logic Gates. Types and Truth tables of logic gates |
| **Week 7** | Analysis of simplification and minimization of Boolean function using Karnaugh map. |
| **Week 8** | Midterm Exam |
| **Week 9** | Multi-level gate circuits. Design of multi levels NAND and NOR gates. |
| **Week 10** | Combinational circuits design; Adder, Substrate, code conversion, magnitude comparator |
| **Week 11** | Decoder, Encoder, Multiplexer, Demultiplexer, parity generator. |
| **Week 12** | Latches and Flip-flops Types of Flip-flops, Clocked S-R Flip-flop, J-K Flip-flop, |
| **Week 13** | Triggering of Flip-flops, Excitation Table of a Flip-flop, Sequential Circuit Model, Classification and Analysis of Sequential Circuits |
| **Week 14** | Registers and Shift Registers, |
| **Week 15** | Counters, Synchronous Counters (Ripple,Up-down mode N) counters, Design Procedure of counters Circuits |
| **Week 16** | Final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Logic gates circuits. |
| **Week 2** | Lab 2: Combinational logic circuits. |
| **Week 3** | Lab 3: Comparator circuits. |
| **Week 4** | Lab 4: Half-adder and full adder circuit. |
| **Week 5** | Lab 5: Half sub tractor and full sub tractor. |
| **Week 6** | Lab 6: Decoder circuit and Encoder circuit.. |
| **Week 7** | Lab 7: Multiplexer circuit. |

## Learning and Teaching Resources

| مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | A. Saha, and N. Manna, “Digital Principles and Logic Design”, Infinity Science Press LLC, (2007). | Yes |
| **Recommended Texts** | Thomas Floyd, “Digital fundamentals”, 8th edition, Person education Inc. | Yes |
| **Websites** | https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Fundamentals of Electrical Engineering I | | | Module Delivery | |
| Module Type | C | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE01 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG1 | Semester of Delivery | | 2 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Naser Al-Falahy | | e-mail | Naser.falahy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Assist. Prof | Module Leader's Qualification | | PhD |
| Module Tutor | Sameh Jassam Mohammed | | e-mail | samehjassam@uoanbar.edu.iq | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG005 | Semester | |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<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 with Ac 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. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Recognize how electricity works in electrical circuits.<br>2. List the various terms associated with electrical circuits.<br>3. Summarize what is meant by a basic electric circuit.<br>4. Discuss the reaction and involvement of atoms in electric circuits.<br>5. Describe electrical power, charge, and current.<br>6. Define Ohm's law.<br>7. Identify the basic circuit elements and their applications.<br>8. Discuss the operations of sinusoid and phasors in an electric circuit.<br>9. Discuss the various properties of resistors, capacitors, and inductors.<br>10. Explain the two Kirchoff's laws used in circuit analysis.<br>11. Identify the capacitor and inductor phasor relationship with respect to voltage and current |
| Indicative Contents<br>المحتويات الإرشادية | AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis.<br>AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. RL, RC and RLC circuits<br>Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, maximum power transfer, RMS and power dissipation. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 92 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 108 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 5and LO# 9 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 6 and LO# 11 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 4, LO5 5and LO# 6 |
| | Report | 1 | | | LO# 7 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO#1 to LO# 7 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Capacitors |
| Week 2 | Series and Parallel Capacitors |
| Week 3 | Inductors |
| Week 4 | Series and Parallel Inductors |
| Week 5 | Sinusoidal Current |
| Week 6 | Phasors |
| Week 7 | Impedance and Admittance |
| Week 8 | Kirchhoff's Laws in the frequency domain |
| Week 9 | Midterm Exam 1 |
| Week 10 | Nodal analysis in the frequency domain |
| Week 11 | mesh analysis in the frequency domain |
| Week 12 | Superposition in the frequency domain |
| Week 13 | Source Transformations in the frequency domain |
| Week 14 | Thévenin and Norton Equivalents in the frequency domain |
| Week 15 | Maximum , Average Power Transfer, RMS value |
| Week 16 | Midterm Exam 2 |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | Lab 1: Kirchhoff's Laws |
| Week 2 | Lab 2: Nodal Analysis |
| Week 3 | Lab 3: Mesh Analysis |
| Week 4 | Lab 4: Superposition Theorem |
| Week 5 | Lab 5: Source Transformations |
| Week 6 | Lab 6: Thévenin and Norton Equivalents |
| Week 7 | Lab 7: Maximum Power Transfer |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | 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 Approach<br>Copyright Year: 2020, dissidents. | No |
| Websites | https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | English Language I | | | **Module Delivery** | |
| **Module Type** | S | | | ☐ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | UOA003 | | | | |
| **ECTS Credits** | 2 | | | | |
| **SWL (hr/sem)** | 50 | | | | |
| **Module Level** | | UG1 | **Semester of Delivery** | | Two |
| **Administering Department** | | EE | **College** | ENG | |
| **Module Leader** | Abdullah Khalid Ahmed | | **e-mail** | Abdullahkhalid.ahmed@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | M.Sc. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | Dr. Ehsan Hamyan Sabbar | **e-mail** | Ehsan.sabbar@uoanbar.edu.iq | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | 1.0 | |

| Relation with other Modules<br>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

**Module Aims**
أهداف المادة الدراسية

1. Expand vocabulary and enhance communication in everyday situations.
2. Improve grammar skills for more accurate speaking and writing.
3. Develop better listening comprehension abilities.
4. Enhance spoken English fluency, accuracy, and pronunciation.
5. Improve reading comprehension and extract key information from texts.
6. Strengthen writing skills for well-structured and grammatically accurate compositions.
7. Increase cultural awareness of English-speaking societies and customs.

**Module Learning Outcomes**
مخرجات التعلم للمادة الدراسية

By the end of successful completion of this course, the student will be able to:

1. Develop academic writing
2. Apply reading skills
3. Expand academic vocabulary through reading
4. Speak through group discussions and debates

**Indicative Contents**
المحتويات الإرشادية

Indicative content includes the following.

| | |
|---|---|
| Auxiliary verbs | Making an offer |
| Greetings forms | prepositions |
| Learning English words by asking | Rooms and furniture |
| Making Plurals | Directions |
| Knowing the numbers | Have/ do/ go |
| Knowing countries in English | Saying years |
| Learning how to ask about others countries/ Nationality | Past simple- irregular verbs |
| Subjects and possessive pronouns | When's your birthday? |
| Using adjectives | Can/ can't |
| Making negatives and questions | Adjective+ noun |
| Making interview and knowing personal information | Going sightseeing |
| Possessives (Verbs) | I'd like- some/ any |
| Learning how to ask about others favorites and hobbies | Signs all around |
| Using articles | Present Continuous |

| | | |
|---|---|---|
| | Prices and currencies | In a restaurant |
| | Present simple tense | Clothes- Opposite verbs |
| | The time | What's matter |
| | Using some adverbs | Transport |

| Learning and Teaching Strategies<br>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, speaking interactive activities and by considering type of activities that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 33 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2.2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 17 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1.13 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative Assessment** | **Quizzes** | **5** | **25% (25)** | **5, 10** | **LO #1, and 2** |
| | **Assignments (HW)** | **2** | **5% (5)** | **2, 4, 6, 8, 9, and 10** | **LO # 1-3** |
| | **Report** | **1** | **5% (5)** | | |
| | **Activities** | | **5% (5)** | **Through lectures** | **LO# 4** |
| | **Lab** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Summative Assessment** | **Midterm Exam** | **2 hr** | **10% (10)** | **7** | **LO # 1-3** |
| | **Final Exam** | **3 hr** | **50% (50)** | **16** | **All** |
| **Total Assessment** | | | **100% (100 Marks)** | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| 1. | • Am/ are/ is, my/ your<br>• How are you?<br>• What's this in English?<br>• Plurals<br>• This is …….<br>• Good morning!<br>• Numbers 1-10 |
| 2. | • Countries<br>• Where's he from?<br>• Numbers 11-30<br>• He/ she/ they, his/ her<br>• Fantastic/ awful/ beautiful |
| 3. | • Jobs<br>• Negatives and questions<br>• Social expressions-1<br>• Am/are/is<br>• Personal information |
| 4. | • Our/ their<br>• The family<br>• The alphabet<br>• Possessive's<br>• Has/ have |
| 5. | • Sports/ food/ drinks<br>• a/ an<br>• Numbers and prices<br>• Present simple- I/ you/ we/ they<br>• languages and nationalities |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| 6. | • The time<br>• Always/ sometimes/ never<br>• Days of the week<br>• Present simple- he/ she<br>• Words that go together |
| 7. | **Mid-term Exam** |
| 8. | • Question words<br>• This/ that<br>• Can I ….?<br>• Me/ him/ us/ them<br>• adjectives |
| 9. | • Rooms and furniture<br>• Prepositions<br>• There is/ are<br>• Directions |
| 10. | • Saying years<br>• Past simple- irregular verbs<br>• When's your birthday?<br>• As/ were born<br>• Have/ do/ go |
| 11. | • Past simple- regular and irregular<br>• Sport and leisure<br>• Questions and negatives<br>• Going sightseeing |
| 12. | • Can/ can't<br>• Adjective+ noun<br>• Adverbs<br>• Everyday problems |
| 13. | • I'd like- some/ any<br>• Signs all around<br>• In a restaurant |
| 14. | • Present Continuous<br>• Present Simple & Present Continuous<br>• Clothes- Opposite verbs<br>• What’s matter |
| 15. | • Future Plans<br>• Transport |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| | • Revision • Social Expressions-2 |
| 16. | **Preparatory for final exam** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | -John & Liz Soars, "New Headway Plus- Beginner Student's Book", 10th ed 2014 | Yes |
| **Recommended Texts** | -Raymond Murphy; "English Grammar in Use", 4th edition 2012<br>Understanding and Using English Grammar, Vol. A, 4th Edition 4th Edition | No |
| **Websites** | https://elt.oup.com/catalogue/items/global/adult_courses/new_headway/beginner_fourth_edition/?cc=global&selLanguage=en<br>https://www.amideast.org/jordan/learn-english/learn-english-online?gclid=EAIaIQobChMIoeyGmdm_ggMVFweLCh2FowJ1EAAYASAAEgKjFfD_BwE<br>https://learnenglish.britishcouncil.org/ | |

| Grading Scheme<br>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 |
| | | | | |

**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.

| Module Approval<br>المصادقةعلى وصف المادة الدراسية | | | |
|---|---|---|---|
| | **Name** | **Date** | **Signature** |
| **Module LeaderApproval** | | **8/6/2023** | |
| **Peer Reviewer Name** | | **8/6/2023** | |
| **Scientific Committee Members Approval** | | **8/6/2023** | |
| | | **8/6/2023** | |
| | | **8/6/2023** | |
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| | | **8/6/2023** | |
| **Scientific CommitteeHeadApproval** | | **8/6/2023** | |

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Engineering Mechanics I (Static)** | | | **Module Delivery** | |
| **Module Type** | **Supportive** | | | ☒ **Theory**<br>☐ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **ENG006** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | 2 |
| **Administering Department** | | ME | **College** | ENG | |
| **Module Leader** | Dr. Ihsan Khalaf Irthea | | **e-mail** | ihsan.irthiea@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Assit. Prof. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Name | **e-mail** | E-mail | |
| **Scientific Committee Approval Date** | | 20/06/2023 | **Version Number** | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. Force system<br>2. Equilibrium of particles<br>3. Force System Resultants<br>4. Equilibrium of a Rigid Body<br>5. Trusses: method of joint and sections<br>6. Frames<br>7. Centroid<br>8. Moment of inertia<br>9. frictions |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. To determine the resultant of Coplanar forces in two and three dimensions<br>2. To introduce the concept of the free-body diagram for a particle.<br>3. To show how to solve particle equilibrium problems using the equations of equilibrium.<br>4. To provide a method for finding the moment of a force about a specified axis.<br>5. To define the moment of a couple.<br>6. To present methods for determining the resultants of non-concurrent force systems.<br>7. To indicate how to reduce a simple distributed loading to a resultant force having a specified location.<br>8. To develop the equations of equilibrium for a rigid body.<br>9. To introduce the concept of the free-body diagram for a rigid body.<br>10. To show how to determine the forces in the members of a truss using the method of joints and the method of sections.<br>11. To analyze the forces acting on the members of frames and machines composed of pin-connected members.<br>12. To show how to determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shape.<br>13. To develop a method for determining the moment of inertia for an area.<br>14. To introduce the product of inertia and show how to determine the maximum and minimum moments of inertia of an area<br>15. To introduce the concept of dry friction and show how to analyze the equilibrium of rigid bodies subjected to this force. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1. Force system: Resultant of forces on particles in two and three dimensions.<br>2. Equilibrium of particles: Free-Body-diagram, equation of equilibrium.<br>3. Force System Resultants: resultant of force and moment on rigid body, couples, moment about point in two and three dimensions, moment about axis.<br>4. Equilibrium of a Rigid Body: Free-Body Diagrams, Equations of Equilibrium.<br>5. Trusses: method of joint and sections<br>6. Frames: Free-Body Diagrams, Equations of Equilibrium.<br>7. Centroid: Centroids of Lines, Areas, and Volumes.<br><br>Moment of inertia: Parallel-Axis Theorem for an Area, Radius of Gyration of an Area, Moments of Inertia for Composite Areas. |

| | |
|---|---|
| | 1. Friction: Mechanism of Dry Friction, Static Friction. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to:<br>1. Encourage students' participation in the exercises<br>2. Refining and expanding their critical thinking skills.<br>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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

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

| | | | |
|---|---|---|---|
| **Total assessment** | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Force system |
| **Week 2** | Force system |
| **Week 3** | Equilibrium of particles |
| **Week 4** | Equilibrium of particles |
| **Week 5** | Force System Resultants |
| **Week 6** | Force System Resultants |
| **Week 7** | Equilibrium of a Rigid Body |
| **Week 8** | Equilibrium of a Rigid Body |
| **Week 9** | Trusses: method of joint and sections |
| **Week 10** | Trusses: method of joint and sections |
| **Week 11** | Frames |
| **Week 12** | Frames |
| **Week 13** | Centroid |
| **Week 14** | Moment of inertia |
| **Week 15** | frictions |
| **Week 16** | **Final Exams** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |

| | |
|---|---|
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |
| **Week 8** | |
| **Week 9** | |
| **Week 10** | |
| **Week 11** | |
| **Week 12** | |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | R. C. Hibbeler, "Engineering Mechanics - Statics " 13th Edition, 2012 | Yes |
| **Recommended Texts** | J.L Meriam and L.G. Kraige (2016) Engineering mechanics statics | Yes |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Arabic Language 2** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | UOA002 | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | | UG2 | **Semester of Delivery** | | 3 |
| **Administering Department** | | Electrical Engineering | **College** | Engineering | |
| **Module Leader** | Muanna w naji | | **e-mail** | muanna.naji@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Assistant Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 11/11/2023 | **Version Number** | | |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course aims to build students' knowledge and competence in the Arabic language, rhetoric, and Arabic literature of all kinds, to increase their ability to appreciate literature and develop their awareness of its concepts :<br>1. Work on developing the intellectual property of the student.<br>2. Ensuring the personal development of the student at the academic level. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Develop academic essay writing proficiency<br>2. Apply reading skills<br>3. Expand academic vocabulary through reading<br>4. Improve critical thinking skills<br>5. Developing the student's intellectual property in the field of the Arabic language, to acquire verbal and actual ability and skill. |
| **Indicative Contents**<br>المحتويات الإرشادية | Arabic grammar, its importance and place in the language. [5 hours]<br>Arabic grammar: subject and object, hamza k, linguistic differences [10 hours]<br>Common mistakes in the Arabic language [5 hours]<br>Arabic Grammar Verbs The Five Types of Noun in the Arabic Language [10 Hours]<br>Advancement and delay in the Holy Qur'an Graphic touches in the Holy Qur'an [5 hours]<br>Literature and Rhetoric [10 hours]<br>Poetry and poets [15 hours] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Raise the students' linguistic level, and build their intellectual progress by highlighting the importance of the Arabic language in their lives as their mother tongue. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 67 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |

| | | | |
|---|---|---|---|
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 58 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 4, 10 | LO #4, 6, 8 and 10 |
| | **Assignments** | 2 | | | |
| | **Projects / Lab.** | 1 | | | |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 and 13 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 20% (20) | 7 | LO # 1-7 |
| | **Final Exam** | 3hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Arabic grammar, its importance and place in the language. |
| **Week 2** | Arabic grammar The subject and the object |
| **Week 3** | Arabic grammar  Drawing a hamza |
| **Week 4** | The miraculous linguistic meanings in some Quranic surahs |

| | |
|---|---|
| **Week 5** | Linguistic differences |
| **Week 6** | Common mistakes in the Arabic language |
| **Week 7** | Mid-term Exam |
| **Week 8** | Arabic grammar The five actions |
| **Week 9** | Types of no in the Arabic language |
| **Week 10** | Progress and delay in the Holy Quran |
| **Week 11** | Graphic touches in the Holy Quran |
| **Week 12** | Graphic touches in the Holy Quran |
| **Week 13** | Literature, poetry and poets |
| **Week 14** | Poetry and poets, Imru' Al-Qais / Abu Al-Atahiya |
| **Week 15** | **Poetry and poets, Badr Shaker al Sayyab. Aljeweler** |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |

