**Ministry of Higher Education and Scientific Research**

**Department Assurance Quality and accreditation Academic**

# Academic Program Description MODULE DESCRIPTION Guide

**2025-2026**

# Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of academic vocabulary whose main purpose is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market, which is reviewed and evaluated annually through internal or external audit procedures and programs such as the external examiner program.

The description of the academic program provides a brief summary of the main features of the program and its courses, indicating the skills that are being worked on to acquire for students based on the objectives of the academic program, and the importance of this description is evident because it represents the cornerstone in obtaining program accreditation and is written jointly by the teaching staff under the supervision of the scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (quarterly), as well as the adoption of the description of the academic program circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna track as the basis for their work.

In this regard, we can only emphasize the importance of writing a description of academic programs and courses to ensure the proper functioning of the educational process.

## Concepts and terminology:

**Academic Program Description**: The description of the academic program provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

**Course Description**: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available learning opportunities. It is derived from the description of the program.

**Program Vision: An** ambitious picture for the future of the academic program to be a sophisticated, inspiring, stimulating, realistic and applicable program.

**Program Mission**: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

**Program Objectives**: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

**Curriculum Structure**: All courses / subjects included in the academic program according to the approved learning system (Bologna), whether it is a requirement (ministry, university, college and scientific department) with the number of study units.

**Learning Outcomes: A** compatible set of knowledge, skills and values acquired by the student after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

**Teaching and learning strategies**: They are the strategies used by the faculty member to develop the student's teaching and learning, and they are plans that are followed to reach the learning goals. That is, describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

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## Academic Program Description Form

University Name: University .... Southern Technical University.....

Faculty/Institute: Institute ..... Maysan Technical Engineering College.....

Scientific Department: Department of .....Engineering of electromechanical Systems techniques.....

Academic or Vocational Program Name: Bachelor of Electromechanical Technology .....

Final Certificate Name: Bachelor of Electromechanical Technology Engineering.....

Academic System: quarterly

Description Date: 5/10/2025

File Filling Date: 14/02/2026

Signature :

Scientific Associate Name: Dr. Jawad Jayoul Saadoun

Signature :

Head of department: Prof. Dr. Wael Hussein Zayer

Check the file before

Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance Division: Alaa Qasim Mohammed

Date:

Signature:

Approval of the Dean

الكلية التقنية الهندسية / ميسان
مكتب العميد

## 1. Program Vision

This academic description of the program provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available opportunities accompanied by a description of each course within the program to form a scientific or human base in the field of maintenance, programming and operation of electromechanical devices and systems and seeks to **prepare plans for the development of staff and curricula to ensure that the requirements of quality standards and academic accreditation are met, in addition to keeping pace with development and ready-made applications in order to contribute By achieving part of it, and that the department be a distinguished scientific research edifice in its programs, curricula and scientific research.**

## 2. Program Mission

**The department seeks to prepare and graduate a specialized staff at a high level of scientific competence and leading leadership in their work, sciences and literature and in developing the knowledge balance in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively and emphasizing social and cultural values for the purpose of dealing with modern systems and technologies within the field of specialization. And work to provide appropriate opportunities to develop the capabilities of the community in investing the development in technology and the need of the labor market and meet their needs in the field of electronic and software systems and provide training advisory services.**

## 3. Program Objectives

1- Graduating highly qualified engineers in the field of electromechanical engineering who are able to develop their skills in Engineering Knowledge Areas Maintenance of electromechanical equipment and systems.

2- **Ability to understand and solve problems** In the field of applications and specialized electromechanical systems and in the design of and programming and the use of organs relevant to the jurisdiction.

3- Providing the department with teachers and researchers and providing government institutions and the private sector Qualified engineers in the field of specialization.

4- **Participate in the preparation of designs Electromechanical systems.**

| 4. **Program Accreditation** |
| --- |
| There isn't any |

| 5. **Other external influences** |
| --- |
| 1- Application + research projects + continuous workshops for students<br>2- Also, external influences contribute to solving many dilemmas related to approved studies<br>3- The needs of the labor market, the quality of graduates and the support of students' skills |

| 6. **Program Structure** | | | | |
| --- | --- | --- | --- | --- |
| **Reviews*** | **Percentage** | **Unit of study** | **Number of Courses** | **Program Structure** |
| Specialty+ Assistant + General | Theoretical 54% Working 46% | 37 Count | 14 | **Requirements of the institution** |
| | | For one month for the second phase<br>For one month for the third stage | | **Summer Training** |
| | | | | **Other** |

* It can include notes whether the course is basic or optional.

## 7. Program Description

| Credit Hours | | Course Name | Course or Course Code | Year/Level |
|---|---|---|---|---|
| practical | theoretical | | | |
| 2 | 2 | **Power & Driving Electronics-1** | **STUMETC 471** | 2026/2025 Fourth stage Chapter one + Chapter Two |
| 2 | 2 | **Microprocessors and controllers-1** | **STUMETC 482** | |
| 2 | 2 | **Signals & Systems-1** | **STUMETC 481** | |
| 0 | 2 | **Control and automation-1** | **STUMETC 473** | |
| 2 | 2 | **Electromechanical devices-1** | **STUMETC 472** | |
| 2 | 2 | **Air Conditioning & Refrigeration Systems-1** | **STUMETC 483** | |
| 2 | 2 | **Power & Driving Electronics-2** | **STUMETC 486** | |
| 2 | 2 | **Microprocessors and controllers-2** | **STUMETC 487** | |
| 2 | 2 | **Signals & Systems-2** | **STUMETC 488** | |
| 0 | 2 | **Control and automation-2** | **STUMETC 489** | |
| 2 | 2 | **Computer aided design and manufacturing** | **STUMETC 474** | |
| 2 | 2 | **Air Conditioning & Refrigeration Systems-2** | **STUMETC 490** | |
| 0 | 2 | **English Language -4** | **STUMETC 484** | |
| 2 | | **Project** | **STUMETC 485** | |
| 22 | 26 | | | المجموع |

**Number of hours for this year = 26 Percentage of theoretical hours = 54% Total graduation units for this year = 37**
**Number of working hours for this year = 22 Percentage of working hours = 46%**

| 7. **Expected learning outcomes of the program** | |
|---|---|
| **Knowledge** | |
| | A1- Definition of the concept of electromechanical<br>A2- Definition of the elements of hardware design for electromechanical systems<br>A3- Introducing the basics of engineering design in the field of specialization<br>**A4- The student's knowledge of digital and logical circuits, communications and their areas of implementation.**<br>**A5- The student's knowledge of the labor market and industries.**<br>**A6- The student's knowledge of how to conduct laboratory experiments and how to analyze and apply the results.** |
| **Skills** | |
| | B1 - Exercises and examples specific to the subject<br>B2 - Explain the methods of solving problems in detail<br>B3 - Analysis and explanation of the vocabulary of the course in detail<br>B4- The use of modern means in the delivery of the vocabulary of the study material |
| **Values** | |
| | A1- Involving the graduate in the labor market and spreading the spirit of honest competition.<br>C2- Competition among the students of the stage for the purpose of completing higher university studies.<br>C3- The ability to analyze, deduce and practice professional ethics in all circumstances.<br>C4- Working under pressure, adopting equality and justice, and working as a member of the same team. |

## 8. Teaching and Learning Strategies

### - Education Strategies:

Education strategies are the methods and methods followed by the professor in communicating the educational goals of students, and the following are some of the teaching strategies:

1- **Lecture or delivery** strategy: in which the professor provides information and facts to students and other ideas related to the topic at hand.

2- **Discussion strategy:** In this type of education strategy, the professor determines the topic to be discussed in the lecture

3- **Problem solving strategy**: In this strategy, the cognitive environment of students is activated, through problem-solving activities, through most of the positive processes and activities that stimulate thinking and raise motivation to learn.

4- **Project-based learning strategy**: This strategy relies on design work that requires applied work, as students are assigned an applied project for the activity, so they are forced to search, read and use books and all knowledge sources in order to accomplish the required.

**-Learning Strategies:**

The main strategy that will be adopted in delivering this module is to encourage students' participation in exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classrooms and tutorials and consideration of the types of simple experiments involving some sampling activities of interest to students.

## 9. Evaluation methods

- Daily surprise exam and homework assessment
- Written Semester Exam
- Study Reports
- Class Participations and Discussions
- Daily Attendance Assessment
- Small Business Valuation

## 10. Faculty

### Faculty Members

| Preparation of the teaching staff | | Special requirements/skills (if applicable) | | Specialization | | Academic Rank |
|---|---|---|---|---|---|---|
| lecturer | angel | | | special | year | |
| | **angel** | | **Delivering awareness lectures Holding workshops and seminars** | **Refractories** | **Mechanical** | **1- Prof. Mahmoud Aziz Mohamed** |
| | **angel** | | | **Control and computers** | **electricity** | **2- Prof.Dr. Wael Hussein Zayer** |
| | **angel** | | | **Capacity & Machinery** | **electricity** | **3-Assoc. Prof. Ahmed Thamer Radi** |
| | **angel** | | | **Applied Mechanics** | **Mechanical** | **4- Assoc. Prof. Jawad Karam Customer** |
| | angel | | | **law** | law | **Dr. Khairy Berri** |
| | **angel** | | | mathematics | mathematics | **Eng. Raed Khalid** |
| | angel | | | **Refractories** | Mechanical | Mr. Waleed Khalaf |
| lecturer | | | | Control and computers | Computer Science | **Dr. Mustafa Sadek** |
| **lecturer** | | | | Capacity & Machinery | electricity | **A.M. d. Sadeq Da'ir** |
| **lecturer** | | | | **Capacity & Machinery** | **electricity** | **5-M.M. Wissam Rahim** |
| **lecturer** | | | | | Mechanical | **Prof. Asaad Kazem Akal** |

## Professional Development

### Mentoring new faculty members

1- Holding workshops, seminars and seminars for developments in the field of electromechanics and information technology for reliability.

2- Involve them in courses to develop administrative skills, time management and smart skills.