| | | |
|---|---|---|
| **Required Texts** | Lectures in the Arabic language. | Yes |
| **Recommended Texts** | Meanings of grammar / Prof. Dr. Fadel Al-Samarrai | No |
| **Websites** | Applied grammar in the Arabic language | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | DC Machines I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE015 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 3 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Settar Subry Keream | | e-mail | Settar.keream@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/Jan/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE001 | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of DC machines. Specifically, the generator operation, Dc motors |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1-This course is designed to enable the students to understand the DC machines as a required at department level.<br>2-The course integrates the Generator-principle of rotating electrical machines and calculation of induced e.m.f., energy, power and torque in DC machines<br>.3- Construction of DC machines and function of commutator. Type of armature windings.<br>4-Calculation of m.m.f. per pole. Type of excitation connections. Armature reaction. Commutation. |
| Indicative Contents<br>المحتويات الإرشادية | DC MACHINE BASICS: Basic Interactions, Wire loop, Commutator, Armature, Magnetic Field, Armature Coil Equations, Coil emf, Coil Torque, Coil Resistance, Electromechanical Power Conversion, Generator Action, Motor action,<br>CONSTRUCTION: Materials, Temperature Rise, Machine Rating, Main parts of the DC machine.<br>ARMATURE WINDING: Winding details, Winding Schemes, Lap winding, Wave winding, Armature Calculations.<br>MAIN FIELD: Main Field Distribution, Field excitation, Magnetization curve<br>ARMTURE REACTION: Distributed Armature m.m.f., Resultant field, Effects of armature reaction, Demagnetizing effect, Treatment of Armature Reaction, Brush shift,<br>Commutation: The Process of Commutation, Equivalent circuit of commutating coil, Linear Commutation, Treatment of sparking, Interpoles,<br>Losses of DC machine |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 1, LO# 2and LO# 4 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 2and LO# 4 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 3and LO# 4 |
| | Report | 1 | | | LO# 3 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1 and LO# 2 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | DC MACHINE BASICS: Basic Interactions, Wire loop, |
| Week 2 | Commutator, Armature, Magnetic Field, Armature Coil Equations, Coil emf, Coil Torque, Coil Resistance, |
| Week 3 | Electromechanical Power Conversion, Generator Action, Motor action, |
| Week 4 | CONSTRUCTION: Materials, Temperature Rise, Machine Rating, Main parts of the DC machine. |
| Week 5 | ARMATURE WINDING: Winding details, Winding Schemes, Lap winding, Wave winding, Armature Calculations |
| Week 6 | MAIN FIELD: Main Field Distribution, Field excitation, Magnetization curve |
| Week 7 | ARMTURE REACTION: Distributed Armature m.m.f., Resultant field, Effects of armature reaction, Shift of the magnetic neutral axis, Treatment of Armature Reaction |
| Week 8 | Midterm Exam |
| Week 9 | Commutation: The Process of Commutation, Equivalent circuit of commutating coil, Linear Commutation, Treatment of sparking, Interpoles, Brush shift |
| Week 10 | GENERATOR OPERATION: The Voltage Equation, Speed of Rotation, Field excitation |
| Week 11 | Voltage drops, Definitions, |
| Week 12 | Voltage control, Voltage regulation |
| Week 13 | Voltage Build-Up,. |
| Week 14 | Applications, Parallel operation |
| Week 15 | losses |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | LAB1: The construction of DC Machines |
| Week 2 | LAB2: Building- up voltage of self – excited shunt generator |
| Week 3 | LAB3: Characteristic of separately excited generator |
| Week 4 | LAB4: Characteristic of self – excited shunt generator |
| Week 5 | LAB5: Characteristic of a. compound generator and b. series generator |
| Week 6 | LAB6: separation of mechanical ,eddy – current and hysteresis losses in DC generator by an auxiliary motor |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Theraja and Theraja (A Textbook of Electrical Technology) volume I basic electrical engineering in S.I. System of units revised by: Tarnekar Chand an ISO 9001:2000 company Chand & company ltd. Ram Nagar (2005) | yes |
| Recommended Texts | | |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electric Circuits I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE003 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 3 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mushtaq Najeeb Ahmed | | e-mail | mushtaq.najeeb@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE001 | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is a first course on electric circuits. The course is designed to provide students with an importance for electrical engineering field: Natural and Step Response of RL and RC Circuits, Sequential Switching; Natural and Step Response of Parallel and Series RLC Circuits. Operation Amplifiers. Balanced Three-Phase Circuits, Analysis of circuits (Wye, Delta); Power Calculations. Unbalanced Three-Phase systems. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Response of RL and RC circuits: Natural and step responses of RL and RC circuits. Natural and step responses of RLC circuits<br>2. Operational amplifier terminals, terminal voltages and currents, the inverting and non-inverting amplifier circuit, the summing-amplifier circuit, and the difference –amplifier circuit<br>3. Balanced Three-Phase Circuits: 3-P Voltages, 3-P Voltage Sources, Analysis of Y-Δ transformation; Power Calculations and Measurements of Average Power in 3-PCircuits. 5.Unbalanced Three-Phase systems |
| Indicative Contents<br>المحتويات الإرشادية | ● Analyze and determine the complete response of RL, RC and RLC circuits<br>● Analyze inverting, summing, and noninverting Op amp circuits.<br>● understand 3-phase system and its power calculation.<br>● apply delta–wye or wye–delta transformation in Three-Phase Circuits as necessary to simplify circuit analysis. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4.133 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.867 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 10 % | | LO# 1, LO# 2and LO# 3 |
| | Assignments | 1 | 5 % | | LO# 1and LO# 2 |
| | Projects / Lab. | | | | |
| | Report | | | | |
| Summative assessment | Midterm Exam | 2hr | 25 % | | LO# 1 and LO# 2 |
| | Final Exam | 3hr | 60 % | | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Operational Amplifier (Ideal, Inverting, and Non-inverting) |
| Week 2 | Operational Amplifier (Summing, Subtracting, Cascaded, Integrator, and Differentiator) |
| Week 3 | Source-Free RC Circuit |
| Week 4 | Source Free RL Circuit |
| Week 5 | Step Response of RC Circuit |
| Week 6 | Step Response of RL Circuit |
| Week 7 | Introduction to Second Order Circuits |
| Week 8 | Source Free Series RLC Circuit |
| Week 9 | Source Free Parallel RLC Circuit |
| Week 10 | Step Response of Series RLC Circuit |
| Week 11 | Step Response of Parallel RLC Circuit |
| Week 12 | Introduction to Three-Phase Circuits |
| Week 13 | Balanced Wye - Wye Connection |
| Week 14 | Balanced Wye-Deltaو Delta-Wye, Delta-Delta Connections |
| Week 15 | Power in Balanced System and Unbalanced 3-phase Systems |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Charles K. Alexander, Matthew N. O. Sadiku "Fundamentals of Electric Circuits" Fifth edition. | No |
| Recommended Texts | James W. Nilsson, Susan A. Riedel "Electric Circuits" Ninth edition | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electromagnetic Fields I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE005 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 3 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Ahmed A. Abbas | | e-mail | Ahmed.abbas@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Assist.prof.Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG004 | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is designed for students to understand vector analysis, Coulomb's law and electric field intensity, Electric flux density, Gauss's law and divergence, Energy and potential. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Understand the fundamental of vector concepts and operation.<br>2. Understand the Coulomb's law and electric field intensity.<br>3. Understand the electric flux density, Gauss's law, divergence and the divergence theorem.<br>4. Use Coulomb's law and Gauss's law to find the electric field about many distributions of charge. |
| Indicative Contents<br>المحتويات الإرشادية | • The fundamental of vector concepts and operation.<br>• The Coulomb's law and electric field intensity.<br>• The electric flux density, Gauss's law, divergence and the divergence theorem.<br>• Coulomb's law and Gauss's law to find the electric field about many distributions of charge. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 3and LO# 4 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 2and LO# 4 |
| | Projects / Lab. | 1 | 10% (10) | | |
| | Report | 1 | | | |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1 and LO# 2 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Vector analysis, scalars and vectors, vector algebra, the Cartesian coordinates system, |
| Week 2 | Vector components and unit vector, the vector field. |
| Week 3 | The dot products, the cross product, other coordinates system: circular cylindrical coordinates, the spherical coordinates system. |
| Week 4 | The experimental law of Coulomb, Electric field intensity, field due to continuous volume charge distribution. |
| Week 5 | Field of line charge, field of a sheet charge. |
| Week 6 | Electric flux density, Gauss's law, Application of Gauss's law: some symmetrical charge distributions. |
| Week 7 | Application of Gauss's law: some symmetrical charge distributions. |
| Week 8 | Midterm Exam |
| Week 9 | Application of Gauss's law: Differential volume element, divergence, Maxwell s first equation (Electrostatics filed). |
| Week 10 | The vector operator and the divergence theorem. |
| Week 11 | Energy expended in moving a point charge in electric field, line integral, definition of potential difference and potential. |
| Week 12 | Potential field of point charge. |
| Week 13 | The potential field of a system of charges. |
| Week 14 | Potential Gradient, the Dipole. |
| Week 15 | Energy density in the electrostatic field. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | William H. Hayt, Jr and Jone A. Buck “Engineering Electromagnetics” 6th Edition. | Yes |
| Recommended Texts | | |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Engineering Mathematics<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Calculus III | | | Module Delivery | |
| Module Type | Basic | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG008 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 3 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Zeyid Tariq Ibraheem | | e-mail | zeyidtariq@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/06/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG004 | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of engineering Mathematics. Specifically, the basic concepts of vectors, lines, and planes. Partial differential equations. Multiple and surface integrations. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. #Understand the Vectors and The Geometry of Space.<br>2. # Understand the Lines and Planes in Space.<br>3. # Understand the Vector Functions and Motion in Space.<br>4. # Explain multiple and surface integrations. |
| Indicative Contents<br>المحتويات الإرشادية | • Recognize the basic concepts of vectors, lines, planes and expand them.<br>• Functions with two or more variables and their applications.<br>• Double and triple integrals and multiple applications.<br>• Surface Integrals. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 3and LO# 4 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 2and LO# 3 |
| | Projects / Lab. | 1 | 10% (10) | | |
| | Report | 1 | | | |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1 and LO# 2 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Brief Review. |
| Week 2 | Vectors: Dot and Cross Product, Equations of Lines and Planes. |
| Week 3 | Vector Function, Velocity and Acceleration. |
| Week 4 | Curvature and the Unit Normal Vectors. |
| Week 5 | Functions of several variables. |
| Week 6 | Determinants. |
| Week 7 | Differentiation. |
| Week 8 | Midterm Exam |
| Week 9 | Partial Differentiation: Function of Two or More Variables and the Chain Rule, |
| Week 10 | Partial Differentiation Applications. |
| Week 11 | Maximum, Minimum and Saddle Points. |
| Week 12 | Multiple Integral: Double and Triple Integral, Area and Volume. |
| Week 13 | Double Integral in Polar Form. |
| Week 14 | Triple Integrals in Rectangular Coordinates. |
| Week 15 | Surface Integrals. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • CALCULUS. | Yes |
| Recommended Texts | • Advanced Engineering Mathematics. | yes |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | English Language II | | | **Module Delivery** | |
| **Module Type** | S | | | ☐ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | UOA 004 | | | | |
| **ECTS Credits** | 2 | | | | |
| **SWL (hr/sem)** | 50 | | | | |
| **Module Level** | | UG2 | **Semester of Delivery** | | Three |
| **Administering Department** | | EE | **College** | Engineering | |
| **Module Leader** | Abdullah Khalid Ahmed | | **e-mail** | Abdullahkhalid.ahmed@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | M.Sc. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | Dr. Ehsan Hamyan Sabbar | **e-mail** | Ehsan.sabbar@uoanbar.edu.iq | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | English Language I | **Semester** | 2 |
| **Co-requisites module** | None | **Semester** | - |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. Expand vocabulary and enhance communication in everyday situations.<br>2. Improve grammar skills for more accurate speaking and writing.<br>3. Develop better listening comprehension abilities.<br>4. Enhance spoken English fluency, accuracy, and pronunciation.<br>5. Improve reading comprehension and extract key information from texts.<br>6. Strengthen writing skills for well-structured and grammatically accurate compositions.<br>7. Increase cultural awareness of English-speaking societies and customs. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | By the end of successful completion of this course, the student will be able to:<br>1. Develop academic essay writing proficiency<br>2. Promote reading skills<br>3. Expand academic vocabulary through reading<br>4. Promote speaking ability through group discussions and debates<br>5. Promote critical thinking skills |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Tenses<br>Vocabulary (Jobs)<br>Present simple<br>Present continuous<br>Past simple<br>Past continuous<br>Count and uncount nouns<br>Expression of quantity<br>Verb patterns<br>Would like and like<br>What … like?<br>Comparative and superlatives<br>Present perfect<br>Tense revision<br>have to & got to<br>have to & should & must<br>Present simple or will<br>Question forms<br>Writing (informal letter)<br>Have/have to<br>Writing (Linking words +Describing a person)<br>Have + noun<br>Writing (a story 1)<br>Articles<br>Vocabulary (clothes)<br>Writing (filling in forms)<br>Will and going to<br>Writing (postcard)<br>Vocabulary (adjective formation)<br>Writing (relative closes)<br>Vocabulary (men and women)<br>Writing (a biography)<br>Vocabulary (job description)<br>Writing (formal letter)<br>Time clauses |

| | | |
|---|---|---|
| | Conditional clauses | Writing (discussing ideas) |
| | Verb patterns | Infinitives |
| | Used to | Writing (formal letters) |
| | The passive form | Vocabulary (words with more than one meaning) |
| | Active and passive | Writing (email) |
| | Second conditional | Vocabulary (phrasal verbs) |
| | Might | Writing (a story 2) |

| Learning and Teaching Strategies<br>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, speaking interactive activities and by considering type of activities that are interesting to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 30 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 20 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1.3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative Assessment** | **Quizzes** | **5** | **25% (25)** | **5, 10** | **LO #1, and 2** |
| | **Assignments (HW)** | **2** | **5% (5)** | **2, 4, 6, 8, 9, and 10** | **LO # 1-3** |

| | | | | | |
|---|---|---|---|---|---|
| | **Report** | **1** | **5% (5)** | | |
| | **Activities** | | **5% (5)** | **Through lectures** | **LO# 4** |
| | **Lab** | | | | |
| **Summative Assessment** | **Midterm Exam** | **2 hr** | **10% (10)** | **7** | **LO # 1-3** |
| | **Final Exam** | **3 hr** | **50% (50)** | **16** | **All** |
| **Total Assessment** | | | **100% (100 Marks)** | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| 1. | • Tenses • Questions<br>• Using a bilingual dictionary • Social expressions-1 |
| 2. | • Present tenses • Have/ have got<br>• Collection: daily life • Making conversation |
| 3. | • Past tenses • Word formation<br>• Time expressions • Personal information |
| 4. | • Much/ many- • some/ any<br>• a few, a little, a lot of • Articles<br>• Shopping • Prices |
| 5. | • Verb patterns-1 • Future forms<br>• Hot verbs • How do you feel? |
| 6. | • What ……. Like? • Comparatives and superlatives<br>• Synonyms and antonyms • Directions |
| 7. | **Mid-term Exam** |
| 8. | • Present perfect • For, since |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| **Week** | **Material Covered** |
| | • Adverbs word pairs<br>• Short answers |
| 9. | • Have (go) to<br>• Should/ must<br>• Words that go together<br>• At the doctor's |
| 10. | • Time clauses<br>• If<br>• Hot verbs<br>• In the hotel |
| 11. | • Verb patterns-2<br>• Manage to, used to<br>• -ed/ -ing adjectives<br>• Exclamations |
| 12. | • Passives<br>• Verbs and nouns that go together<br>• Notices<br>• Adverbs |
| 13. | • Second conditional<br>• Might<br>• Phrasal verbs<br>• Social expressions-2 |
| 14. | • Present perfect continuous<br>• Word information<br>• Present perfect simple vs. continuous<br>• Writing letters |
| 15. | • Past perfect for clarification<br>• Hot verbs<br>• Reported statements<br>• Saying goodbye |
| 16. | **Final Exam preparatory** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | -John & Liz Soars, "New Headway Plus- Pre-Intermediate Student's Book", 10th ed 2012 | Yes |
| **Recommended Texts** | -Raymond Murphy; "English Grammar in Use", 4th edition 2012<br>Understanding and Using English Grammar, Vol. A, 4th Edition 4th Edition | No |
| **Websites** | https://elt.oup.com/catalogue/items/global/adult_courses/new_headway/pre-intermediate_fourth_edition/?cc=global&selLanguage=en&mode=hub<br>https://www.amideast.org/jordan/learn-english/learn-english-online?gclid=EAIaIQobChMIoeyGmdm_ggMVFweLCh2FowJ1EAAYASAAEgKjFfD_BwE<br>https://learnenglish.britishcouncil.org/ | |

| Grading Scheme<br>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 |
| | | | | |

**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.

| Module Approval<br>المصادقةعلى وصف المادة الدراسية | | | |
|---|---|---|---|
| | **Name** | **Date** | **Signature** |
| **Module Leader Approval** | | **8/6/2023** | |
| **Peer Reviewer Name** | | **8/6/2023** | |
| **Scientific Committee Members Approval** | | **8/6/2023** | |
| | | **8/6/2023** | |
| | | **8/6/2023** | |
| | | **8/6/2023** | |
| | | **8/6/2023** | |
| **Scientific Committee Head Approval** | | **8/6/2023** | |

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Fundamentals of Electronics I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE007 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 3 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Munther Naif Thiyab | | e-mail | Munther.thiyab@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | $M_{SC}$ | Module Leader's Qualification | | Master |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE001 | Semester | 2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | The goals of this course are to enable students to:<br>1) Explanation of the physical structure of the semiconductors.<br>2) Analysis of a pn diode operation, description of the device characteristics<br>3) Investigation of diode circuits and applications<br>4) Analysis of a BJT, description of device characteristics<br>5) Definition of DC biasing circuits of BJTs, distinguishing the differences between circuits |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. After successfully completing the course, the students will be able to:<br>2. Apply mathematics, science, and engineering to analyze and design electronic circuits<br>3. Identify, formulate, and solve engineering problems in the area circuits and systems.<br>4. Identify and characterize different semiconductor devices (P-N Junction and BJT)<br>5. explain different diode and transistor applications (clipping, clamping, amplifier, ...)<br>6. Analyze and design different electronic circuits contain semiconductor devices using devices' models.<br>7. understand the design parameters and different characteristics of small signal BJT amplifiers. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to Electronic devices and systems.<br>• Construction of pn Diodes, BJT, FET and other Devices.<br>• Characteristics and operation Principals of Electronics Devices.<br>• Practical applications of pn Diodes, BJT, FET and others Devices.<br>• DC and AC Biasing and analysis of electronic circuits. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |

| | | | |
|---|---|---|---|
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 3and LO# 5 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 3and LO# 4 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 2, LO# 3and LO# 5 |
| | Report | 1 | | | |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1 to LO# 4 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Semiconductor Materials and PN Junction |
| Week 2 | Forward biased, Reversed biased, and I-V. Relationship |
| Week 3 | Diode and Zener diode circuits: DC analysis, models and applications |
| Week 4 | Bipolar junction transistor Introduction |
| Week 5 | Transistor Structure |
| Week 6 | biasing, and I-V Relationship |
| Week 7 | DC analysis of transistor circuits- Part I |
| Week 8 | DC analysis of transistor circuits -Part II |
| Week 9 | Basic transistor applications: Switch, Digital Logic, etc |
| Week 10 | Basic transistor amplifier configuration |
| Week 11 | Design and applications |
| Week 12 | Bias Stabilization |
| Week 13 | Field Effect Transistors (FETs): Structure and Operation of JFET |
| Week 14 | P-Channel, N-Channel, |
| Week 15 | Enhancement-Mode, Depletion-Mode MOSFETs |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | **electronics I lab:**1-Lab Equipment Familiarization |
| Week 2 | **electronics I lab:2**-Diode Characteristics and |
| Week 3 | **electronics I lab:3**-Diode Applications (1) |
| Week 4 | **electronics I lab:4**-Diode Applications (2) |
| Week 5 | **electronics I lab:5**-Zener Diode Characteristic |
| Week 6 | **electronics I lab:6**-Zener Diode Applications |
| Week 7 | **Electronics 1lab:7-**Emitting Light Diode |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit Theory”, 11th edition, Pearson, 2013. | No |
| Recommended Texts | •Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit Theory”, 10th edition, Pearson, 2013. | No |
| Websites | | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| Group | Grade | التقدير | Marks (%) | Definition |
| Success Group (50 - 100) | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |
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| Fail Group (0 – 49) | FX – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
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| | | | | |

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# مفردات المنهج لمادة
# جرائم حزب البعث
# قسم الهندسة الكهربائية

# للعام الدراسي **2023-2024**

**مقدمة :**

**بناءا على التوجيهات الصادرة من عمادة كلية الهندسة ورئاسة الجامعة والتوجيهات المركزية من وزارة التعليم العالي والبحث العلمي بخصوص المفردات والخطة الدراسية لمادة جرائم حزب العث في العراق. ادناه المنهاج الدراسي الاكمل للمادة والذي يتضمن:**

1- **المفردات الدراسية.**
2- **الخطة الدراسية المتبعة.**

**3- عدد الساعات المخصصة.**

**4- أسماء التدريسيين المكلفين بالمادة.**

- **المفردات الدراسية لمادة جرائم حزب البعث في العراق**

| ت | المفردات الدراسية | الوصف |
|---|---|---|
| 1 | المقدمة | مقدمة عامة عن المنهج |
| 2 | الفصل الاول | جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005 م |
| 3 | الفصل الثاني | الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق |
| 4 | الفصل الثالث | الجرائم البيئية لنظام البعث في العراق |
| 5 | الفصل الرابع | جرائم المقابر الجماعية |

- **الخطة الدراسية لمادة جرائم حزب البعث**

| ت | وصف مادة المحاضرة | الاسبوع | نوع المحاضرة |
|---|---|---|---|
| 1 | ▪ مقدمة عامة عن المنهج<br>▪ جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005 م أقسام الجرائم.<br>▪ مفهوم الجرائم واقسامها.<br>▪ تعريف الجريمة لغة واصطلاحا. | الأول | نظري حضوري |
| 2 | ▪ جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام 2005<br>▪ أنواع الجرائم الدولية<br>▪ القرارات الصادرة من المحكمة الجنائية العليا. | الثاني | نظري حضوري |
| 3 | ▪ الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق.<br>▪ الجرائم النفسية .<br>▪ آليات الجرائم النفسية .<br>▪ آثار الجرائم النفسية . | الثالث | نظري حضوري |
| 4 | ▪ الجرائم الاجتماعية<br>▪ عسكرة المجتمع .<br>▪ موقف النظام البعثي من الدين | الرابع | نظري حضوري |
| 5 | ▪ انتهاكات القوانين العراقية. | الخامس | نظري حضوري |
| 6 | ▪ صور انتهاكات حقوق الإنسان وجرائم السلطة -1 . | السادس | نظري حضوري |

| | | | |
|---|---|---|---|
| 7 | الامتحان الشهري الاول | السابع | امتحان حضوري |
| 8 | ▪ صور انتهاكات حقوق الإنسان وجرائم السلطة -2<br>▪ بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث .<br>▪ أماكن السجون والاحتجاز لنظام البعث . | الثامن | نظري حضوري |
| 9 | ▪ الجرائم البيئية لنظام البعث في العراق .<br>▪ التلوث الحربي والإشعاعي وانفجار الالغام | التاسع | نظري حضوري |
| 10 | ▪ تدمير المدن والقرى (سياسة الأرض المحروقة) | العاشر | نظري حضوري |
| 11 | ▪ تجفيف الأهوار<br>▪ تجريف بساتين النخيل والأشجار والمزروعات | الحادي عشر | نظري حضوري |
| 12 | ▪ جرائم المقابر الجماعية<br>▪ أحداث مقابر الإبادة الجماعيةّ المرتكبة من النظام البعثي في العرا ق | الثاني عشر | نظري حضوري |
| 13 | ▪ التصنيف الزمني لمقابر الإبادة الجماعيةّ في العراق للمدة 1963 م – 2003 م. | الثالث عشر | نظري حضوري |
| 14 | ▪ التصنيف الزمني لمقابر الإبادة الجماعيةّ في العراق للمدة 1963 م – 2003 م. | الرابع عشر | نظري حضوري |
| 15 | الامتحان الشهري الثاني | الخامس عشر | نظري حضوري |
| 16 | الامتحان النهائي | السادس عشر | نظري حضوري |

- **عدد الساعات المخصصة وجدول المادة:**
  - **عدد الساعات هي 2 ساعة أسبوعيا.**
  - **عدد الساعات الكلية في الفصل هي 30 ساعة.**
  - **الجدول الأسبوعي:**

## الجـدول الأسبوعــي للمحاضرات

## للفصــل الدراســي الاول للعـــام 2023- 2024

المـــرحلة: الثانية- شعبة A

| اليوم | موعد المحاضرة | اسم المادة | اسم التدريسي |
|---|---|---|---|

| | | | |
|---|---|---|---|
| الأحد | Digital Techniques I | 08:30am - 11:00am | م.د. زياد طارق إبراهيم |
| | English Language II | 11:00am - 01:30pm | م.د. حامد ردام حسين |
| | Fundamentals of Electronics I | 01:30pm - 03:00pm | م. عبدالله خالد احمد |
| الاثنين | Calculus III | 08:30am - 11:00am | د. محمد عبدالرحمن فرج |
| | Electromagnetic Fields I | 11:00am - 01:30pm | ا.م.د. احمد عبداللطيف عباس |
| | - | 01:30pm - 02:30pm | - |
| الثلاثاء | LAB21 Electronics | 08:30am - 11:00am | المهندس عمر عبدالله حمود, م.م. سامح جسام محمد , م.م. شهد فاضل جابر , م.م. مصطفى لطيف حسن |
| | LAB21 DC Machines | 11:00am - 01:30pm | المهندس مصطفى محمد كريم, م.د. ستار صبري كريم, م.م. عبدالله فوزي شفيق, م.م. ياسمين كامل نجم |
| | - | 01:30pm - 02:30pm | - |
| الأربعاء | جرائم حزب البعث | 08:30am - 10:30am | م.د. ماجد هادي طلال |
| | Calculus III | 10:30am - 12:30pm | د. محمد عبدالرحمن فرج |
| | | 12:30pm - 02:30pm | - |
| الخميس | Electric Circuits I | 08:30am - 11:00am | م.د. مشتاق نجيب احمد |
| | DC Machines I | 11:00am - 01:30pm | م.د. ستار صبري كريم |
| | - | 01:30pm - 02:30pm | - |

## المـــرحلة: الثانية- شعبة B

| اليوم | موعد المحاضرة | اسم المادة | اسم التدريسي |
|---|---|---|---|
| الأحد | 08:30am - 11:00am | Fundamentals of Electronics I | م.د. حامد ردام حسين |
| | 11:00am - 01:30pm | Digital Techniques I | م.د. زياد طارق إبراهيم |
| | 01:30pm - 02:30pm | Engineering Mechanics (Static) | م.د. احسان احميان صبار |
| الاثنين | 08:30am - 11:00am | Electromagnetic Fields I | ا.م.د. احمد عبداللطيف عباس |

| | | | |
|---|---|---|---|
| | 11:00am - 01:30pm | Calculus III | د. محمد عبدالرحمن فرج |
| | 01:30pm - 02:30pm | - | - |
| الثلاثاء | 08:30am - 11:00am | Electric Circuits I | م.د. مشتاق نجيب احمد |
| | 11:00am - 01:30pm | DC Machines I | م.د. ستار صبري كريم |
| | 01:30pm - 02:30pm | - | - |
| الأربعاء | 08:30am - 10:30am | Calculus III | د. محمد عبدالرحمن فرج |
| | 10:30am - 12:30pm | جرائم حزب البعث | م.د. ماجد هادي طلال |
| | 12:30pm - 02:30pm | English Language II | م. عبدالله خالد احمد |
| الخميس | 08:30am - 11:00am | LAB21 Electronics | المهندس عمر عبدالله حمود, م. زينب نجيب عبد الحميد, م.د. حامد ردام حسين, م.م. براء سعيد علي, م.م. سامح جسام محمد , م.م. شهد فاضل جابر , م.م. مصطفى لطيف حسن |
| | 11:00am - 01:30pm | LAB21 DC Machines | المهندس مصطفى محمد كريم, م.د. ستار صبري كريم, م.م. خالد وليد عبد, م.م. عبدالله فوزي شفيق |
| | 01:30pm - 02:30pm | - | - |

- **أسماء التدريسيين المكلفين بتدريس المادة:**

| |
|---|
| 1- م.د. ماجد هادي طلال |

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Engineering Statistics | | | Module Delivery | |
| Module Type | Related | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG010 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 4 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mohammed Ali Hussein | | e-mail | Mohammed.almahamdy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG08 | Semester | 3 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | Statistical Engineering models are based on mathematics and probability theory. This course provides students with a working knowledge of fundamental statistics principles and probability in addition to a preface to the regression and correlation analysis. By the end of the semester, students should be able to determine when each of the various topics we have covered is appropriate to use, and to apply them to practical engineering situations or problems. This course will cover techniques on data collection and presentation, descriptive statistics, basic elements of probability theory, sampling techniques and theory, statistical estimation, hypothesis testing and regression analysis. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. use a number of methods and techniques for collecting and presentation the sets of data;<br>2. calculation and demonstration the center tendency and variation of data;<br>3. compute the probabilities in a simple case and using the rules of probability in computing;<br>4. give an account of the concept random variable and be able to use some common probability distributions;<br>5. understand the meaning of the central limit theorem;<br>6. use point and interval estimates for some typical statistical problems;<br>7. • apply elementary regression for fitting measured data. |
| Indicative Contents<br>المحتويات الإرشادية | Fundamentals (Introduction to Statistics)<br>• Introduction<br>• Descriptive and Inferential Statistics<br>• Variables and Types of Data<br>• Data Collection and Sampling Techniques<br>• Observational and Experimental Studies<br><br>Presentation of a Statistical Data<br>• Introduction<br>• Organizing Data<br>• Grouped Frequency Distributions or Frequency Distributions Table<br>• Graphs: Histograms, Frequency Polygons, and Ogive<br>• Other Types of Graphs<br><br>Data Description<br>• Measures of Central Tendency (Mean, Median and Mode)<br>• Measures of Variation<br>- 2.1. Population Variance and Standard Deviation<br>- 2.2. Sample Variance and Standard Deviation<br>- 2.3. Variance and Standard Deviation for Tabulated Data<br>- 2.4. Range<br>• Coefficient of Variation<br><br>Probability and Counting Rules<br>• Sample Spaces and Probability |

| | |
|---|---|
| | • Tree diagram<br>• Basic Probability Rules<br>• Venn Diagram<br>• The Addition Rules for Probability<br>• The Multiplication Rules and Conditional Probability<br>• Conditional Probability<br>• Counting Rules<br>- 8.1. Permutations<br>- 8.2. Combinations<br>• Probability and Counting Rules<br><br>Discrete Probability Distributions<br>• Probability Distributions<br>• Mean, Variance, Standard Deviation<br>• The Binomial Distribution<br>• The Poisson Distribution<br><br>Continuous Probability Distributions: The Normal Distribution<br>• Normal Distributions<br>• Applications of the Normal Distribution<br>• Normal Distributions Formula<br>• The Standard Normal Distribution<br>• Finding Areas Under the Standard Normal Distribution Curve (Table Method)<br>• A Normal Distribution Curve as a Probability Distribution Curve<br>• Applications of the Normal Distribution<br>• Determining Normality<br>• The Normal Distribution Approximation to the Binomial Distribution<br><br>Confidence Intervals and Sample Size<br>• Preface<br>• Confidence Intervals for the Mean When σ is Known<br>- 2.1. A point estimate<br>- 2.2. An interval estimate<br>- 2.3. Confidence Intervals<br>• Sample Size<br>• t-Distribution<br>• Confidence Intervals for the Mean When σ is Unknown<br>• The chi-square Distribution<br>• Confidence Intervals for Variances and Standard Deviations<br>- Confidence Interval for a Variance<br>- Confidence Interval for a Standard Deviation<br><br>Hypothesis Testing<br>• Preface<br>• Steps in Hypothesis Testing—Traditional Method<br>- The null hypothesis (H0) |

| | |
|---|---|
| | - The alternative hypothesis (H1)<br>- The level of significance<br>• z Test for a Mean<br>• P-Value Method for Hypothesis Testing<br>• t Test for a Mean<br>• z Test for a Proportion<br>• X2 Test for a Variance or Standard Deviation<br><br>Testing the Difference Between Two Means, Two Proportions, and Two Variances<br>• Preface<br>• Testing the Difference Between Two Means: Using the z Test<br>• Testing the Difference Between Two Means of Independent Samples: Using the t Test<br>• Testing the Difference Between Two Means: Dependent Samples<br>• Testing the Difference Between Two Variances<br><br>Correlation and Regression<br>• Preface<br>• Scatter Plots and Correlation<br>• Regression<br>• Coefficient of Determination and Standard Error of the Estimate. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 53 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 147 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 3and LO# 5 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 3and LO# 5 |
| | Projects / Lab. | | | | |
| | Report | 1 | 5% (5) | | |
| Summative assessment | Midterm Exam | 2hr | 20% (15) | 8 | LO# 2 to LO# 4 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction: basic probability |
| Week 2 | Conditional probability, independent events |
| Week 3 | Principle of counting, permutations, combinations, binomial coefficient |
| Week 4 | Random variables and probability distributions |
| Week 5 | Graphical interpretations, joint distributions |
| Week 6 | Mathematical expectation, |
| Week 7 | Variance and standard deviation, |
| Week 8 | Midterm Exam |
| Week 9 | Correlation coefficient, skewness and kurtosis |
| Week 10 | Percentiles, mean, median, mode |
| Week 11 | Examples |
| Week 12 | Exam |
| Week 13 | Binomial distribution, |
| Week 14 | Normal distribution, |
| Week 15 | Examples |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |
| Week 8 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Probability & Statistics for Engineers & Scientists. 9th edition. by Walpole et.al. | No |
| Recommended Texts | • Statistics for Engineers and Scientists. 4th edition. by Navidi<br>• Schaum's Outline Probability and Statistics 4th edition. by Spiegel et.al. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computer Science II** | | | **Module Delivery** | |
| **Module Type** | **Related** | | | ☒ **Theory**<br>☐ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **UOA008** | | | | |
| **ECTS Credits** | **3** | | | | |
| **SWL (hr/sem)** | **75** | | | | |
| **Module Level** | | UG2 | **Semester of Delivery** | | 4 |
| **Administering Department** | | Electrical | College | College of Engineering | |
| **Module Leader** | Maath Jasem Mahammad | | **e-mail** | maath.mahammad@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Ass. Professor Dr. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | Adnan Salih Suhail | **e-mail** | adnan.sahel@uoanbar.edu.iq | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | | **Semester** | |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course presents an overview of fundamental computer science topics. Overview topics include an introduction to computer components, computer hardware, operating systems, digitization of data, and application program (Microsoft office). |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Analyze, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.<br>2. Identify problems and formulate solutions for systems.<br>3. Communicate effectively with a range of audience.<br>4. Work effectively as part of a team to develop and deliver quality software artifacts.<br>5. Design solutions using approaches that integrate ethical, social, legal, and economic responsibilities. |
| **Indicative Contents**<br>المحتويات الإرشادية | - Introduction of Microsoft Excel<br>- Workbooks, Worksheets and Cell in Microsoft Excel<br>- Formulas in Microsoft Excel<br>- Fundamentals of Networks and Internet |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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 | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 27 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 75 | | |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 5 | 25% (25) | 3,5,9, 11,13 | LO #1, 2, 10 and 11 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO # 3, 4, 6 and 7 |
| | Projects / Lab. | | 6% (4) | Continuous | |
| | Activities | | 4% (6) | 13 | LO # 5, 8 and 10 |
| Summative assessment | Midterm Exam | 2 hr | 10% (10) | 7 | LO # 1-7 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Introduction of Microsoft Excel |
| Week 2 | Workbooks and Worksheets |
| Week 3 | Cell in Microsoft Excel |
| Week 4 | File and Home Tab |
| Week 5 | Insert Tab |
| Week 6 | Layout Tab |
| Week 7 | **Mid – term Exam** |
| Week 8 | Formulas Tab |
| Week 9 | Formulas Tab |