3- Keeping up with and following up the implementation of the government program and entry.

| Professional development of faculty members |
| --- |
| **The focus in the Department of Electromechanical Techniques in general is on continuous improvement, as the department always seeks to improve the scientific and administrative process and overcome all the difficulties and obstacles that hinder the educational program through the development of human resources for personal development.**<br>**The following procedures illustrate the steps implemented or in the process of being implemented in this area:**<br>**D1. Continuous improvement and development of faculty members through training programs and workshops inside and outside the department and the university.**<br>**D2. Increase extracurricular activities such as holding conferences, scientific seminars, personal creations, and sports locally, regionally, and internationally.**<br>**D3. Encouraging faculty members to obtain the highest scientific and administrative ranks through promotions.**<br>**D4. Providing modern scientific sources and books for the department's library to keep pace with continuous progress.** |

| 10. **Acceptance Criterion** |
| --- |
| - Central acceptance by the Ministry (biological + applied)<br>- Top 10% of technical institutes of the corresponding scientific departments |

| 11. **The most important sources of information about the program** |
| --- |
| • The curriculum approved by the Ministry of Higher Education and Scientific Research and its guides.<br>• Decisions and recommendations of the scientific committees at the Southern Technical University.<br>• Courses in teaching methods.<br>• Course descriptions.<br>• Courses in civil society organizations.<br>• Conferences, seminars , workshops and seminars.<br>• Relevant state institutions.<br>• Internet research for similar experiments .<br>• Personal experiences.<br>• Labor market needs. |

| 12. Program Development Plan |
| --- |
| Developing engineering education and building an electromechanical technical engineer by building a development system based on:<br>- Modern and contemporary curricula<br>- Simulation of technical engineering education quality curricula<br>- Relying on the international academic program taking into account local specificity<br>- Studying the need of the labor market for electromechanical disciplines and their various branches<br><br>**- Opening branches specialized in the field of measurement and control, maintenance of networks and according to the needs of the labor market.**<br><br>**- Use and development of comprehensive virtual laboratories.** |

| Program Skills Outline | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Please tick the boxes corresponding to the individual learning outco program under evaluation. | | | | | | | | | | | | | | |
| Learning outcomes required from the program | | | | | | | | | | | | | | |
| Values | | | | Skills | | | | Knowledge | | | | fundamental Or optional | Course Name | Cou Co |
| C4 | C3 | C2 | C1 | B4 | B3 | B2 | B1 | A4 | A3 | A2 | A1 | | | |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Power & Driving Electronics-1 | STUN 41 |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Microprocessors and controllers-1 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | Specialized | Signals & Systems-1 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Control and automation-1 | STUN 41 |
| √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | Specialized | Electromechanical devices | STUN 41 |
| √ | √ | √ | √ | | √ | | √ | √ | √ | √ | √ | Specialized | Computer aided design and manufacturing | STUN 41 |
| √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | Specialized | Air Conditioning & Refrigeration Systems-1 | STUN 48 |
| | √ | √ | √ | | √ | √ | √ | | √ | √ | √ | General | English Language | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | Specialized | Project | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Power & Driving Electronics-2 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Microprocessors and controllers-2 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | Specialized | Signals & Systems-2 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | √ | | √ | √ | √ | Specialized | Control and automation-2 | STUN 48 |
| √ | √ | √ | √ | √ | √ | √ | | | √ | √ | √ | Specialized | Air Conditioning & Refrigeration Systems-2 | STUN 49 |

- **Please tick the boxes corresponding to the individual learning outcomes of the program subject to the program.**

# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | Electronic Physics | | | **Module Delivery** | |
| **Module Type** | **Core** | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 121 | | | | |
| **ECTS Credits** | **7** | | | | |
| **SWL (hr/sem)** | **175** | | | | |
| **Module Level** | 1 | **Semester of Delivery** | 2 | | |
| **Administering Department** | ETE | **College** | METC | | |
| **Module Leader** | Wael Hussein Zayer | **e-mail** | wael.zayer@stu.edu.iq | | |
| **Module Leader's Acad. Title** | Professor | **Module Leader's Qualification** | Ph.D. | | |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail | | |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To understand the fundamentals of structure of the atom, orbitals in the atom, energy levels connectivity, semiconductors.<br>2. To have knowledge about the physics of semiconductor materials.<br>3. To understand the characteristics and theories in semiconductor materials in terms of crystal structures, charge carriers and energy bands.<br>4. To describe crystalline structures of semiconductors. describe band structures of semiconductors.<br>5. To explain the properties of n-type and p-type semiconductors. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understand the structure of the atom, orbitals in the atom, energy levels. To understand contributory, conductivity, semiconductors.<br><br>2. Understand doping, equivalence , diffraction and diffusion , conductors, insulators and semiconductors, connectivity.<br><br>3. Understand the structure of PN junction:, the properties of the junction, the operation of diodes in electrical circuits.<br><br>4. Learn junction applications like zener diode, half wave rectifier and full wave rectifier filters.<br><br>5. Understand the transistor specifications.<br><br>6. Recognize saturation and cutoff in the transistor.<br><br>7. Understand the operation of transistor as a switch.<br><br>8. Understand the operation of transistor as an amplifier.<br><br>9. Understand the operation of FET transistor.<br><br>10. Understand the operation of JFET transistor and JFET Properties.<br><br>11. Understand the circuit analysis of JFET.<br><br>12. Understand the properties and circuit analysis of MOS-FET transistor.<br><br>13. Understand the operation of FET transistor as an amplifier.<br><br>14. Understand the operation of FET transistor as switch. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | semiconductors:<br>1. structure of the atom, orbitals in the atom, - energy levels<br>2. Contributory and Contributory Links - Conductivity, semiconductors. [7]<br><br>doping, equivalence -Diffraction and diffusion<br>-Conductors, insulators and semiconductors -connectivity. [7]<br><br>PN junction: open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits- junction applications- Dual types- Zener diode. Half wave rectifier and full wave rectifier -Filters. [14]<br><br>three-way transistor- The controlled source- Triple connection- Transistor specifications- saturation and cutoff in the transistor- transistor as a switch- transistor as an amplifier. [28]<br><br>FET transistor- Voltage controlled power source- JFET transistor- JFET properties- Circuit Analysis of JFET- MOS-FET transistor- properties and circuit analysis- FET transistor as an amplifier- FET transistor as a switch. [42] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 175 | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 10 | LO #1, #2 and #12, #13 |
| | **Assignments** | 2 | 5% (5) | 4 and 8 | LO #3 and #6 |
| | **Project** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #8 and #9 |
| | **Lab reports and Lab exam** | 15, 1 | 15% (15) | 1-15, 8 | LO #1-15, LO #1-8 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #8 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | semiconductors:<br>- structure of the atom, orbitals in the atom, - energy levels<br>- Contributory and Contributory Links - Conductivity, semiconductors |
| **Week 2** | doping, equivalence -Diffraction and diffusion<br>-Conductors, insulators and semiconductors -<br>Connectivity |
| **Week 3** | PN junction:<br>open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits |
| **Week 4** | junction applications<br>Dual types.<br>Zener diode.<br>Half wave rectifier and full wave rectifier<br>Filters |
| **Week 5** | three-way transistor The<br>controlled source Triple<br>connection.<br>Transistor specifications |