| | |
|---|---|
| **Week 10** | Data Tab |
| **Week 11** | Review and View Tab |
| **Week 12** | Fundamentals of Networks and Internet |
| **Week 13** | Browsing and Searching the Internet |
| **Week 14** | E-mail and E-Chatting |
| **Week 15** | The Ethics of Internet World |
| **Week 16** | **Final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction of Microsoft Excel |
| **Week 2** | Lab 2: File and Home Tab |
| **Week 3** | Lab 3: Insert and Layout Tab |
| **Week 4** | Lab 4: Formulas in Microsoft Excel |
| **Week 5** | Lab 5: Data Tab |
| **Week 6** | Lab 6: Browsing and Searching the Internet |
| **Week 7** | Lab 7: E-mail and E-Chatting |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | (أساسيات الحاسوب وتطبيقاته المكتبية (الجزء الأول) (الجزء الثاني<br>أ.م.د. زياد محمد عبود ، أ.د.غسان حميد عبد المجيد ، أ.م.د. أمير حسين مراد ، م. بلال كمال أحمد | Yes |
| **Recommended Texts** | | |
| **Websites** | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | DC Machines II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE016 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 4 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Settar Subry Keream | | e-mail | Settar.keream@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE015 | Semester | 3 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of DC machines. Specifically, the Dc motors, , BLDC motors and transformers |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. # Understand the speed control of DC motors, braking and starting of DC motors.<br>2. # Understand the principle of brushless DC motor . and transformers |
| Indicative Contents<br>المحتويات الإرشادية | ● MOTOR OPERATION: Governing equations, Load: torque and current, Applied voltage, Field excitation, Mechanical characteristic, Stability<br>● Speed control: Armature voltage control, Armature resistance control, Field control,<br>● Starting: Direct on-line starting, Variable voltage starting, Resistance starting, Starters,<br>● Braking: External braking, Electric braking, Applications.<br>● Brushless DC motor principle of operation<br>● Transformer principle: Single phase transformer, three phase transformers.<br>● types of transformer, construction, no-load and short circuit tests and efficiency |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 1and LO# 2 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 1and LO# 2 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 1and LO# 2 |
| | Report | 1 | | | LO# 1and LO# 2 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1and LO# 2 |
| | Final Exam | 3hr | 60% (60) | 16 | LO# 1and LO# 2 |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | MOTOR OPERATION: Governing equations, Load: torque and current, |
| Week 2 | Applied voltage, Field excitation, Mechanical characteristic, Stability |
| Week 3 | Speed control: Armature voltage control, Armature resistance control, Field control, |
| Week 4 | Midterm Exam |
| Week 5 | Starting: Direct on-line starting, Variable voltage starting, |
| Week 6 | Resistance starting, Starters, |
| Week 7 | Braking: External braking, |
| Week 8 | Electric braking, |
| Week 9 | Applications. |
| Week 10 | Brushless DC motor principle of operation, |
| Week 11 | construction Applications |
| Week 12 | Transformer principle: Single phase transformer, Transformer-types of transformer, construction, no-load and short circuit tests. |
| Week 13 | losses in transformers, the equivalent circuit of the transformer, efficiency, regulation, auto-transformer. |
| Week 14 | Three phase transformers, Efficiency and maximum efficiency condition of transformer. |
| Week 15 | Parallel operation of transformer. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | LAB1: Connection & rotation direction of DC shunt wound machines operating as motor |
| Week 2 | LAB2: Speed control of a DC shunt motor |
| Week 3 | LAB3: Load characteristic of separately – excited shunt – wound DC motor |
| Week 4 | LAB4: Connection & rotation direction of DC series wound machines operating as motor |
| Week 5 | LAB5: Load characteristic of series – wound DC moto |
| Week 6 | LAB6: Load characteristic of Shunt and compound DC moto |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Theraja and Theraja (A Textbook of Electrical Technology) volume I basic electrical engineering in S.I. System of units revised by: Tarnekar Chand an ISO 9001:2000 company Chand & company ltd. Ram Nagar (2005) | yes |
| Recommended Texts | | |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electric Circuits II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE004 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 4 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mushtaq Najeeb Ahmed | | e-mail | mushtaq.najeeb@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE003 | Semester | 3 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is a second course on electric circuits. The focus of the course is to impart useful skills on the students to enhance their circuit analysis capability. Hence, the course is designed to provide students with a knowledge on circuit analysis by Introducing the topic and illustrating its importance for electrical engineering field: Laplace transform and relation between current and voltage for resistance, capacitance and inductance, Laplace transform and its applications in electric circuit the concept of magnetic coupling, Analysis of magnetic coupled circuits, Linear transformers, Ideal transformers. Two-port networks and its different equation forms, Evaluation of its parameter, Interconnected two-port networks, Frequency response. High-pass, low-pass, Band pass, and Band-stop filters. Revision and a set of solved examples. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | ● Laplace Transform Analysis of Circuits:<br>● The Laplace transform and its inverse. Properties: multiplication-convolution, differentiation, initial and final value theorems. Application of Laplace in Circuits in the s-domain: transfer function, impedance, circuit reduction, initial conditions.<br>● Mutual Inductance and Transformers: Mutual inductance. Coupling coefficient. Analysis of coupled coils. Dot rule. Energy in a pair of coupled coils. Conductively coupled equivalent circuits. Linear transformer. Ideal transformer.<br>● Autotransformer. Reflected impedance.<br>● Frequency Response, Filters<br>● Frequency response. High-pass and low-pass networks. Half-power frequencies. Band-pass filters and Band-stop filters.<br>● Two-Port Networks<br>● Terminals and ports, z-parameters. t-equivalent of reciprocal networks. y-parameters.<br>● Conversion between z and y parameters. h and g parameters. Transmission parameters. Interconnecting two-port networks. |
| Indicative Contents<br>المحتويات الإرشادية | ● Understand the basic properties of Laplace transform and its application to electric circuits.<br>● Analyze electrical networks using complex frequency approach and Laplace transform.<br>● Apply such approaches to magnetically coupled circuits and two port networks. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4.133 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 63 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4.2 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 10 % | | LO# 2, LO# 5and LO# 9 |
| | Assignments | 1 | 5 % | | LO# 6 and LO# 8 |
| | Projects / Lab. | | | | LO# 4, LO5 5and LO# 6 |
| | Report | | | | LO# 7 |
| Summative assessment | Midterm Exam | 2hr | 25 % | | LO#1 to LO# 7 |
| | Final Exam | 3hr | 60 % | | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction to Magnetically Coupled Circuits and Mutual Inductance |
| Week 2 | Energy in a Coupled Circuit |
| Week 3 | Explanation of Linear Transformer |
| Week 4 | Concept of Ideal Transformer |
| Week 5 | Concept of Ideal Autotransformer and Three-Phase Transformers |
| Week 6 | Concept of Series and Parallel Resonance |
| Week 7 | Passive Filters (Lowpass, Highpass, Bandpass, and Bandstop) |
| Week 8 | Active Filters (Lowpass, Highpass, Bandpass, and Bandreject) |
| Week 9 | Introduction to Laplace Transform and Its Properties |
| Week 10 | Inverse Laplace Transform |
| Week 11 | Circuit Element Models (Laplace Transform Applications) |
| Week 12 | Circuit Analysis and Transfer Functions (Laplace Transform Applications) |
| Week 13 | Tow-port Networks (Impedance Parameters) |
| Week 14 | Tow-port Networks (Admittance Parameters) |
| Week 15 | Tow-port Networks (Transmission Parameters) |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Charles K. Alexander, Matthew N. O. Sadiku "Fundamentals of Electric Circuits" Fifth edition. | No |
| Recommended Texts | James W. Nilsson, Susan A. Riedel "Electric Circuits" Ninth edition | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electromagnetic Fields II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE006 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 4 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Ahmed A. Abbas | | e-mail | Ahmed.abbas@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Assist. prof. Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE005 | Semester | 3 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is designed for students to understand current and conductors dielectrics and capacitance, Poisson's and Laplace's equations, the steady magnetic field, Magnetic forces, materials and inductance, Time-varying fields and Maxwell's equations. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. . Understand the current and current density and continuity of current.<br>2. Understand the metallic conductor, conductor properties and boundary conditions and semiconductor.<br>3. Understand the dielectric materials and capacitance.<br>4. Understand the relationship between the potential and electric fields.<br>5. Use Laplace and Poisson equations to find potential fields within regions bounded by the charge density.<br>6. Understand the steady magnetic field.<br>7. Understand the magnetic force, materials and inductance.<br>8. Understand the time-varying field and Maxwell equations |
| Indicative Contents<br>المحتويات الإرشادية | ● The current and current density and continuity of current.<br>● The metallic conductor, conductor properties and boundary conditions and semiconductor.<br>● The dielectric materials and capacitance.<br>● The relationship between the potential and electric fields.<br>● Laplace and Poisson equations to find potential fields within regions bounded by the charge density.<br>● The steady magnetic field.<br>● The magnetic force, materials and inductance.<br>● The time-varying field and Maxwell equations |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |

| | |
|---|---|
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Current and current density, continuity of current, metallic conductors, |
| Week 2 | Conductor properties and boundary conditions, semiconductors. |
| Week 3 | The nature of dielectric materials, boundary conditions for perfect dielectric materials. |
| Week 4 | Boundary conditions for perfect dielectric materials, capacitance. |
| Week 5 | Poisson and Laplace equations, derivation of Poisson and Laplace equations, examples of solution of Poisson and Laplace equations. |
| Week 6 | Biot- Savart law. |
| Week 7 | Ampere law, curl. |
| Week 8 | Midterm Exam |
| Week 9 | Stokes theorem, magnetic flux and magnetic flux density. |
| Week 10 | The scalar and vector magnetic potentials. |
| Week 11 | Derivation of the steady –magnetic field laws, force on moving charge, force on differential current element. |
| Week 12 | Force between differential current element, force and torque on a closed circuit. |
| Week 13 | The nature of magnetic materials, magnetic boundary conditions, the magnetic circuit, potential energy and forces on magnetic materials. |
| Week 14 | Faraday law, displacement current. |
| Week 15 | Maxwell equation in point form, Maxwell equation in integral form, the retarded potentials. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | William H. Hayt, Jr and Jone A. Buck “Engineering Electromagnetics” 6th Edition. | Yes |
| Recommended Texts | | |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Engineering Mathematics<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Calculus IV | | | Module Delivery | |
| Module Type | Basic | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG009 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG2 | Semester of Delivery | | 4 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Zeyid Tariq Ibraheem | | e-mail | zeyidtariq@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/06/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG008 | Semester | 3 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of engineering Mathematics. Specifically, the basic concepts of differential equations, first and second differential equations, and expanding them. Fourier series applications. Laplace transforms. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. # Understand the first and second differential equations.<br>2. # Understand the periodic and nan-periodic of signals.<br>3. # Explain the Laplace laws used in differential equations, unit step functions, shifting, derivative, and integration roles. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to differential equations.<br>• Fourier series, Complex Exponential Form.<br>• Fourier series, Even and Odd functions, Half Range.<br>• Laplace transformations.<br>• Laplace transforms properties, convolution theorem. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 62 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 1, LO# 2and LO# 3 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 3 |
| | Projects / Lab. | 1 | 10% (10) | | |
| | Report | 1 | | | |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO# 1 to LO#2 |
| | Final Exam | 3hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | First Order: Variable Separable and Homogenous Differential equations. |
| Week 2 | Linear, Bernoulli and Exact Differential Equations. |
| Week 3 | Second Order: Homogeneous Differential equations. |
| Week 4 | Second Order: Non Homogeneous Differential equations. |
| Week 5 | Laplace Transform: Definition, Properties. |
| Week 6 | Unit Step Function, Gamma Function. |
| Week 7 | Inverse Laplace Transform: Properties and Partial Fractions. |
| Week 8 | Midterm Exam |
| Week 9 | Solution of Differential Equations Using Laplace Transformm, and convolution theorem. |
| Week 10 | Applications: Solution of Electric Circuits Using Laplace Transform. |
| Week 11 | Fourier Series: Periodic and non Periodic Functions, Euler Formulas. |
| Week 12 | Even and Odd functions, Half Range , Expansion(Fourier Sine and Fourier Cosine). |
| Week 13 | Complex Fourier Series (Exponential). |
| Week 14 | Applications of Fourier Series in Electric Circuits. |
| Week 15 | Partial Differentiation: Function of Two or More Variables. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • CALCULUS. | Yes |
| Recommended Texts | • Advanced Engineering Mathematics. | yes |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Fundamentals of Electronics II | | | | |
| Module Type | Core | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | | |
| Module Code | ELE08 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | 2 | Semester of Delivery | 4 | | |
| Administering Department | Electrical | College | College of Engineering | | |
| Module Leader | Munther Naif Thiyab | e-mail | Munther.thiyab@uoanbar.edu.iq | | |
| Module Leader's Acad. Title | $M_{SC}$ | Module Leader's Qualification | Master | | |
| Module Tutor | | e-mail | | | |
| Peer Reviewer Name | | e-mail | | | |
| Scientific Committee Approval Date | 30/June/2023 | Version Number | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE07 | Semester | 3 |
| Co-requisites module | None | Semester | None |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | The goals of this course are to enable students to:<br>1) Explanation of the physical structure of the semiconductors in AC domain.<br>2) AC Analysis of a pn diode operation, description of the device characteristics<br>3) Investigation of diode circuits and applications<br>4) AC Analysis of a BJT, description of device characteristics<br>5) Construction and DC biasing circuits of JFET and MOSFET .<br>6) AC Analysis and small signals Circuits of JFET's and MOSFET's. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. After successfully completing the course, the students will be able to:<br>2. Apply mathematics, , and engineering to the analyze and design electronic circuits<br>3. Identify, formulate, and solve engineering problems in the area circuits and systems.<br>4. Identify and characterize different semiconductor devices (P-N Junction, JFET, and MOSFET)<br>5. Understand different type of diode and JFET transistor applications.<br>6. Perform a DC and small Signal analysis of JFET, MOSFET, and MESFET networks.<br>7. Analyze and design different electronic circuits contain semiconductors using devices' models.<br>8. Understand the design parameters and different characteristics of small signal amplifiers. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to Electronic devices and systems in AC domain.<br>• Construction and analysis of pn Diodes, BJT, FET and other Devices.<br>• Characteristics and operation Principals of Electronics Devices.<br>• Practical applications of pn Diodes, BJT, FET and others Devices.<br>• AC Biasing and analysis of electronic circuits. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5.2 |
| Unstructured SWL (h/sem) | 48 | Unstructured SWL (h/w) | 3.2 |

| | | | |
|---|---|---|---|
| الحمل الدراسي غير المنتظم للطالب خلال الفصل | | الحمل الدراسي غير المنتظم للطالب أسبوعيا | |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | LO# 2, LO# 5and LO# 7 |
| | Assignments | 2 | 5% (5) | 2, 12 | LO# 5 and LO# 6 |
| | Projects / Lab. | 1 | 10% (10) | | LO# 4, LO#5 and LO# 6 |
| | Report | 1 | | | LO# 6 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | LO#1 to LO# 6 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Semiconductor Diodes (Logic Circuits) |
| Week 2 | Semiconductor Diodes (Logic Circuits) |
| Week 3 | Diode AC Applications |
| Week 4 | Diode AC Applications |
| Week 5 | Diode AC Applications |
| Week 6 | BJT Transistor Modeling |
| Week 7 | BJT Small – Signal Analysis |
| Week 8 | BJT Small – Signal Analysis |
| Week 9 | BJT Small – Signal Analysis |
| Week 10 | FET Small – Signal Analysis |
| Week 11 | Deplation – Type MOSFETs |
| Week 12 | Enhancement – Type MOSFETs |
| Week 13 | MOSFETs Transistor Aplication |
| Week 14 | Small Signal Analysis of Field- Effect Transistor |
| Week 15 | Small Signal Analysis of Field- Effect Transistor |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | **electronics II lab:**1- Characteristics of Bipolar Junction |
| Week 2 | **electronics II lab:2**- Transistor DC Biasing Circuits |
| Week 3 | **electronics II lab:3**- Logic Gate Circuits |
| Week 4 | **electronics II lab:4**- Small Signal BJT Amplifier |
| Week 5 | **electronics II lab:5**- JFET Characteristics |
| Week 6 | **electronics II lab:6**- The FET Common Source Amplifier |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit Theory”, 11th edition, Pearson, 2013. | No |
| Recommended Texts | •Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit Theory”, 10th edition, Pearson, 2013. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Analog Communications and Noise | | | Module Delivery | |
| Module Type | C | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE013 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 5 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mohammed Ali Hussein | | e-mail | Mohammed.almahamdy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE011 | Semester | |
| Co-requisites module | | Semester | 5 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of communication system engineering. Specifically, the analog communication systems (AM and FM). The noise within the communication systems is also introduced. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1- Understand and analyze communication systems in both the time and frequency domains.<br>2- Understand the principles of amplitude and frequency modulations.<br>3- Understand the sources of the electrical noise and its roles on the communications. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to communication system, channel, waves propagation.<br>• Amplitude Modulation: DSB-SC, DSB-LC, SSB, VSB.<br>• FDM<br>• Frequency Conversion, Super-Heterodyne Receiver<br>• Frequency Modulation: power, bandwidth, generation, detection.<br>• Introduction to the noise in communication systems. Noise Sources, Thermal Noise, White & Filtered Noise, Equivalent Temperature.<br>• Noise & SNR in selected studied systems. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 77 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2,3 |
| | Projects / Lab. | | | | 1,2 |
| | Report | 1 | 5% (5) | | 3 |
| Summative assessment | Midterm Exam | 2hr | 20% (15) | 8 | 1,2,3 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction to Communication System, Channel; Signal Classification and Characteristics |
| Week 2 | Introduction to Waves Propagation, Multipath |
| Week 3 | Introduction to Fourier Transform, Filters & Bandwidth |
| Week 4 | Amplitude Modulation Systems, AM-DSB-SC (Modulation/Demodulation) |
| Week 5 | AM-DSB-LC (Modulation-Demodulation) |
| Week 6 | AM-SSB & AM-VSB (Modulation-Demodulation) |
| Week 7 | FDM, Frequency Conversion, Super-Heterodyne Receiver |
| Week 8 | Midterm Exam |
| Week 9 | FM: Introduction, NBFM, WBFM |
| Week 10 | Spectrum Plotting Using Bessel Function, Power in FM |
| Week 11 | FM Generation: Direct (VCO) and Indirect Method (Armstrong) |
| Week 12 | FM Detection: Discriminator, Zero Crossing Detector, PLL |
| Week 13 | Introduction, Noise Sources, Mathematical Representation of Noise, Noise Figure |
| Week 14 | Thermal Noise, White & Filtered Noise, Equivalent Temperature, Noise in Multistage System |
| Week 15 | Noise & SNR in: AM and FM. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Lathi, and Ding. “Modern Digital and Analog Communication Systems”, 2010. | No |
| Recommended Texts | • Proakis, and Salehi. “Communication Systems Engineering”. 2002. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **AC Machines I** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **ELE017** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UG3 | **Semester of Delivery** | | 5 |
| **Administering Department** | | Type Dept. Code | **College** | Type College Code | |
| **Module Leader** | Name Dr. Omar Kamil Dahham | | **e-mail** | E-mail: omar.dahham@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | lectuer | **Module Leader's Qualification** | | Ph.D. |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE004; ELE016 | **Semester** | 1,4 |
| **Co-requisites module** | | **Semester** | |

## Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

| | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course is designed to enable the students to understand the AC machines.<br>especially induction motors to the standard required at department level.<br>2. The course integrates Introduction of AC machines construction and operation principle for students of the third year in electrical engineering department.<br>3. Students, in this course, will deals with single phase induction machine, equivalent circuit, three phase induction machines etc.<br>4. Theoretical preparation of students to work in the field of electrical machine design, operation, fault detection and control.<br>5. Applying numerical method to solve industrial problem. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Knowledge of AC machines type in general.<br>2. Deals with single phase induction machine<br>3. Deals with three phase induction machines etc.<br>4. Theoretical preparation of students to work in the field of electrical machine design, operation, fault detection and control.<br>5. Applying numerical method to solve industrial problem |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Introduction of electromagnetic field and design electrical machine. (12 hours)<br>Single phase induction motor. Main and auxiliary windings the doubt revolving field theory. The equivalent circuit-performance calculations. (12 hours)<br>Three phase induction motors-3-phase. AC winding-the rotating electromagnetic field. The equivalent circuit performance. (6 hours)<br>Open circuit and short circuit tests of three phase induction motor, efficiency calculations. Torque speed curve and torque characteristics. (6 hours)<br>Starting of induction machine. Speed control of induction motors. Other modes of operation-starting. (6 hours) |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive educational programs and by thinking about the type of simple experiments that include some theoretical and practical activities that include calculating some important values and selection methods for different types of motors and using theoretical information to identify and predict malfunctions that occur to motors in work sites |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 77 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of Electromagnetic Field |
| **Week 2** | Design Electrical Machine |
| **Week 3** | Single Phase Induction Motor |
| **Week 4** | Main and Auxiliary Windings the Doubt Revolving Field Theory |
| **Week 5** | The Equivalent Circuit-Performance Calculations. |
| **Week 6** | Three Phase Induction Motors-3-Phase |
| **Week 7** | Ac Winding-The Rotating Electromagnetic Field |
| **Week 8** | The Equivalent Circuit Performance, |
| **Week 9** | The Equivalent Circuit Performance, |
| **Week 10** | Torque Speed Curve and Torque Characteristics |
| **Week 11** | Torque Speed Curve and Torque Characteristics |
| **Week 12** | Torque Speed Curve and Torque Characteristics |
| **Week 13** | Starting of Induction Machine, |
| **Week 14** | Speed Control of Induction Motors |
| **Week 15** | Other Modes of Operation-Starting |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction of Electrical Machines. |
| **Week 2** | Lab 2: Introduction of Lab. Parts and Equipment |
| **Week 3** | Lab 3: Characteristics of The Single-Phase Induction Motor |
| **Week 4** | Lab 4: Starting of Single-Phase Induction Motor |
| **Week 5** | Lab 5: Laboratory Exam |
| **Week 6** | Lab 6: Introduction of Three Phase Induction Motors-3-Phase |
| **Week 7** | Lab 7: Connection and Rotational Direction of Three Phase Induction Motor. |

| | |
|---|---|
| **Week 8** | Lab 8: Torque Speed Curve and Torque Characteristics |
| **Week 9** | Lab 9: Efficiency, Current and Power Factor of Three Phase Induction Motor. |
| **Week 10** | Lab 10: No load and short circuit test of three phase induction motor |
| **Week 11** | Lab 11: mid. Exam |
| **Week 12** | Lab 12: Connection & Rotational Direction and Optimum Starting Resistance Test of Three Phase Induction Motor Fitted with Slip Ring Rotor. |
| **Week 13** | Lab 13: Characteristics of Three Phase Induction Motor Fitted with Slip Ring Rotor. |
| **Week 14** | Lab 14: Laboratory Exam |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | B.L Thiraja, A.K Thiraja, " A text book of electrical technology, volume II | Yes |
| **Recommended Texts** | Chapman "Electric Machinery Fundamental", Fourth Edition | No |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Computer Networks III | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE020 | | | | |
| ECTS Credits | 4 | | | | |
| SWL (hr/sem) | 100 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 5 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Ahmed Shakir Abdullah | | e-mail | Ahmed.s.abd@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 10/June/2023 | Version Number | | 1.0 |

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

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | 1. This course deals with the basic concept of data communications.<br>2. To understand the layered architecture of communication protocols<br>3. To learn digital signal transmission and encoding techniques.<br>4. To understand multiplexing techniques.<br>5. This course deals with concepts and techniques in error detection and correction.<br>6. To understand LAN architectures and systems. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Describe the general principles of data communication.<br>2. Describe how signals are used to transfer data between nodes.<br>3. Describe how packets in the Internet are delivered.<br>4. Explain the concept of dividing a job into layered tasks, the functions of the various layers of the OSI Mode.<br>5. Explain the basics of TCP/IP model, functions of the different layers and protocols involved, addressing mechanisms used under the TCP/IP, IPv4 and importantly IP address and IP header format.<br>6. Define the transmission medium and its types, understand various network strategies and topologies.<br>7. Describe how routing protocols work.<br>8. Design and implement a network protocol.<br>9. Explain multiplexing techniques.<br>10. Explain network security and cryptography.<br>11. Discuss the internet elements and their applications. |
| Indicative Contents<br>المحتويات الإرشادية | • Network communications, and data networking.<br>• Data transmission: concepts and terminology. transmission media.<br>• Signal encoding techniques, and digital data communications techniques.<br>• Network topologies, network types, computer communications networks.<br>• LAN protocol architecture, topologies and transmission media.<br>• Wireless LAN Technology, IEEE 802.11 architecture and services, physical layer.<br>• OSI reference model and its layers, physical layer.<br>• Data link control protocols. Network layer.<br>• TCP / IP and its layers.<br>• Internetwork protocols.<br>• Circuit switching and packet switching.<br>• Routing in switched networks.<br>• Transport protocols.<br>• Network security and cryptography.<br>• Internet applications: electronic mail and network management, internet directory service and World Wide Web. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3.1 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 53 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3.5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 100 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| 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 |
| Summative assessment | Midterm Exam | 2hr | 20% (15) | 7 | LO # 1-7 |
| | Final Exam | 2hr | 60% (60) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction to data communications and networking |
| Week 2 | Data transmission: Data, signals, transmission impairments & their parameters |
| Week 3 | Signal encoding techniques: (digital data, digital signals), (digital data, Analog signals), & (analog data, analog signals). |
| Week 4 | Network topologies, network types, & computer communication networks. |
| Week 5 | Transmission media: Introduction, guided media, applications, optical fiber, unguided media, wireless channels, & satellite microwave. |
| Week 6 | Wireless LANs: Wireless LAN Technology, IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control, & IEEE 802.11 Physical Layer. |
| Week 7 | Introduction, OSI model with its layers and physical layers |
| Week 8 | Midterm Exam |
| Week 9 | Data Link Control & Protocols Data Link Layer: Framing, character-oriented protocols, bit-oriented protocols, flow and error control & protocols. |
| Week 10 | Introduction, TCP/IP model & its layers |
| Week 11 | Switching networks: Circuit switching, packet switching, message switching, virtual circuit, cell switching, & ATM virtual connections. |
| Week 12 | Routing: Introduction, Path determination & routing algorithms |
| Week 13 | Multiplexing: Frequency division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, & digital subscriber line |
| Week 14 | Network security: Introduction, security architecture, security attacks, & achieving network security. |
| Week 15 | Internet applications: electronic mail and network management, internet directory service & World Wide Web. |
| Week 16 | Final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Behrouz A. Forouzan, “data communications and networing’’4th ed., 2007, Mc Graw Hill. | Yes |
| Recommended Texts | • William Stallings ‘’Data and computer communications’’ 8th edition, 2007, Pearson Education, Inc. | Yes |
| Websites | 1. http://eti2506.elimu.net/Introduction/Books/Data%20Communications%20and%20Networking%20By%20Behrouz%20A.Forouzan.pdf<br>2. https://memberfiles.freewebs.com/00/88/103568800/documents/Data.And.Computer.Communications.8e.WilliamStallings.pdf | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electronic I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE009 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 5 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Omar Khaldoon Adulrahman | | e-mail | okabdulrahman@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE004 | Semester | 4 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces Multistage and compound Configurations , Log and antilog amplifiers, Amplifier frequency response, Differential amplifier , Application to CMOS and BIMOS circuits , Operational amplifier Characteristics , Op -Amp applications : Constant-Gain Multiplier, Voltage Summing, Voltage Buffer, Controlled Sources, Comparator , Active Filters. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1- Understand and analyze the Amplifiers and power amplifier in both the time and frequency domains.<br>2- Understand the principles of operational amplifier, and application.<br>3- Understand the Active filter. |
| Indicative Contents<br>المحتويات الإرشادية | •Amplifier Frequency Response.<br>• Multistage Frequency Effects.<br>• Differential Amplifier Circuits, BIMOS and CMOS Differential Amplifier circuits .<br>• Operational Amplifier (op-amp) Circuits:<br>• Op-Amp Specifications – DC offset parameters and Frequency parameters.<br>• Differential and common – mode operation.<br>• Op-Amp Applications<br>• Controlled Sources, Instrumentation Circuits.<br>•Active Filters |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2 |
| | Projects / Lab. | 1 | 10% (10) | | 3 |
| | Report | 1 | | | 1 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | 2 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Amplifier Frequency Response, log , and Antilog |
| Week 2 | Low-Frequency Response—BJT Amplifier. |
| Week 3 | Low-Frequency Response— JFET Amplifier |
| Week 4 | High-Frequency Response—BJT Amplifier |
| Week 5 | High-Frequency Response—JFET Amplifier. |
| Week 6 | Multistage Frequency Effects |
| Week 7 | Differential Amplifier Circuits, BIMOS and CMOS Differential Amplifier circuits . |
| Week 8 | Operational Amplifiers Basics. |
| Week 9 | Operational Amplifier (op-amp) Circuits: Inverting and non-Inverting amplifier, , Summing amplifier, Integrator and Differentiator. |
| Week 10 | Op-Amp Specifications – DC offset parameters and Frequency parameters. |
| Week 11 | Differential and common – mode operation |
| Week 12 | Op-Amp Applications: Multiple – stage gains, Voltage Subtraction, Voltage Buffer. |
| Week 13 | Controlled Sources, Instrumentation Circuits. |
| Week 14 | Voltage Comparator |
| Week 15 | Active Filters: low – pass filter, High – pass filter and Band pass filter. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | CE Amplifier – Setting up the Rest Point (part 1) |
| Week 2 | CE Amplifier – Setting up the Rest Point (part 2) |
| Week 3 | CE Amplifier – $R_i$ measurements |
| Week 4 | CE Amplifier –$R_o$ measurements |
| Week 5 | Frequency response of C.E. Amplifier (part 1) |
| Week 6 | Frequency response of C.E. Amplifier (part 2) |
| Week 7 | Multistage Amplifiers (part 1) |
| Week 8 | Multistage Amplifiers (part 2) |
| Week 9 | Operational Amplifiers. Inverting characteristics |
| Week 10 | Operational Amplifiers. Non-Inverting characteristics |
| Week 11 | Differential amplifiers |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | R. Boylestad and L. Nashelsky, “Electronic Devices and Circuit Theory”, 11th edition , 2013 | No |
| Recommended Texts | Electronic devices : electron flow version / Thomas L. Floyd.— 9th edition. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electric Power I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE21 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 5 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mushtaq Najeeb Ahmed | | e-mail | mushtaq.najeeb@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE04 | Semester | 4 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is designed to introduce elements of power system, generation unit, thermal plants, Hydro plants, Steam plants, nuclear plants. Explain principle of Load factor, capacity factor, transmission line constants, resistance, inductance, single phase two wire, three phase, symmetrical distance, unsymmetrical distance, flat arrangement, horizontal arrangement, hexagonal arrangement. Give an overview of Capacitance, single phase two wire, three phase, symmetrical distance, unsymmetrical distance, flat arrangement, horizontal arrangement, earth effect. Performance design of T.L, short T.L, equivalent circuit, voltage regulation, phasor diagram, Medium T.L, equivalent circuit, voltage regulation, phasor diagram, T model, pi model, Long T.L, equivalent circuit, voltage regulation, phasor diagram. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Energy resources, various types of power stations,<br>2. Load factor and capacity factor.<br>3. Constants of transmission line.<br>4. Symmetrical and unsymmetrical distance.<br>5. Flat, horizontal, and hexagonal arrangements.<br>6. Three phase, symmetrical distance, and unsymmetrical distance.<br>7. Performance of transmission line.<br>8. Short transmission line.<br>9. Medium transmission line.<br>10. Long transmission line. |
| Indicative Contents<br>المحتويات الإرشادية | 1. Explain the basic concept of power generation.<br>2. Explain the electrical power generations methods.<br>3. Understand the electrical design of transmission line.<br>4. Design a transmission line system by applying mathematical methods. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4.133 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 10 % | | 1,8 |
| | Assignments | 1 | 5 % | | 2,3 |
| | Projects / Lab. | | | | 4.5 |
| | Report | | | | 6,7 |
| Summative assessment | Midterm Exam | 2hr | 25 % | | 1,2,4,7 |
| | Final Exam | 3hr | 60 % | | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | General Background |
| Week 2 | Power Stations (Steam, Hydro-electric, and Diesel) |
| Week 3 | Variable Load on Power Station |
| Week 4 | Variable Load on Power Station |
| Week 5 | Constants of T.L (Resistance and Inductance derivation due to internal and external fluxes) |
| Week 6 | Constants of T.L (Resistance and Inductance derivation due to internal and external fluxes) |
| Week 7 | Inductance of (single-phase, one conductor in a group, and composite conductor) |
| Week 8 | Inductance of (single-phase, one conductor in a group, and composite conductor) |
| Week 9 | Inductance of 3-phase Line Symmetrical and Unsymmetrical Spacing |
| Week 10 | Inductance of (Bundled Conductors and Parallel-circuit 3-phase lines) |
| Week 11 | Capacitance of Transmission Line (single-phase and three-phase with symmetrical spacing) |
| Week 12 | Capacitance of 3-phase with unsymmetrical spacing, bundle conductors, and effect of earth on capacitance |
| Week 13 | Equivalent Circuit of Short Transmission Line |
| Week 14 | Equivalent Circuit of Medium Transmission Line (Nominal T method) |
| Week 15 | Equivalent Circuit of Medium Transmission Line (Nominal pi method) |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | W. Stevenson, element of power system analysis, McGraw- Hill Pub., 2005. | No |
| Recommended Texts | Principles of power system, V.K Mehta, S. Chand & company ltd., 2004. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Signals and Systems I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE011 | | | | |
| ECTS Credits | 7 | | | | |
| SWL (hr/sem) | 175 | | | | |
| Module Level | 3 | Semester of Delivery | 5 | | |
| Administering Department | Electrical | College | College of Engineering | | |
| Module Leader | Adnan Salih Suhail | e-mail | adnansaheluoanbar.edu.iq | | |
| Module Leader's Acad. Title | Dr. | Module Leader's Qualification | Ph.D. | | |
| Module Tutor | | e-mail | | | |
| Peer Reviewer Name | | e-mail | | | |
| Scientific Committee Approval Date | 30/June/2023 | Version Number | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG009 | Semester | 4 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of the continuous signals and systems. It studies the linear time-invariant (LTI) systems and their impulse response, convolution. The Fourier transform, and series of continuous signals. The course teaches the frequency response and its applications in the electrical systems and signals communication. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1-Understand the basic types of analog signals and systems.<br>2-Understand the causality and stability of continuous LTI systems.<br>3-Understand and deploy the Fourier transform/series of continuous-time signals and Systems in the electrical engineering. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to C.T system, impulse response, and convolution.<br>• Classification of system.<br>• types of signals, and classification of signals.<br>• Frequency response of LTI system,<br>• system function and transfer function using Laplace Transform.<br>• Block diagram characterization of LTI system.<br>• solution of system differential equation using LT. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 150 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 10 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 238 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 8% (8) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 3, 11 | 2 |
| | Projects | 1 | 5% (5) | | 3 |
| | | | | | 2 |
| Summative assessment | Midterm Exam | 2hr/2 | 20% (22) | 8, 14 | 3,2 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction to signals and Definition of Signals & Systems |
| Week 2 | Classification of Signals |
| Week 3 | Operations on signals |
| Week 4 | Properties of linear system |
| Week 5 | Analysis of responses, and convolution |
| Week 6 | Representation of Fourier Series |
| Week 7 | Properties of Fourier series, Trigonometric Fourier Series |
| Week 8 | Midterm Exam |
| Week 9 | Fourier Transform, Properties of Fourier Transforms |
| Week 10 | LTI-System Function & Impulse Function |
| Week 11 | block diagram representation of a LTI continuous-time system described by a differential equation. |
| Week 12 | characterize LTI CT systems in the time domain using impulse response and differential equations. |
| Week 13 | use the transfer function of a LTI CT system and the inverse Laplace-transform to obtain the system output. |
| Week 14 | Midterm Exam |
| Week 15 | The Frequency Response of Continuous Time LTI Systems |
| Week 16 | Final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | #Oppenheim; Willsky; Hamid; “Signals and Systems” 2nd ed. | No |
| Recommended Texts | #Hsu; “Schaum’s Outline of Signals and Systems” 3ed. | No |
| Websites | https://www.tutorialspoint.com/signals_and_systems | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Digital Communications | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE014 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | UG3 | | Semester of Delivery | 6 | |
| Administering Department | Electrical | | College | College of Engineering | |
| Module Leader | Mohammed Ali Hussein | | e-mail | Mohammed.almahamdy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | Dr. | | Module Leader's Qualification | Ph.D. | |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | 30/June/2023 | | Version Number | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE013 | Semester | 5 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of the digital communication systems. It discusses different techniques of transmitting analog signals in form of discrete/binary signals. Different carrier modulation methods of the binary data are presented. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Understand the principles of sampling and encoding of analog signals.<br>2. Understand the TDM.<br>3. Understand the principles of digital modulation. |
| Indicative Contents<br>المحتويات الإرشادية | • The sampling theory, Nyquist sampling and aliasing in reconstruction.<br>• PCM.<br>• Delta PCM, Deferential PCM, Delta Modulation.<br>• PAM-TDM, PCM-TDM, ISI & Eye Diagram.<br>• M-ary baseband signaling.<br>• Digital modulation: BASK, BFSK, BPSK.<br>• M-ary Modulation, QPSK, QAM. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3.2 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 202 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2 |
| | Projects / Lab. | 1 | 10% (10) | | 3 |
| | Report | 1 | | | 2 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | 1,2 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | The Sampling Theory, Nyquist Sampling Rate & Aliasing in Reconstruction |
| Week 2 | PCM |
| Week 3 | Examples & Problems |
| Week 4 | Non-Uniform Quantization, SNR in PCM |
| Week 5 | Delta PCM, Deferential PCM, DM Systems, Noise in DM, Adaptive DM |
| Week 6 | PAM-TDM, Crosstalk and Guard Times, PCM-TDM, ISI & Eye Diagram |
| Week 7 | Channel Capacity, Multi-Level Baseband Signaling (M-ary) |
| Week 8 | Midterm Exam |
| Week 9 | Probability of Error at Reception |
| Week 10 | Examples & Problems |
| Week 11 | Introduction Digital Modulation, BASK |
| Week 12 | BFSK |
| Week 13 | BPSK |
| Week 14 | M-ary Modulation, QPSK |
| Week 15 | QAM |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | LAB1: RF oscillators |
| Week 2 | LAB2: 2nd order filter |
| Week 3 | LAB3: AM-DSB-LC Modulation |
| Week 4 | LAB4: Frequency Modulation |
| Week 5 | LAB5: PCM |
| Week 6 | LAB6: PWM |
| Week 7 | LAB7: ASK |
| Week 8 | LAB8: FSK |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | • Lathi, and Ding. “Modern Digital and Analog Communication Systems”, 2010. | No |
| Recommended Texts | • Proakis, and Salehi. “Communication Systems Engineering”. 2002. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **AC Machines II** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **ELE018** | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UG3 | **Semester of Delivery** | | 6 |
| **Administering Department** | | Type Dept. Code | **College** | Type College Code | |
| **Module Leader** | Name Dr. Omar Kamil Dahham | | **e-mail** | E-mail: omar.dahham@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | lectuer | **Module Leader's Qualification** | | Ph.D. |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE017 | **Semester** | 5 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course is designed to enable the students to understanding synchronous machines and transformers to the standard required at department level.<br>2. The course integrates Introduction of SG and SM definition of all types, operation and control of Synchronous machines and transformer for students of the third year in electrical engineering department. Students, in this course, will deals with operation principle of synchronous generator, equivalent circuit of SG and efficiency calculation.<br>3. Study motor operation mode and its equivalent circuit. Efficiency calculation of SM, starting and stopping of SM.<br>4. introduction of transformers and its several types. Power transformer and distribution transformer. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Knowledge of synchronous machines type in general.<br>2. Deals with synchronous generators and its control.<br>3. Deals with parallel operation of SG.<br>4. Deals with synchronous motors and its control and applications.<br>5. Deals with single phase and three phase transformer and its operation and application in industry life.<br>6. Theoretical preparation of students to work in the field of electrical machine design, operation, fault detection and control.<br>7. Applying numerical method to solve industrial problem |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Introduction of Three phase synchronous machines. Basic theory of operation of synchronous generator. (6 hours)<br>Voltage & torque equations for cylindrical rotor of SG. Voltage and - torque equations for salient pole of SG. Parallel operation of SG. (12 hours)<br>Basic theory of operation of synchronous motor. Efficiency and losses of SG. (6 hours)<br>Voltage & torque equations of SM. Efficiency and losses of SM. Starting and stopping of SM. (12 hours)<br>Transformer principle: Single phase transformer, Transformer-types of transformer, construction, phasor diagram, no-load and short circuit tests. (6 hours)<br>losses in transformers, the equivalent circuit of the transformer, efficiency, regulation, auto-transformer. (6 hours)<br>Three phase transformers. Efficiency and maximum efficiency condition of transformer. Parallel operation of transformer. (6 hours) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive educational programs and by thinking about the type of simple experiments that include some theoretical and practical activities that include calculating some important values and selection methods for different types of synchronous motors, generators and transformers. and using theoretical information to identify and predict malfunctions that occur to motors in work sites |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | LO #1, 2, and 11 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | LO # 3, 4, 6 and 7 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | |
| | **Report** | 1 | 10% (10) | 13 | LO # 5, 8 |
| **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)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of Three phase synchronous machines |
| **Week 2** | basic theory of operation of synchronous generator |
| **Week 3** | voltage & torque equations for cylindrical rotor of SG |
| **Week 4** | voltage and -torque equations for salient pole of SG |
| **Week 5** | Parallel operation of SG |
| **Week 6** | basic theory of operation of synchronous motor |
| **Week 7** | Efficiency and losses of SG |
| **Week 8** | voltage & torque equations of SM |
| **Week 9** | Efficiency and losses of SM |
| **Week 10** | Starting and stopping of SM |
| **Week 11** | Transformer principle |
| **Week 12** | Three phase transformers |
| **Week 13** | Efficiency and maximum efficiency condition of transformer |
| **Week 14** | Parallel operation of transformer |
| **Week 15** | Parallel operation of transformer |
| **Week 16** | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1Introduction of Synchronous Machines. |
| **Week 2** | Lab 2: Connection and Rotational Direction Test of Synchronous Generator. |
| **Week 3** | Lab 3: No load characteristics of synchronous generator |
| **Week 4** | Lab 4: Load characteristics of synchronous generator |
| **Week 5** | Lab 5: Mains synchronization and control characteristics of the synchronous generator |
| **Week 6** | Lab 6: connection and rotational direction test and load characteristics of synchronous motor. |
| **Week 7** | Lab 7: V- curve of the syn. Motor |

| | |
|---|---|
| **Week 8** | Lab 8 : Open circuit & short circuit tests of single phase transformer. |
| **Week 9** | Lab 9: Regulation and efficiency of three phase transformer by direct load. |
| **Week 10** | L ab 10: Polarity making and conversion of two winding transformer into auto transformer |
| **Week 11** | Lab 11: Back to back test on single phase transformer. |
| **Week 12** | Lab 12: SCOTT connection of transformer |
| **Week 13** | Laboratory Exam |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | B.L Thiraja, A.K Thiraja, " A text book of electrical technology, volume II | Yes |
| **Recommended Texts** | Chapman "Electric Machinery Fundamental", Fourth Edition | No |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electronic II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE010 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 6 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Omar Khaldoon Adulrahman | | e-mail | okabdulrahman@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE009 | Semester | 4 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the Power Amplifiers: Definitions and Amplifier Types . Feedback Circuits: Feedback Concepts, Feedback Connection Types .Linear Oscillators : Basic Principles of Sinusoidal Oscillators , Positive Feedback and Oscillation, The oscillation Criterion . RC Oscillator: RC Phase-Shift Oscillator and Wien-Bridge oscillator. LC and Crystal Oscillator . Non-Sinusoidal Oscillators and Tim Circuits. Schmitt Trigger Oscillator, The 555 Circuit and applications (Monostable ultivibrator, Astable Multivibrator). Power Supplies (Voltage Regulators) and Practical Applications. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1- Understand the Amplifiers types, and analyze the feedback circuit and feedback conniction<br>2-Understand the principles of Oscillation, and its circuits and application.<br>3- Understand the Power supplies and voltage regulation. |
| Indicative Contents<br>المحتويات الإرشادية | • Power Amplifiers: Definitions, Amplifier Classes and Efficiency<br>•Feedback Circuits: Feedback Concepts. Feedback Connection Types.<br>• Practical Feedback Circuits: Voltage –shunt, Voltage- series configuration.<br>• Practical Feedback Circuits: Current –shunt, Current - series configuration.<br>• Linear Oscillators: Basic Principles of Sinusoidal Oscillators,<br>• Power Supplies (Voltage Regulators) and Practical Applications. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2 |
| | Projects / Lab. | 1 | 10% (10) | | 3 |
| | Report | 1 | | | 1 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | 2 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | • Power Amplifiers: Definitions, Amplifier Classes and Efficiency |
| Week 2 | • Class A amplifiers. |
| Week 3 | • Class B amplifiers and Class- (AB), Class- (C) |
| Week 4 | •Feedback Circuits: Feedback Concepts. Feedback Connection Types. |
| Week 5 | • Practical Feedback Circuits: Voltage –shunt, Voltage- series configuration. |
| Week 6 | • Practical Feedback Circuits: Current –shunt, Current - series configuration. |
| Week 7 | • Linear Oscillators: Basic Principles of Sinusoidal Oscillators, Positive Feedback and Oscillation, |
| Week 8 | • RC Phase-Shift Oscillator and Wien Bridge Oscillator |
| Week 9 | • LC Oscillator, Crystal Oscillator, |
| Week 10 | • Non-Sinusoidal Oscillators and Timer Circuits Schmitt Trigger Oscillator. |
| Week 11 | • The 555 Circuit and applications (Monostable Multivibrator) |
| Week 12 | • Astable Multivibrator |
| Week 13 | • Power Supplies (Voltage Regulators) and Practical Applications. |
| Week 14 | • Discrete Transistor Voltage Regulation |
| Week 15 | • IC Voltage Regulators. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | Differential amplifiers |
| Week 2 | Active filter. |
| Week 3 | The triangle- square wave generator. |
| Week 4 | Applying Negative Feedback on Amplifiers part |
| Week 5 | RC Phase – shift Oscillators(part 1) |
| Week 6 | RC Phase – shift Oscillators(part 2) |
| Week 7 | LC Oscillator(part 1) |
| Week 8 | LC Oscillator(part 2) |
| Week 9 | Voltage Regulator |
| Week 10 | Current Regulator |
| Week 11 | Laboratory Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | R. Boylestad and L. Nashelsky, “Electronic Devices and Circuit Theory”, 11th edition , 2013 | No |
| Recommended Texts | Electronic devices : electron flow version / Thomas L. Floyd.— 9th edition. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Electric Power II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE022 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG3 | Semester of Delivery | | 6 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mushtaq Najeeb Ahmed | | e-mail | mushtaq.najeeb@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE021 | Semester | 5 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course is designed to introduce the 2-port network, ABCD constants, power circle diagram, power flow through T.L. Give an overview of Overhead T.L insulators, string insulators, voltage distribution, and corona. Explain Sag and stress calculations, parabola equation, effect of ice and wind, different level supports, economic operation, and underground cables. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Parameters of 2-port networks<br>2. Load ability and power flow through T.L.<br>3. Mechanical design of O.H.T.L. insulators.<br>4. Voltage distribution on string insulator.<br>5. Sag calculations through same and different supports.<br>6. Corona phenomena study.<br>7. Parameters of underground cables.<br>8. Economic dispatch of power system. |
| Indicative Contents<br>المحتويات الإرشادية | • To understand the 2-port networks parameters.<br>• To explain the load ability and power flow through T.L.<br>• To understand O.H.T.L insulators.<br>• To understand the basic concept of sag calculation<br>• To understand underground cables.<br>• To know the principle of economic dispatch of power system. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4.133 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 10 % | | 1,2,3 |
| | Assignments | 1 | 5 % | | 4,5,6 |
| | Projects / Lab. | | | | 7,8 |
| | Report | | | | 1,2,5,8 |
| Summative assessment | Midterm Exam | 2hr | 25 % | | 8,7,3,4,5 |
| | Final Exam | 3hr | 60 % | | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | 2-Port Networks and Determination Short T.L. Parameters |
| Week 2 | ABCD Method for Medium Transmission Lines |
| Week 3 | ABCD method for long transmission lines and 2-Cascaded T.L |
| Week 4 | Power Flow through T.L., Sending and Receiving Circle Diagrams |
| Week 5 | Power Flow through T.L., Sending and Receiving Circle Diagrams |
| Week 6 | Overhead T.L Components, Conductor Materials, and Line Supports |
| Week 7 | Overhead T.L Components, Conductor Materials, and Line Supports |
| Week 8 | Potential Distribution over Suspension Insulator String |
| Week 9 | Potential Distribution over Suspension Insulator String |
| Week 10 | Corona and Sag in Overhead Transmission Lines |
| Week 11 | Corona and Sag in Overhead Transmission Lines |
| Week 12 | Underground Cables |
| Week 13 | Underground Cables |
| Week 14 | Economic Operation of Power Generation (without line losses) |
| Week 15 | Economic Operation of Power Generation (with line losses) |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | W. Stevenson, element of power system analysis, McGraw- Hill Pub., 2005. | No |
| Recommended Texts | Principles of power system, V.K Mehta, S. Chand & company ltd., 2004. | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computer Programming** | | | **Module Delivery** | |
| **Module Type** | **Basic** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **ELE019** | | | | |
| **ECTS Credits** | **4** | | | | |
| **SWL (hr/sem)** | **100** | | | | |
| **Module Level** | UG3 | | **Semester of Delivery** | 6 | |
| **Administering Department** | Electrical | | College | College of Engineering | |
| **Module Leader** | Maath Jasem Mahammad | | **e-mail** | maath.mahammad@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | Ass. Professor Dr. | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 01/06/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | | **Semester** | |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course provides introduction to MATLAB. Programming in MATLAB includes input and output of data, algebraic and logical expressions, all data types including complex numbers and strings, array indexing and array operations, matrices and matrix operations, control structures, graphics and plots. Applications of MATLAB to solutions of engineering problems include solutions of systems of linear equations. Introduction to Simulink. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Become familiar with fundamental operations in Matlab.<br>2. Use matrix forms to describe and solve linear systems of equations.<br>3. Programming with MATLAB to solve mathematical and engineering problems.<br>4. Use MATLAB to generate graphics.<br>5. Use the Simulink simulation package to simulate some electric circuits. |
| **Indicative Contents**<br>المحتويات الإرشادية | • General introduction to MATLAB.<br>• Numeric, Cell, and Structure Arrays.<br>• Matrix and Array Operations.<br>• Matrix Methods for solving linear equations.<br>• Script Files and Functions.<br>• Programming in MATLAB.<br>• Control flow and operators.<br>• Plotting, creating multiple plot types and three-dimensional plots.<br>• Introduction to Simulink and its instruments. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 53 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 100 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | 1,2,3 |
| | **Assignments** | 2 | 10% (10) | 2, 12 | 4,1,2 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | 1.3 |
| | **Report** | 1 | 10% (10) | 13 | 1.3 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 10% (10) | 7 | 1,4,5 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | General introduction to MATLAB. |
| **Week 2** | Numeric, Cell, and Structure Arrays. |
| **Week 3** | Matrix and Array Operations. |
| **Week 4** | Matrix Methods for solving linear equations. |
| **Week 5** | Script Files and Functions. |
| **Week 6** | Programming in MATLAB. |

| | |
|---|---|
| **Week 7** | Programming Exercises |
| **Week 8** | Programming Exercises |
| **Week 9** | **Mid – term Exam** |
| **Week 10** | Control flow and operators. |
| **Week 11** | Control flow and operators. |
| **Week 12** | Plotting, creating multiple plot types and three dimensional plots. |
| **Week 13** | Plotting, creating multiple plot types and three dimensional plots. |
| **Week 14** | Introduction to Simulink and its instruments. |
| **Week 15** | Introduction to Simulink and its instruments. |
| **Week 16** | **Final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction to MATLAB program. |
| **Week 2** | Lab 2: Matrix and Array arithmetic operations in MATLAB |
| **Week 3** | Lab 3: Solving Linear Equations in MATLAB |
| **Week 4** | Lab 4: Programming in MATLAB |
| **Week 5** | Lab 5: Control Flow and Operators in MATLAB |
| **Week 6** | Lab 6: Plotting in MATLAB |
| **Week 7** | Lab 7: Introduction to Simulink in MATLAB |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Introduction to MATLAB for Engineers by William J. Palm III, McGraw-Hill, 3rd Edition, 2011. | No |
| **Recommended Texts** | Introduction To MATLAB For Engineering Students by David Houcque, Northwestern University, (version 1.2, August 2005) | No |
| **Websites** | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Signals and Systems II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☐ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE012 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | 3 | Semester of Delivery | | 6 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Adnan Salih Suhail | | e-mail | adnansaheluoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE011 | Semester | 5 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course introduces the fundamentals of the discrete-signals and systems. It studies the linear time-invariant (LTI) systems and their impulse response, convolution. The Discrete-Fourier transform, and series of Discrete-Time signals. The course teaches the frequency response and its applications in the electrical systems and signals communication. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1-Understand the basic types of discrete signals and systems.<br>2-Understand the causality and stability of D-T LTI systems.<br>3-Understand and deploy the Fourier transform/series of Discrete-time signals and Systems in the electrical engineering. |
| Indicative Contents<br>المحتويات الإرشادية | • Introduction to D.T system, impulse response, and convolution.<br>• Classification of D-T LTI system.<br>• types of D-Tsignals, and classification of signals.<br>• Frequency response of D-T LTI system,<br>• system function and transfer function using Z-Transform.<br>• Block diagram characterization of LTI system.<br>• solution of system difference equation using Z-Transform. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 150 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 10 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 88 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 238 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 8% (8) | 5, 10 | 2 |
| | Assignments | 2 | 5% (5) | 3, 11 | 1 |
| | Projects | 1 | 5% (5) | | 3 |
| | | | | | 2 |
| Summative assessment | Midterm Exam | 2hr/2 | 20% (22) | 8, 14 | 1 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Introduction to Discrete-Time (D-T) signals and Definition of Signals & Systems |
| Week 2 | Classification of D-TSignals |
| Week 3 | Operations on D-T signals |
| Week 4 | Properties of D-T LTI system |
| Week 5 | Analysis of responses, and convolution |
| Week 6 | Representation of Discrete Fourier Series |
| Week 7 | Properties of D-T Fourier series, Complex Fourier Series |
| Week 8 | Midterm Exam |
| Week 9 | Discrete-Time Fourier Transform, Properties of Fourier Transforms |
| Week 10 | LTI-System Function & Impulse Function |
| Week 11 | block diagram representation of a LTI Disctere-time system described by a difference equation. |
| Week 12 | characterize LTI D-T systems in the time domain using impulse response and difference equations. |
| Week 13 | Z-Transform, properties of Z-T, invers Z-T, Z-T of basic D-T signals. |
| Week 14 | Midterm Exam |
| Week 15 | use the transfer function of a LTI D-T system and the inverse Z-transform to obtain the system output |
| Week 16 | Final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | #Oppenheim; Willsky; Hamid; “Signals and Systems” 2nd ed. | No |
| Recommended Texts | #Hsu; “Schaum’s Outline of Signals and Systems” 3ed. | No |
| Websites | https://www.tutorialspoint.com/signals_and_systems | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Engineering Numerical Methods | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ENG011 | | | | |
| ECTS Credits | 5 | | | | |
| SWL (hr/sem) | 125 | | | | |
| Module Level | | UG4 | Semester of Delivery | | 7 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Mohammed Ali Hussein | | e-mail | Mohammed.almahamdy@uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ENG009; UOA007 | Semester | 2,2 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | The numerical methods course involves solving engineering problems drawn from all fields of engineering. The numerical methods include: Error analysis, roots of nonlinear algebraic equations, solution of linear and transcendental simultaneous equations, matrix and vector manipulation, curve fitting and interpolation, numerical integration and differentiation, solution of ordinary and partial differential equations. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Be aware of the mathematical background for the different numerical methods introduced in the course.<br>2. Understand the different numerical methods to solve the algebraic equations and to solve system of linear and nonlinear equations.<br>3. Understand the different numerical methods for interpolation, differentiation, integration and solving set of ordinary differential equations.<br>4. Understand how numerical methods afford a mean to generate solutions in a manner that can be implemented on digital computers.<br>5. Use the built-in functions in MATLAB and EXCEL.<br>6. Create MATLAB functions for solving numerical engineering problems.<br>7. • Work on multidisciplinary projects. |
| Indicative Contents<br>المحتويات الإرشادية | Part-I: Basic Tools<br>Unit-1: Error Analysis<br>• Measuring Errors<br>• Sources of Error<br>• Consistency, Order, Smoothness and Convergence<br>Unit-2: Roots of equations (Nonlinear Equations)<br>• Bisection Method<br>• False-Position Method (Optional)<br>• Newton-Raphson Method<br>• Secant Method (Optional)<br>Unit-3: Simultaneous Linear algebraic Equations<br>• Direct Methods<br>- Review of Determinants and Matrices<br>- Cramer's Rule<br>- Gauss-Elimination method (simple and partial pivoting methods)<br>- Gauss-Jordan Method<br>- Matrix Inversion method<br>• Indirect (Iterative) Method<br>- Jacobi Method<br>- Gauss-Seidel Method<br>- Successive Over-Relaxation Method<br>Unit-4: Numerical Differentiation and Integration<br>- Numerical differentiation using difference method<br>- Numerical Integration, Trapezoid and Simpson's Rules<br>- Extrapolation of Errors<br>Unit-5: Interpolation and Curve Fitting<br>- Direct Fit Polynomial<br>- Least Squares Method |