| | |
|---|---|
| **Week 6** | saturation and cutoff in the transistor |
| **Week 7** | transistor as a switch |
| **Week 8** | transistor as an amplifier |
| **Week 9** | FET transistor<br>Voltage controlled power source |
| **Week 10** | JFET transistor JFET<br>Properties |
| **Week 11** | JFET circuit analysis |
| **Week 12** | MOS-FET transistor<br>Properties and circuit analysis |
| **Week 13** | FET transistor as an amplifier |
| **Week 14** | FET transistor as a switch |
| **Week 15** | Application examples |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | **Characteristics Diode** |
| **Week 2** | **Half wave rectifier** |
| **Week 3** | **Full wave rectifier** |
| **Week 4** | **Clipper Circuit** |
| **Week 5** | **Clamper Circuit** |
| **Week 6** | **Voltage Multipliers** |
| **Week 7** | **Other Diode applications ( AND circuit)** |
| **Week 8** | **Other Diode applications ( OR circuit)** |
| **Week 9** | **Zener Diode characteristics** |
| **Week 10** | **Zener regulator** |
| **Week 11** | **BJT characteristics** |
| **Week 12** | **FET characteristics** |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Electronics for Physicists: An Introduction (Undergraduate Lecture Notes in Physics) 1st ed. 2020 Edition by Bryan H. Suits | No |
| **Recommended Texts** | fundamental of physics by F.Bush | No |
| **Websites** | No | |

| 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 | راس ب | (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 and electrical Drawing | **Module Delivery** | |
| **Module Type** | Basic | **Theory**<br>**Lecture**<br>**Practical** | |
| **Module Code** | STUMETC 123 | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | | |
| **Module Level** | 1 | **Semester of Delivery** | 2 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ala'a | **e-mail** | Ala'a.qasim@stu.edu.iq |
| **Module Leader's Acad. Title** | Assist. Lecturer | **Module Leader's Qualification** | Asst. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **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 | 1- To understand manual drafting and dimensioning of views<br>2- To perform lines drawing, simple sketches and modify dimensions.<br>3- This course deals with the basic concept of electrical drawing.<br>4- To understand sections and isometrics.<br>5- Explains the principles of orthographic views<br>6- To understand multi view projection.<br>7- To understand sectional view drawing |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Recognize drawing paper Specification and Kinds of Lines 2- Understand the first angle projection and third angle projection 3- Explain multi view projection and views Distributions.<br>4- Drawing of side view and drawing of top view .<br>5- Dimensioning of Drawing and Full Section<br>6- Understand half Section and offset Section<br>7- Explain partial section<br>8- To understand electrical drawing |
| **Indicative Contents**<br>المحتويات الإرشادية | Drawing Paper Specification, Kinds of Lines, First Angle Projection [21 hrs]<br><br>Third Angle Projection, Multi View Projection, Views Distributions [21 hrs]<br><br>Drawing of Side View, Drawing of Top View, Dimensioning of Drawing, Full Section, Half Section, Offset Section [21 hrs]<br><br>Partial Section, Pictorial Drawing, Isometric Drawing [21 hrs]<br><br>Electrical Drawing , Electrical Symbols, Electronic Symbols [21 hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 110 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 40 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **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 | 20% (10) | 5 and 8 | LO #1, #2 and #5, #6 |
| | **Assignments** | 2 | 20% (10) | 4 and 14 | LO #3 and #8 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي

| | Material Covered |
|---|---|
| **Week 1** | Drawing Paper Specification |
| **Week 2** | Kinds of Lines |
| **Week 3** | First Angle Projection |
| **Week 4** | Third Angle Projection |
| **Week 5** | Multi View Projection |
| **Week 6** | Views Distributions |
| **Week 7** | Drawing of Side View, Drawing of Top View |
| **Week 8** | Dimensioning of Drawing, Full Section |
| **Week 9** | Half Section, Offset Section |
| **Week 10** | Partial Section |
| **Week 11** | Pictorial Drawing |
| **Week 12** | Isometric Drawing |
| **Week 13** | Electrical Drawing |
| **Week 14** | Electrical Symbols |
| **Week 15** | Electronic Symbols |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Engineering Drawing . assistant professor Abed Alrassol AL-Khfaf , UOT , 1990<br><br>Electrical Drawing, J. C. Cluley , 1979 | No |

| 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 | راس ب | (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 materials | | | **Module Delivery** | |
| **Module Type** | Core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC112 | | | | |
| **ECTS Credits** | 8 | | | | |
| **SWL (hr/sem)** | 200 | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 1 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Jawad Kareem Zbun | | **e-mail** | jawad.kareem@stu.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** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **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 | 1. 2. It provides a working knowledge of Material Science.<br>3. Illustration and discussion the principles of Material structure-selection and description.<br>To select a material for a given use based on considerations of cost and performance.<br>4. To be able to create a new material that will have some desirable properties.<br>5. To understand the limits of materials and the change of their properties with use. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. 2. An understanding of Dimensions and units of measurement.<br>3. 4. List the various terms associated with Engineering Materials .<br>5. 6. Summarize what is meant by a basic of materials selection.<br>7. Discuss the structure, properties and application on of different materials.<br>Describe atoms bonding.<br>Define Crystal Structure.<br>Identify the principle of solidification.<br>8. Discuss the various properties of semiconductors..<br>9. Identify the properties of composite materials. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A –various Materials types , structure and behavior Theory<br>Classification of Materials, Advanced materials, Atomic structure, Crystal structureDefects-types of defect-linear defect- Alloy applications- Types of Ceramics. [15 hrs]<br><br>Ceramics, Types of Ceramics polymers, Polymers types and properties, Semiconductors, Composite materials phase. [15 hrs]<br><br>diagram -Carbon steel diagram, Heat treatment , Quenching and Tempering. [10 hrs]<br><br>Mechanical behavior for metals- elastic and plastic deformation, Mechanical behavior of polymers, Mechanical behavior of Ceramics, Mechanical behavior of Composite materials. [15 hrs]<br><br>Revision problem classes [6 hrs]<br><br>Part B –Properties of materials<br><br>Hardness and other mechanical properties, Physical propertiese. [15 hrs]<br><br>Thermal properties, Heat capacity, Thermal expansion, Thermal stresses. [7 hrs]<br><br>Physical and electrical properties, Electrical conductivity of polymers and Ceramics. Semi conductivity Dielectrical properties [15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **200** | | |

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 10 | LO #1, #3 and #4, #5 |
| | **Assignments** | 2 | 5% (5) | 3 and 8 | LO #6 and #9 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | **Lab report and Lab exam** | 7, 1 | 15% (15) | | |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction - Classification of Materials. |
| **Week 2** | Advanced materials – Atomic structure. |
| **Week 3** | Atoms bonding- Crystal structure. |
| **Week 4** | Defects-types of defect-linear defect-Principle of solidification. |
| **Week 5** | Alloy applications- Types of Ceramics. |

| | |
|---|---|
| **Week 6** | Polymers, Polymers types and properties. |
| **Week 7** | Semiconductors, Composite materials. |
| **Week 8** | Phase diagram -Carbon steel diagram. |
| **Week 9** | Heat treatment. |
| **Week 10** | Mechanical behavior for metals- elastic and plastic deformation . |
| **Week 11** | Mechanical behavior for Ceramics, Polymers and composite materials. |
| **Week 12** | Hardness and other mechanical properties |
| **Week 13** | Physical and electrical properties |
| **Week 14** | Electrical conductivity of polymers and Ceramics |
| **Week 15** | Thermal properties |
| **Week 16** | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Lab 1: Introduction to Rockwell Hardness tes |
| **Week 2** | Lab 2: Brinell Hardness test |
| **Week 3** | Lab 3: Vickers Hardness test |
| **Week 4** | Lab 4: Sample preparation for Microscopic examination |
| **Week 5** | Lab 5: ASTM GRAIN SIZE ANALYSIS |
| **Week 6** | Lab 6: Heat Treatment- Quenching and tempering |
| **Week 7** | Lab 7: Preparation and study of the Micro Structure of pure metals like Iron, Copper and Aluminum. |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Engineering Materials 1, An introduction to Their Propertiesand Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996. | NO |
| **Recommended Texts** | Materials Science and Engineering – An introduction, sixth edition,John Wiley & Sons, Inc. 2004. | No |
| **Websites** | https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf | |

## 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 | راس ب | (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 Mechanics | | | **Module Delivery** | |
| **Module Type** | Core | | | **Theory**<br>**Lecture** | |
| **Module Code** | STUMETC 122 | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | 150 | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 2 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ahmed thamer radhi | | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | M.SC |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To develop problem solving skills and understanding of mechanics theory through the application of techniques.<br>2. 3. To understand force, resultant and vectors from a mechanical devices.<br>4. This course deals with the basic concept of statics and dynamics mechanics. This is the basic subject for all mechanics parts.<br>5. To understand force moment, equilibrium, centroid and moment of inertia problems.<br>6. To know about friction problems perform mechanics dynamics analysis. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. 2. 3. 4. Recognize how force resultant works in mechanic parts.<br>5. 6. 7. 8. Understand the moment associated with force resultant.<br>9. Explain what is the equilibrium.<br>10. Discuss the centroid and its types in mechanics.<br>11. Describe moment of inertia.<br>Define truss concept.<br>Identify the basic friction elements and their applications.<br>Discuss the different types of loads.<br>Discuss the terms of displacement, velocity .<br>Explain the two dynamics.<br>Identify how to find the dynamics components and analysis. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Introduction to static. Scalar quantity, vector quantity ,standers units. Tow– Tow–dimensional force systems, rectangular components .Moment, principle of moment ,couple ,couple-force system Resultants .Three-dimensional force system, component forces for three dimensions .couple in three-dimensional force system, couple-force system in three-dimensional force system. Resultant in three –dimensional forces. Equilibrium, free body diagram. Structures ,analysis methods. Types of friction, types friction centroid.[10 hrs]<br><br>Composite bodies &figures Moment of inertia-composite area. [10 hrs]<br><br>Introductiontodynamic.Kinematicsofparticles,rectilinearmotion.Velocity,acceleration&motionlaws.Plane curvilinear motion(rectangularcoordinate(xy)).Projectilemotion.Planecurvilinearmotion(normal & tangential coordinates (n-1)).Plane curvilinear motion (polar coordinates (rϴ)).[10 hrs]<br><br>Kinetics of particles, Newton's second law. Rectilinear motion. Curvilinear motion. Kinetics of particles, work power, Efficiency, principle of work & kinetic energy. Impulse & momentum [15 hrs] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 94 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 56 | **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 تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #6, #8 |
| | **Assignments** | 2 | 10% (10) | 4 and 12 | LO #3 and #6, #7 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to static. Scalar quantity, vector quantity, standers units. Tow– Tow– dimensional force systems, rectangular components. |
| **Week 2** | Moment, principle of moment, |
| **Week 3** | couple, couple -force system Resultants. |
| **Week 4** | Three-dimensional force system, component forces for three dimensions. couple in threedimensional force system, couple-force system in three-dimensional force system. |
| **Week 5** | Resultant in three –dimensional forces. Equilibrium, free body diagram. |
| **Week 6** | Structures, analysis methods. |
| **Week 7** | Centroid concept |
| **Week 8** | Composite bodies &figures Moment of inertia-composite area. |
| **Week 9** | Introduction to friction,. |
| **Week 10** | Introduction to dynamic. Kinematics of particles, rectilinear motion. |
| **Week 11** | Velocity, acceleration& motion laws. Plane curvilinear motion (rectangular coordinate(x-y)). Projectile motion. |