| | |
|---|---|
| | - Logarithmic regression (Optional)<br>- Exponential regression (Optional)<br>- Linear interpolation, Quadratic Interpolation<br>- Lagrange Interpolation (Optional)<br>- Newton Divided Difference Interpolation (Optional)<br>Part-II: Numerical Solutions of Ordinary Differential Equations<br>Unit-6: Initial Value Problem<br>- Euler's Method<br>- Runge-Kutta 2nd<br>- Runge-Kutta 4th<br>- Higher Order Equations<br>Unit-7: Boundary Value Problem<br>- Equilibrium (Finite Difference) Method<br>Part-III: Numerical Solutions of Partial Differential Equations<br>Unit-8: PDEs<br>- Elliptic Equations<br>- Parabolic Equations<br>- Hi-parabolic Equations<br>- Advanced Application (Case Studies based on each department interests). |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1,2,3 |
| | Assignments | 2 | 5% (5) | 2, 12 | 4,5 |
| | Projects / Lab. | | | | 7,6 |
| | Report | 1 | 5% (5) | | 2,4 |
| Summative assessment | Midterm Exam | 2hr | 20% (15) | 8 | 3.1,4,5,7 |
| | Final Exam | 3hr | 60% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Material Covered |
| Week 1 | Error Analysis, Errors in Numerical Methods |
| Week 2 | Bracketing Methods |
| Week 3 | Open Methods |
| Week 4 | The Graphical Method, Gauss–Seidel method |
| Week 5 | Gauss Elimination Method, Gauss–Jordan Method |
| Week 6 | LU Decomposition |
| Week 7 | Midterm Exam |
| Week 8 | Least–Squares Regression |
| Week 9 | Interpolation |
| Week 10 | Numerical Differentiation |
| Week 11 | Numerical Integration |
| Week 12 | Euler Method |
| Week 13 | Fourth-Order Runge-Kutta Method |
| Week 14 | Error Analysis, Errors in Numerical Methods |
| Week 15 | Bracketing Methods |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | |
| Week 2 | |
| Week 3 | |
| Week 4 | |
| Week 5 | |
| Week 6 | |
| Week 7 | |
| Week 8 | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | Numerical Methods for Engineers, S. C. Chapra and R. P Canale, McGraw-Hill, 6th edition 2010. | No |
| Recommended Texts | | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Control Theory I | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE025 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG4 | Semester of Delivery | | 7 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Yousif Ismail Al Mashhaany | | e-mail | yousif.mohammed @uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Prof. Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | | Semester | |
| Co-requisites module | ELE012; ELE018 | Semester | 6,6 |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course gives the students a theoretical foundation for understanding feedback control system analysis it Introduce basic techniques for analysis and design of feedback control systems. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Understand the control theory and the fundamentals of automatic control engineering.<br>2. Understand the mathematical representation of different types physical systems.<br>3. Understand the methods of block diagram reduction and signal flow graph formula.<br>4. Understand the different types of error analysis.<br>5. Understand the transit response analysis.<br>6. Understand the stability concept using Routh-Hurtize criteria. |
| Indicative Contents<br>المحتويات الإرشادية | ● definition about control theory and a comparison between open loop and closed loop systems.<br>● Derivation of transfer function and making a mathematical representation for various types of physical systems.<br>● Presents block diagram formulation and reduction and signal flow graph formula.<br>● Test input signals and transit response analysis for first, second and higher order systems.<br>● Study error analysis and stability theorem in s domain using Routh-hurtize criteria |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 73 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1,5,7 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2,3 |
| | Projects | 1 | 10% (10) | | 4,5 |
| | Report | 1 | | | 6 |
| | Lab | 1 | 10% (10) | 3,10 | 1,3,7 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | 1,7,5,3 |
| | Final Exam | 3hr | 50% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Introduction to control system: Introduction, Open Loop System, Close Loop System, Definitions, The engineering control problem. |
| Week 1 | Mathematical Representation of physical systems: Linear system, nonlinear system, transfer functions, Block diagram, electrical systems, mechanical translation system. |
| Week 2 | Mathematical Representation of physical systems: mechanical rotational system, Thermal system, Modeling in state space. |
| Week 3 | Mathematical Representation of physical systems: How to derive transfer function from the state space equations, |
| Week 4 | Mathematical Representation : State space representation of dynamic system. |
| Week 5 | Block diagrams Processing: Procedures for drawing a block diagram, block diagram reduction. |
| Week 6 | Block diagrams Processing: closed loop system subjected to a disturbance, multivariable Systems, transfer matrices. |
| Week 7 | Signal flow graphs: Signal flow graph representation of linear system. |
| Week 8 | Signal flow graphs: Mason's gains formula for signal flow graph, Transfer function process in signal flow graph. |
| Week 9 | Transient response analysis: Test signals, impulse response function, first order system, higher order system, definitions of time constant, damping ratio and natural frequency. |
| Week 10 | Transient response analysis: definitions of transient response specifications, impulse response, dominant poles. |
| Week 11 | Steady – state error in unity- feedback control system: Classifications of control systems. |
| Week 12 | static position error coefficients, dynamic error coefficients. |
| Week 13 | Routh's Stability Criterion: Introduction, Routh's Criteria Rules, Solved problem for Checking System Stability. |
| Week 14 | Root Locus: Root locus plot, general rules for constructing root loci. |
| Week 15 | special cases, conditionally stable system, non-minimum phase systems. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | LAB1: Laplace transforms |
| Week 2 | LAB2: First order system |
| Week 3 | LAB3: Second order system |
| Week 4 | LAB4: Transient Response Specifications |
| Week 5 | LAB5: Steady State Error |
| Week 6 | LAB6: System simulation |
| Week 7 | LAB7: Dominant pole of second order system |
| Week 8 | LAB8: Proportional controller |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | "Modern Control Engineering" , By Katsuhiko Ogata, Fifth Edition, 2010 | Yes |
| Recommended Texts | " Linear Control System Analysis and Design with MATLAB " by John J. D'Azzo and Constantine H. Houpis , 2003. | No |
| | "Classical Control Theory", By Yousif Al Mashhadany, first Edition, 2014 | No |
| | "Control Systems Engineering" , Sixth Edition, By Norman S. Nise, 2011 | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Electric Power III** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE023 | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | | UG4 | **Semester of Delivery** | | 7 |
| **Administering Department** | | Type Dept. Code | **College** | Type College Code | |
| **Module Leader** | Name Dr. Omar Kamil Dahham | | **e-mail** | E-mail: omar.dahham@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | lectuer | **Module Leader's Qualification** | | Ph.D. |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE022 | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course is designed to enable the students to understand of power system analysis for students of the Fourth year in electrical engineering department.<br>2. The course integrates Power system representation; Per unit system; Balanced and unbalanced faults, Symmetrical fault calculations. Symmetrical components, Unsymmetrical faults; Synchronous machine in power system.<br>3. Power system load flow problems. Direct methods involving inversion of the nodal admittance matrix, iterative methods Gauss-Seidal method.<br>4. Newton Raphson method. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. knowledge of Power system representation.<br>2. deals with Balanced and unbalanced faults.<br>3. deals Symmetrical fault calculations. Symmetrical components, Unsymmetrical faults.<br>4. deals with Synchronous machine in power system and its necessity.<br>5. deals with Power system load flow problems and its analysis methods. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Introduction of power system analysis for students of the Fourth year in electrical engineering department. (3 hours)<br>Per unit system (9 hours).<br>Balanced and unbalanced faults, Symmetrical fault calculations. (12 hours)<br>Symmetrical components, Unsymmetrical faults. (12 hours)<br>Synchronous machine in power system. (6 hours)<br>Power system load flow problems. Direct methods involving inversion of the nodal admittance matrix, iterative methods Gauss-Seidal method, Newton Raphson method. (18 hours) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive educational programs and by thinking about the type of simple experiments that include some theoretical and practical activities that include calculating some important values and selection methods for power system representation and fault |

| | |
|---|---|
| | calculation for symmetrical and unsymmetrical faults. Evaluation of bus bar voltages and load flow solution for different cases of operation. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 103 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of power system |
| **Week 2** | Power system representation |
| **Week 3** | Per unit system |

| | |
|---|---|
| **Week 4** | Balanced faults, |
| **Week 5** | Symmetrical fault calculations. |
| **Week 6** | Symmetrical components |
| **Week 7** | Unsymmetrical faults |
| **Week 8** | Unsymmetrical faults |
| **Week 9** | Synchronous machine in power system; |
| **Week 10** | Power system load flow problems |
| **Week 11** | Direct methods involving inversion of the nodal admittance matrix |
| **Week 12** | iterative methods Gauss-Seidal method |
| **Week 13** | iterative methods Gauss-Seidal method |
| **Week 14** | Newton Raphson method; |
| **Week 15** | Newton Raphson method; |
| **Week 16** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: |
| **Week 2** | Lab 2: |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | McGraw-Hill, 1994.- Jonn J. Grainger, Power System Analysis, international edition | Yes |
| **Recommended Texts** | McGraw-Hill, 2008.- D. P. Kothari, Power System Engineering, second editions. | yes |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | Information Theory | | | **Module Delivery** | |
| **Module Type** | Core | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE027 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | Electrical | | **College** | College of Engineering | |
| **Module Leader** | Naser F. Abdullah | | **e-mail** | naser.falahy@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Professor | | **Module Leader's Qualification** | Ph.D. | |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE014 | **Semester** | 6 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course will cover the following topics: Information Presentation and Information Sources, Measures of Information, Entropy and Information, Information Rate, Source Coding and Channel modeling, Channel Coding. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Understand Source Coding<br>2. Understand Channel Capacity<br>3. Understand Channel Coding |
| **Indicative Contents**<br>المحتويات الإرشادية | 1. understand and measure information (6 hrs)<br>2. understand Entropy and Information Rate (6 hrs)<br>3. Investigate source coding theorem (9 hrs)<br>4. Understand Shannon Channel Capacity theorem (6 hrs)<br>5. Investigate channel coding theorem (12 hrs)<br>6. Implement Error detection and correction for data protection (6 hrs) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 103 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module Evaluation<br>تقييم المادة الدراسية |
|---|

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | 1,2 |
| | **Assignments** | 2 | 5% (5) | 2, 12 | 3 |
| | **Projects / Lab.** | 0 | 0% (0) | - | 1 |
| | **Report** | 0 | 0% (0) | - | 2 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 25% (25) | 7 | 2,3 |
| | **Final Exam** | 3hr | 60% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction to probability |
| **Week 2** | Introduction to Information |
| **Week 3** | Source Coding Theorem |
| **Week 4** | Shannon Code and Fano Code |
| **Week 5** | Huffman code |
| **Week 6** | LZ code and data compression |
| **Week 7** | Mid-term Exam |
| **Week 8** | Introduction Communication Channel |
| **Week 9** | Error detection and correction |
| **Week 10** | ARQ and FEC codes |
| **Week 11** | Channel Capacity Theorem |
| **Week 12** | Channel Coding Theorem |
| **Week 13** | Linear Block Code |
| **Week 14** | Cyclic Code |
| **Week 15** | Channel coding and Decoding |
| **Week 16** | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | Material Covered |
|---|---|
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | S. Haykin, "communication system" 2001. | Yes |
| **Recommended Texts** | Glavieux, "Channel Coding in Communication Networks", ISTE, 2007 | Yes |
| **Websites** | https://www.uoanbar.edu.iq/English/staff-page.php?ID=678 | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Ethics and Leadership skills** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒**Theory**<br>☒**Lecture**<br>☐**Lab**<br>☐**Tutorial**<br>☐**Practical**<br>☐**Seminar** | |
| **Module Code** | ENG012 | | | | |
| **ECTS Credits** | **2** | | | | |
| **SWL (hr/sem)** | **50** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 7 | |
| **Administering Department** | Type Dept. Code | | **College** | Type College Code | |
| **Module Leader** | Abdulsattar Ahmed A | | **e-mail** | abdulsattar.ahmed@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | Asset.Teacher | | **Module Leader's Qualification** | Master | |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | | **Semester** | |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | The goals of this course are to enable students to:<br><br>1-Develop an awareness of ethical challenges in your everyday lives and work.<br>2-Develop an awareness of ethical leadership/decision-making through research, interviews, observations in the real world, reading the text, and planning a symposium as a team. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | Following completion of this course, students will be able to:<br>1- Explain the basic concepts of leadership.<br>2- Build power and influence.<br>3- Add value to their sphere of influence<br>4- Give and receive feedback, actively listen, provide supportive communication, and coach and counsel their team members |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>**1.Introduction to leadership**: [ 4 hrs]<br>Leadership definition, make a difference? Why is leadership<br>**2-.Communication**[ 4 hrs]<br>Communication types, Thoughts emotion and communication (head, heart and hands) What influences our communication, Damaging communication habits Connecting with others, Peer communication assessment<br>**3. Self-Administration**[ 4 hrs]<br>4 **Effective team leadership**[ 4 hrs]<br>What is team Why work in teams? Different types of teams Team roles<br>Role of team leader<br>5. **Administration Skills**[ 2 hrs]<br>6. **Leadership Skills**[ 2hrs]<br>7. **Leadership and management styles**[ 4 hrs]<br>Management styles, Attributes of the engineering leader Modern leadership<br>Characteristics of servant leader Command leadership vs. servant leadership<br>8. **Thinking and Smart Skills**[ 4 hrs]<br>9. **Education Development. Skills of Working Market and Commerce**[ 2 hrs]<br>10. **Marketing of Searches, Services and Ideas**[ 2 hrs] |

| | |
|---|---|
| | 11**. Making of Leaders and Leaders of Changing** [ 2 hrs]<br>12. **Leadership and management styles**[ 6 hrs]<br>Management styles, Attributes of the engineering leader Modern leadership Characteristics of servant leader Command leadership vs. servant leadership<br>13. Introduction to Engineering Ethics[ 4 hrs]<br>**14. Professional Ethics** Definition Origins Principles Professional Codes of Ethics[ 4 hrs]<br>**15. Ethical Issues in Engineering Practice**[ 4 hrs]<br>1 -Safety Considerations<br>2- The Role of Good Design, Sustainable design and design for all , Safety and risk in Design.<br>3- Environmental Ethics |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)**<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 33 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 17 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

| **Module Evaluation**<br>تقييم المادة الدراسية |
|---|

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 10% (10) | 2, 12 | 2 |
| | Projects / Lab. | | | | 3,4 |
| | Report | 1 | 10% (10) | 13 | 1 |
| Summative assessment | Midterm Exam | 3 hr | 10% (10) | 7 | 3,2 |
| | Final Exam | 3hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Introduction to leadership. |
| Week 2 | Communication |
| Week 3 | Self-Administration |
| Week 4 | **Effective team leadership** |
| Week 5 | **Administration Skills** |
| Week 6 | Leadership |
| Week 7 | Skills Leadership and management styles |
| Week 8 | Thinking and Smart Skills. |
| Week 9 | Education Development |
| Week 10 | Skills of Working Market and Commerce |
| Week 11 | Marketing of Searches |
| Week 12 | Making of Leaders and Leaders of Changing. |
| Week 13 | **Leadership and management styles** |
| Week 14 | . Professional Ethics |
| Week 15 | 15. Ethical Issues in Engineering Practice |
| Week 16 | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | Material Covered |
|---|---|
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | 1- Benator, Barry and Thumann, Albert "Project Management and Leadership Skills for Engineering and Construction Projects." 2003, The Fairmont Press, Inc., USA | no |
| **Recommended Texts** | 2- Fleddermann, C. B. (2012). Engineering Ethics. Upper Saddle River, NJ: Prentice Hall. 3- Csode of Ethics- Iraqi Engineers Association | No |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| Module Title | Control Theory II | | | Module Delivery | |
| Module Type | Core | | | ☒ Theory<br>☒ Lecture<br>☒ Lab<br>☐ Tutorial<br>☐ Practical<br>☐ Seminar | |
| Module Code | ELE026 | | | | |
| ECTS Credits | 6 | | | | |
| SWL (hr/sem) | 150 | | | | |
| Module Level | | UG4 | Semester of Delivery | | 8 |
| Administering Department | | Electrical | College | College of Engineering | |
| Module Leader | Yousif Ismail Al Mashhaany | | e-mail | yousif.mohammed @uoanbar.edu.iq | |
| Module Leader's Acad. Title | | Prof. Dr. | Module Leader's Qualification | | Ph.D. |
| Module Tutor | | | e-mail | | |
| Peer Reviewer Name | | | e-mail | | |
| Scientific Committee Approval Date | | 30/June/2023 | Version Number | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| Prerequisite module | ELE025 | Semester | 7 |
| Co-requisites module | | Semester | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| Module Aims<br>أهداف المادة الدراسية | This course gives the students the ability for understanding steps and procedure drawing root locus plot, and designing compensator using root locus method, frequency domain analysis including polar plot, bode plot, gain and phase margin, Nyquist stability criteria, three term controller (PD, PI, PID) controllers. The course focuses on analysis of control systems in state space and the methods of design of control system using state space approach. In the end of the course, the course introduces sampled data systems and analysis of digital control systems. |
| Module Learning Outcomes<br>مخرجات التعلم للمادة الدراسية | 1. Understand the methods of sketching and designing compensators using root locus method.<br>2. Understand the frequency domain analysis and plots used to represent frequency domain.<br>3. Design a three-term controller.<br>4. Analyze control systems using state space approach.<br>5. Understand the principles of digital control systems. |
| Indicative Contents<br>المحتويات الإرشادية | ● Understand the principle of classical control system.<br>● Apply the stability testing theorems in time domain and frequency domain.<br>● Analysis the control system performance according to status physics system.<br>● Design the different types of compensating circuit to solve the stability problem.<br>● Design the different types of PID controller to get stable control system. |

| | |
|---|---|
| | • Understand the basic information for digital control by study sampling data theorem.<br>• Understand the basic information for optimal control by study the state space control principle. |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| Structured SWL (h/sem)<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | Structured SWL (h/w)<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| Unstructured SWL (h/sem)<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | Unstructured SWL (h/w)<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| As | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 10% (10) | 5, 10 | 1 |
| | Assignments | 2 | 5% (5) | 2, 12 | 2 |
| | Projects | 1 | 10% (10) | | 3 |
| | Report | 1 | | | 4,5 |
| | Lab | 1 | 10% (10) | 3,10 | 2 |
| Summative assessment | Midterm Exam | 2hr | 15% (15) | 8 | 3,4,1 |
| | Final Exam | 3hr | 50% (60) | 16 | all |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| Week | Root locus plot and general rules for constructing root locus. |
| Week 1 | Special cases in root locus, conditionally stable system and non-minimum phase systems. |
| Week 2 | Control system design by the root locus. |
| Week 3 | Effects of the addition of poles and zeroes and lead compensator, lag compensator and lag-lead compensator |
| Week 4 | Introduction to frequency Response Analysis and polar plot for different types of control system |
| Week 5 | Nyquist stability criterion theorem |
| Week 6 | Bode diagram: Bode plot (Logarithmic plot) |
| Week 7 | Stability by Gain and phase margin. |

| | |
|---|---|
| Week 8 | Three term controller: PD controller and PI controller. |
| Week 9 | PID controller and modified PID controller |
| Week 10 | Analysis of control systems in state space |
| Week 11 | control system representation in s.s. |
| Week 12 | Transformation between s.s. and transfer function |
| Week 13 | Controllability and observability of control system |
| Week 14 | Introduction to sampled data systems and digital control systems |
| Week 15 | Root locus plot and general rules for constructing root locus. |
| Week 16 | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| Week | Material Covered |
| Week 1 | LAB1: Phase lag compensator |
| Week 2 | LAB2: Phase lead compensator |
| Week 3 | LAB3: Phase lead-lag compensator |
| Week 4 | LAB4: Integral controller |
| Week 5 | LAB5: Derivative controller |
| Week 6 | LAB6: Proportional - integral (PI) controller |
| Week 7 | LAB7: Proportional -Derivative (PD)controller |
| Week 8 | LAB8: Proportional - integral - derivative (PID) controller |
| Week 9 | LAB9: PID Controller – DC Motor Position Control |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | Text | Available in the Library? |
| Required Texts | "Modern Control Engineering" , By Katsuhiko Ogata, Fifth Edition, 2010 | Yes |
| Recommended Texts | " Linear Control System Analysis and Design with MATLAB " by John J. D'Azzo and Constantine H. Houpis , 2003. | No |
| | "Classical Control Theory", By Yousif Al Mashhadany, first Edition, 2014 | No |
| | "Control Systems Engineering" , Sixth Edition, By Norman S. Nise, 2011 | No |
| Websites | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Digital Electronics** | | | **Module Delivery** | |
| **Module Type** | Core | | | ☐ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE034 | | | | |
| **ECTS Credits** | 5 | | | | |
| **SWL (hr/sem)** | 125 | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 8 | |
| **Administering Department** | Electrical | | **College** | College of Engineering | |
| **Module Leader** | Zainab N. Abdulhameed | | **e-mail** | Zainab.abdulhameed@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | Lect. | | **Module Leader's Qualification** | M.Sc | |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | 30/June/2023 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE002 | **Semester** | 2 |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course is designed to enable the students to understand the Digital Electronics circuits.<br>2. The course concerned with design and implementation of digital circuits using finite state machines (synchronous and asynchronous)<br>3. Studying various types of digital to anlage (D/A) and analog to digital (A/D) convertors.<br>4. Knowing the characteristics and types of different logic families<br>5. studying the construction and types of Semiconductor memories and programmable logic devices. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Understand the steps and the procedures for designing and analyzing synchronous and asynchronous state machines.<br>2- Understand the methods of conversion between digital and analog signals using different types of D/A and A/D convertors.<br>3- Understand the various types of logic families and learning the methods of connection between them.<br>4- Understand the construction, types and characteristics of digital memories.<br>5- Understand the various types of programmable logic devices |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>1- Design and analysis of synchronous state machines: Finite state machine principles, Mealy and Moors model, state diagram and table derivation; reduction of state table (implication chart); state assignments, circuit realization using flip-flops, analysis of synchronous state machines<br>2- Design and analysis of asynchronous state machines: state diagram and flow-table derivation, minimization of flow-table (implication chart reduction and merging process); state assignments. timing problems (racing, static and essential hazards), circuit realization using latches analysis of asynchronous state machines.<br>3- D/A and A/D converters: principles and design, types of error in ADC's and DAC's, D/A converters (weighted-resistors DAC, R-2R ladder DAC's), A/D converters (single and dual slope ADC, successive approximation ADC, stair step ramp ADC, tracking ADC, Simultaneous or Flash A/D Converters, Counter-Type A/D Converter)<br>4- Logic families: characteristics and types of digital integrated circuits (IC), transistor-transistor logic (TTL), emitter-coupled logic (ECL), CMOS logic families (CMOS, PMOS, NMOS), injection integrated logic (I2L), interfacing between different logic families<br>5- Semiconductor memories: memory classification, memory architecture, Read Only Memory (ROM), programmable ROM (PROM), erasable PROM (EPROM) electrically EPROM (E2PROM), static RAM, dynamic RAM<br>6- Programmable logic devices: Programmable Logic Array (PLA), Programmable |

| | |
|---|---|
| | Array Logic (PAL), Field Programmable Gate Arrays (FPGA). Generic Array logic (GAL), Programming Languages (VHDL Hardware Description Language). |

| Learning and Teaching Strategies<br>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. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 3 | 10% (10) | 5, 10 | 1 |
| | **Assignments** | 2 | 10% (10) | 2, ,5,9, 12 | 2,3 |
| | **Projects / Lab.** | 1 | | | 4 |
| | **Report** | 1 | | | 4,1 |
| **Summative assessment** | **Midterm Exam** | 2hr | 20% (20) | 8 | 2,3,5 |
| | **Final Exam** | 3hr | 60% (60) | 16 | all |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to sequential logic cct ,and background to the combinational logic cct . |
| **Week 2** | Introduction to digital circuits using finite state machines |
| **Week 3** | Introduction to SSM(Synch.State machine) ( mealy and moore model ) |
| **Week 4** | Design of Synch.State machine SSM |
| **Week 5** | Analysis of Synch.State machine SSM |
| **Week 6** | Introduction to ASM (ASynch.State machine) , and Design of ASM |
| **Week 7** | Analysis of Asynch.State machine ASM |
| **Week 8** | Midterm Exam |
| **Week 9** | Introduction to Analog to digital convertor( ADC) principles and types |
| **Week 10** | Introduction to digital to Analog to convertor( DAC) principles and types |
| **Week 11** | Ccs. and types of digital integrated circuits (IC) |
| **Week 12** | Transistor- Transistor Logic (TTL), emitter-coupled logic (ECL), CMOS logic families |
| **Week 13** | memory classification, architecture |
| **Week 14** | RAM,ROM,EPROM, E2PROM |
| **Week 15** | PAL,PLA |
| **Week 16** | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | |
| **Week 6** | |
| **Week 7** | |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | - M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003. | Yes |
| **Recommended Texts** | - S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3rd Edition., Vikas Publishing House Pvt. Ltd, New Delhi, 2006. | No |
| **Websites** | | |

| Grading Scheme<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Power electronics** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE024 | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | 4 | | **Semester of Delivery** | 8 | |
| **Administering Department** | electrical | | **College** | College of engineering | |
| **Module Leader** | Falah Shallal Khaleefah | | **e-mail** | f.sh.khalifa@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | lecturer | | **Module Leader's Qualification** | Ph.D. | |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE008 | **Semester** | 4 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. To develop problem solving skills and understanding of power electronics through the application of techniques.<br>2. To be able to work with power semiconductor devices.<br>3. To be able to design controlled and uncontrolled rectifiers.<br>4. To be able to design a power inverters.<br>5. To be able to design a DC to DC converters.<br>6. To be able to design a DC to AC converters.<br>7. To be able to design an AC to AC converters. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Explain the static and dynamic characteristics of fundamental power semiconductor devices.<br>2. Explain the working principle of uncontrolled rectifiers and calculate the performance parameters from the average, RMS and peak values of the related circuit parameters.<br>3. Calculate harmonics in the output and input currents for rectifier operations.<br>4. Design and analyze various types of switched-mode DC converters.<br>5. Explain the control of power converters using pulse-width modulation (PWM).<br>6. describe the basic working principle of switch-mode inverters,<br>7. Simulate simple power electronic circuits using simulation packages like Multisim.<br>8. Conduct experiments with converters and compare the results with theoretical concepts and simulations. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Type something like: the strategy adopted is to explain the subjects by the professor in class to the students using all the electronics available such as power point, data show, and the internet. Then the graduates must submit to all formative and Summative assessment. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

| Module Evaluation<br>تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5, 10 | 1,2 |
| | **homework** | 2 | 5% (5) | 2, 8 | 3,5 |
| | **test** | 1 | 10% (10) | 6 | 4,7 |
| | **attendance** | 2 | 5% (5) | continuous | 8,1 |
| **Summative assessment** | **Midterm Exam** | 2 hr | 20% (10) | 8 | 2,3,5,6,7 |
| | **Final Exam** | 2hr | 50% (50) | 16 | all |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of Power Electronic. |
| **Week 2** | Overview of power semiconductor devices: Diodes, Thyristor, BJT, MOSFET, IGBT. |
| **Week 3** | Overview of power semiconductor devices: Diodes, Thyristor, BJT, MOSFET, IGBT. |
| **Week 4** | Overview of power semiconductor devices: Diodes, Thyristor, BJT, MOSFET, IGBT |
| **Week 5** | Rectifiers: Single-phase and three-phase diode rectifiers with different types of loads, Average power output, Performance parameters, Harmonic analysis. |
| **Week 6** | Rectifiers: Single-phase and three-phase diode rectifiers with different types of loads, Average power output, Performance parameters, Harmonic analysis. |
| **Week 7** | Rectifiers: Single-phase and three-phase diode rectifiers with different types of loads, |

| | |
|---|---|
| | Average power output, Performance parameters, Harmonic analysis. |
| **Week 8** | Mid-term Exam |
| **Week 9** | Switch-mode DC-DC converters: Design, analysis and control of Step-down (Buck), Step-Up (Boost), Buck-Boost. |
| **Week 10** | Switch-mode DC-DC converters: Design, analysis and control of Step-down (Buck), Step-Up (Boost), Buck-Boost. |
| **Week 11** | Switch-mode DC-DC converters: Design, analysis and control of Step-down (Buck), Step-Up (Boost), Buck-Boost. |
| **Week 12** | Switch-mode DC-AC converters: Basic inverter concept, Sinusoidal PWM. |
| **Week 13** | Switch-mode DC-AC converters: Basic inverter concept, Sinusoidal PWM. |
| **Week 14** | Voltage Controllers (AC – AC Converters). |
| **Week 15** | Voltage Controllers (AC – AC Converters). |
| **Week 16** | **Preparatory week before the final Exam** |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | M. H. Rashid; "Power Electronics: Circuits, Devices & Applications", 3rd Ed, 2008. | Yes |
| **Recommended Texts** | Power electronics _ devices, circuits, and applications ( PDF Drive ) (1) | yes |
| **Websites** | | |

## 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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Programmable Logic Controller** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☒ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE036 | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | | UG4 | **Semester of Delivery** | | 8 |
| **Administering Department** | | Electrical | College | College of Engineering | |
| **Module Leader** | Maath Jasem Mahammad | | **e-mail** | maath.mahammad@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | | Ass. Professor Dr. | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | 01/06/2023 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE002; ELE010 | **Semester** | 2,6 |
| **Co-requisites module** | | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | This course presents an overview of fundamental computer science topics. Overview topics include an introduction to computer components, computer hardware, operating systems, digitization of data, and application program (Microsoft office). |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Analyze, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.<br>2. Identify problems and formulate solutions for systems.<br>3. Communicate effectively with a range of audience.<br>4. Work effectively as part of a team to develop and deliver quality software artifacts.<br>5. Design solutions using approaches that integrate ethical, social, legal, and economic responsibilities. |
| **Indicative Contents**<br>المحتويات الإرشادية | - General Definitions System, Computer System, Hardware, Software, …etc.<br>- Hardware Components. CPU, Main Memory, I/O, System Bus and CPU Structure. Basic Computer Functions (Data Processing,).<br>- Input / output Devices.<br>- Operating systems.<br>- Application program (Microsoft office). |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **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)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 77 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 48 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Computer Fundamentals |
| **Week 2** | Computer Components - Hardware |
| **Week 3** | Computer Components - Software |
| **Week 4** | Computer Safety |
| **Week 5** | Operating Systems |
| **Week 6** | Operating System - Windows |
| **Week 7** | **Mid – term Exam** |
| **Week 8** | Introduction of Microsoft Word |
| **Week 9** | Page Layout and View Tap |

| | |
|---|---|
| **Week 10** | Insert Objects in Microsoft Word |
| **Week 11** | More Options in Microsoft Word |
| **Week 12** | Introduction of Microsoft Power Point |
| **Week 13** | Insert Objects and Add Animations in Microsoft Power Point |
| **Week 14** | Introduction of Microsoft Excel |
| **Week 15** | Insert Objects in Microsoft Excel |
| **Week 16** | **Final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Introduction to Windows 10 |
| **Week 2** | Lab 2: Introduction of Microsoft Word |
| **Week 3** | Lab 3: Documents in Microsoft Word |
| **Week 4** | Lab 4: Introduction of Microsoft Power Point |
| **Week 5** | Lab 5: Slides in Microsoft Power Point |
| **Week 6** | Lab 6: Introduction of Microsoft Excel |
| **Week 7** | Lab 7: Sheets in Microsoft Excel |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | أساسيات الحاسوب وتطبيقاته المكتبية (الجزء الأول) (الجزء الثاني) ((الجزء الثالث<br>أ.م.د. زياد محمد عبود ، أ.د.غسان حميد عبد المجيد ، أ.م.د. أمير حسين مراد ، م. بلال كمال أحمد | Yes |
| **Recommended Texts** | | |
| **Websites** | | |

| **Grading Scheme**<br>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 |
| | | | | |

**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.

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Power System Analysis** | | | **Module Delivery** | |
| **Module Type** | **Elective** | | | ☒ **Theory**<br>☒ **Lecture**<br>☐ **Lab**<br>☐ **Tutorial**<br>☐ **Practical**<br>☐ **Seminar** | |
| **Module Code** | ELE039 | | | | |
| **ECTS Credits** | **5** | | | | |
| **SWL (hr/sem)** | **125** | | | | |
| **Module Level** | UG4 | | **Semester of Delivery** | 8 | |
| **Administering Department** | Type Dept. Code | | **College** | Type College Code | |
| **Module Leader** | Name Dr. Omar Kamil Dahham | | **e-mail** | E-mail: omar.dahham@uoanbar.edu.iq | |
| **Module Leader's Acad. Title** | lectuer | | **Module Leader's Qualification** | Ph.D. | |
| **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<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | ELE023 | **Semester** | |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | 1. This course is designed to enable the students to understand of power system analysis for students of the Fourth year in electrical engineering department.<br>2. The course integrates Power system stability;<br>3. Study of protection of power system generation, transmission and distribution.<br>4. Study of important parts of system protection. explanation of grounding system. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. knowledge of Power system analysis.<br>2. Understanding of Power System Stability and its calculations<br>3. Understanding of Power System Protection with all applications.<br>4. Understanding of Grounding and Earthling system.<br>5. Understanding of Power System Distribution.<br>6. Understanding of HVDC transmission system. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>This course is designed to enable the students to understand of power system analysis for students of the Fourth year in electrical engineering department. (3 hours)<br>Power system stability; Study of protection of power system generation, transmission and distribution. (18 hours)<br>Study of important parts of system protection. explanation of grounding system. (18 hours)<br>Introduction of distribution system. High voltage DC transmission system performance. ( 9 hours) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in the exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive educational programs and by thinking about the type of simple experiments that include some theoretical and practical activities that include calculating some important values and selection methods for power system analysis and steady stat stability and transient stability. Design power system protection and choosing circuit |

| | |
|---|---|
| | breakers and its locations . HVDC transmission lines ant its impotence. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 47 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 78 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

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

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction of Power System Stability |
| **Week 2** | Study Stat Stability |
| **Week 3** | Study Stat Stability |
| **Week 4** | Study Stat Stability |

| | |
|---|---|
| **Week 5** | Transient Stability |
| **Week 6** | Transient Stability |
| **Week 7** | General Concepts of Power System Protection |
| **Week 8** | Generator Protection |
| **Week 9** | Transformer Protection |
| **Week 10** | Transmission Line Protection |
| **Week 11** | Different Types of Relay Construction and Operation |
| **Week 12** | Grounding Types |
| **Week 13** | Power System Distribution |
| **Week 14** | HVDC |
| **Week 15** | HVDC |
| **Week 16** | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Lab 1: |
| **Week 2** | Lab 2: |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | McGraw-Hill, 1994.- Jonn J. Grainger, Power System Analysis, international edition | Yes |
| **Recommended Texts** | McGraw-Hill, 2008.- D. P. Kothari, Power System Engineering, second editions. | yes |
| **Websites** | | |

## 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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