| | |
|---|---|
| **Week 12** | Plane curvilinear motion(normal & tangential coordinates (n-1)). Plane curvilinear motion(polar coordinates (r-Θ)). |
| **Week 13** | Kinetics of particles |
| **Week 14** | Newton's second law. Rectilinear motion. Curvilinear motion. |
| **Week 15** | Kinetics of particles, work power, Efficiency, principle of work& kinetic energy. Impulse & momentum |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Engineering Mechanics,Volume1, Statics &Dynamics , Fifth Edition by J. L. Meriam & L. G. Kraige | No |
| **Recommended Texts** | | |
| **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 | راس ب | (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/1** | **Module Delivery** | |
| **Module Type** | Basic | **Theory**<br>**Lecture** | |
| **Module Code** | STUMETC 124 | | |
| **ECTS Credits** | 3 | | |
| **SWL (hr/sem)** | 75 | | |
| **Module Level** | 1 | **Semester of Delivery** | 2 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Wael Hussein Zayer | **e-mail** | wael.zayer@stu.edu.iq |
| **Module Leader's Acad. Title** | Professor | **Module Leader's Qualification** | Ph.D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Develop students skills in understanding the basic grammars of English.<br>2. Develop students' speaking skills in English.<br>3. Develop students' listening skills in English.<br>4. Develop students' reading skills in English.<br>5. Develop students' reading skills in English. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Understand the rule of present simple, numbers as Vocabulary<br>2. Understand the usage of am / are / is, cities and countries as Vocabulary.<br>3. Understand the grammars of personal information, social expressions as Vocabulary .<br>4. Understand the grammars of possessives, word groups as Vocabular .<br>5. Understand the grammars of present simple, Countries and nationalities as Vocabulary.<br>6. Understand the grammars of present simple, Your day as Vocabulary.<br>7. Understand the grammars of Question words, Verb patterns 1, Adjectives as Vocabulary.<br>8. Understand the grammars of There is / are, places and things as Vocabulary.<br>9. Understand the grammars of Simple irregular, was/were, have, do, go as Vocabulary.<br>10. Understand the grammars of past simple, work, sports, and leisure as Vocabulary.<br>11. Understand the grammars of can / can't, requests, verbs as Vocabulary.<br>12. Understand the grammars of like / would like, some / any, in a restaurant as Vocabulary.<br>13. Understand the grammars of present continuous, opposite verbs as Vocabulary.<br>14. Understand the grammars of future plans, present continuous for future, transport and travel as Vocabulary. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>The grammars of present simple, am / are / is, personal information. Numbers, cities and countries, social expressions as Vocabulary. [12].<br><br>The grammars of possessives, present simple. Word groups, Countries and nationalities, your day as Vocabulary. [12].<br><br>The grammars of Question words, There is / are, Simple irregular, was/were . Verb patterns 1, adjectives, places and things, have, do, go as Vocabulary. [12].<br><br>The grammars of past simple, can / can't, like / would like, some / any. Work, sports, and leisure, verbs, in a restaurant as Vocabulary. [12].<br><br>The grammars of present continuous, future plans, present continuous for future. Opposite verbs, transport and travel as Vocabulary. [8]. |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 63 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 12 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **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** | 3 | 15% (10) | 3, 8 and 12 | LO #1and #5 and #11 |
| | **Assignments** | 3 | 15% (10) | 4, 9 and 14 | LO #3, #8 and #13 |
| | **Report** | 1 | 10% (10) | 13 | LO #4, #8 and #12 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Unit one : At a party<br>Grammar: Present Simple<br>Vocabulary: Numbers |
| **Week 2** | Unit two : Going sightseeing<br>Grammar: am / are / is<br>Vocabulary: Cities and countries |
| **Week 3** | Unit three: In a cafe<br>Grammar: Personal information<br>Vocabulary: Social expressions |
| **Week 4** | Unit four : In a chemist's<br>Grammar: Possessives<br>Vocabulary: Word groups |
| **Week 5** | Unit Five : In a post office<br>Grammar: present simple<br>Vocabulary: Countries and nationalities |
| **Week 6** | Unit six : In a railway station<br>Grammar: present simple<br>Vocabulary: Your day |
| **Week 7** | Unit seven : On the phone<br>Grammar: Question words, Verb patterns 1<br>Vocabulary: Adjectives |
| **Week 8** | Unit eight : Personal questions<br>Grammar: Questions and answers, There is / are Vocabulary:<br>Places and things |

| | |
|---|---|
| **Week 9** | Unit nine : What's the matter?<br>Grammar: Past Simple irregular, was/were Vocabulary:<br>have, do, go |
| **Week 10** | Unit ten: What's the problem?<br>Grammar: Past Simple 1<br>Vocabulary: Work, sports, and leisure |
| **Week 11** | Unit eleven:<br>Grammar: can / can't, Requests Vocabulary:<br>Verbs |
| **Week 12** | Unit twelve:<br>Grammar: like / would like, some / any Vocabulary:<br>In a restaurant |
| **Week 13** | Unit thirteen:<br>Grammar: Present Continuous<br>Vocabulary: Opposite verbs |
| **Week 14** | Unit fourteen:<br>Grammar: Future plans, Present Continuous for future Vocabulary:<br>Transport and travel |
| **Week 15** | assessment |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | New headway, Liz and John Soars, OXFORD | No |
| **Recommended Texts** | English Grammar in Use, 5th Edition by Raymond Murphy. | No |
| **Websites** | https://elt.oup.com/student/headway/beg/?cc=global&selLanguage=en | |

## 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 | راس ب | (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 computer/1** | | | **Module Delivery** | |
| **Module Type** | basic | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 114 | | | | |
| **ECTS Credits** | 5 | | | | |
| **SWL (hr/sem)** | 125 | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 1 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ghadah Salim Khefi | | **e-mail** | g.s.khefi@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Assist. Lecturer | **Module Leader's Qualification** | | Asst. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To develop problem-solving skills and an understanding of the computer through the application of techniques<br>2. 2- To understand the work of the electronic computer and the possibility of dealing with it<br>3. Developing an understanding of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks.<br>4. Developing practical skills in software development, including programming, debugging, testing, and documentation.<br>5. Developing problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools.<br>6. Developing an understanding of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide.<br>7. Developing an understanding of the role of computer science in society, including its impact on industry, government, healthcare, and education.<br>8. Developing an appreciation for the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Discusses the basic components of a computer system, including hardware, software, and peripherals.<br>2. Understand basic computer programming concepts such as variables, loops, and conditionals<br>3. It discusses the basics of computer networking, including the different types of networks, network topologies, and network protocols.<br>4. Learn about common operating systems, such as Windows, Mac OS, and Linux, including their features, functions, and user interface<br>5. Learn to use popular productivity software, including word processing, spreadsheet, and presentation applications<br>6. Understand the importance of computer security and privacy, including risks associated with malware, viruses, and phishing<br>7. Develop basic troubleshooting skills, including identifying and resolving common hardware and software problems<br>8. Learn basic computer terms and concepts, including file management, data storage, and computer ethics<br>9. Familiarize learners with basic computer terms and concepts, such as file management, data storage, and computer ethics.<br>10. Learners understand different file formats, data storage options, and ethical considerations related to the use of computers and the Internet.<br>11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords |

| | |
|---|---|
| | 12. Learners have developed skills in creating, editing and formatting documents, spreadsheets and presentations. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | <u>Part A - Computer Basics</u><br><br>1- Computer Basics includes, computer life cycle - computer generations - data and information - computer features - areas of use. Computer's components(10 hrs)<br>2- The physical parts of the computer - input devices - output devices - computer case<br>Software entity - computer setup systems - personal computer features (8 hrs)<br>3- Part review (2hrs)<br><br><u>Part B-Computer security and software licenses</u><br>4- Ethics of the electronic world - forms of transgression in the digital world - computer security - computer privacy - computer software licenses - types of licenses - intellectual property - types of electronic penetration (10hrs)<br>5- malicious programs<br>Computer viruses - components of the virus - types of viruses - the most common security risk (8hrs)<br>-Part review (2hrs)<br><br><u>Part C- Operating Systems</u><br>-Definition of operating system - Functions of the operating system - Objectives of the operating system - Classification of operating systems (10hrs)<br>6- Desktop Components - Start Menu - Taskbar - Notification Area - Folders and Files -<br>Desktop Backgrounds - Control Panel – Help (8hrs) -<br>Part review (2hrs) |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | 1. Start with the basics: Begin by introducing learners to the basic components of a computer system, including hardware, software, and peripherals. Use simple, easy-to-understand language and provide visual aids, such as diagrams and images, to help learners grasp the concepts.<br><br>2. Use a hands-on approach: Provide learners with opportunities to practice using computers and software applications. Use interactive activities, such as tutorials, quizzes, and games, to engage learners and reinforce their learning.<br><br>3. Provide clear instructions: Ensure that instructions are clear and easy to follow. Break down complex tasks into smaller, manageable steps and provide learners with clear guidance on how to complete each step.<br><br>4. Use real-world examples: Use real-world examples to illustrate the relevance and practical applications of computer technology. For example, show learners how to create a resume using word processing software or how to create a budget using a spreadsheet application. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 64 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 61 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **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) | 7 and 13 | LO #2, #3، and #7, #8، |
| | **Assignments** | 2 | 10% (10) | 3 and 10 | LO #1, #4 and #5, #6،#9 |
| | **Projects / Lab.** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 14 | LO #10, #11 and #12 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Phases of the computer cycle, and its development |
| **Week 2** | Electronic computer, data Information and computer features |
| **Week 3** | Computer components and types of computers |
| **Week 4** | The physical parts of the computer, and the entity software |
| **Week 5** | computer setup systems and computer features |
| **Week 6** | Factors that must be taken into account when Buying a computer, and the ethics of the world electronic |
| **Week 7** | Forms of abuse in the digital world - Computer security and privacy the computer |
| **Week 8** | Computer software licenses and types Intellectual property licenses |
| **Week 9** | Hack email and its sources |
| **Week 10** | Malignant-Types - components |
| **Week 11** | Computer risks- Health - psychological - social |
| **Week 12** | Operating systems - concept - functions - goals |

| | |
|---|---|
| **Week 13** | Desktop background, control panel |
| **Week 14** | Mouse settings and controls Windows general exercises |
| **Week 15** | preparatory week before the final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to Word- Understanding the Word interface- Creating a new document<br>- Saving and opening documents- Basic text editing and formatting |
| **Week 2** | Formatting Text- Font type, size, and color- Bold, italic, and underline- Alignment and indentation- Bullets and numbering |
| **Week 3** | Page Layout- Margins and orientation- Page size and breaks- Headers and footers<br>- Page numbering |
| **Week 4** | Styles and Themes- Creating and modifying styles- Applying themes- Saving and sharing styles and themes |
| **Week 5** | Tables- Creating tables- Formatting tables- Merging and splitting cells- Calculating in tables |
| **Week 6** | Images and Graphics- Inserting images and graphics- Resizing and cropping images- Adding captions and alt text- Working with shapes and text boxes |
| **Week 7** | Document Collaboration- Sharing documents- Tracking changes- Reviewing and accepting changes- Adding comments |
| **Week 8** | Mail Merge- Creating a data source- Creating a mail merge document- Previewing and finishing the merge |
| **Week 9** | Templates- Using built-in templates- Creating custom templates- Saving and sharing templates<br>- Applying templates |
| **Week 10** | Working with Long Documents- Using headings and subheadings- Creating a table of contents<br>- Adding footnotes and endnotes- Creating an index |
| **Week 11** | Advanced Formatting- Using styles for formatting- Formatting page numbers and section breaks<br>- Working with columns and breaks- Using line and page breaks |
| **Week 12** | Advanced Editing- Using find and replace- Using the thesaurus and dictionary- Creating and modifying autocorrect entries- Using the Clipboard and Smart Cut and Paste |

| | |
|---|---|
| **Week 13** | Macros and Automation- Recording and running macros- Customizing the Quick Access Toolbar and Ribbon- Using keyboard shortcuts- Automating tasks with Visual Basic for Applications (VBA) |
| **Week 14** | Advanced Topics- Creating and editing forms- Protecting documents with passwords and permissions- Using macros to automate tasks- Customizing Word options and settings |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | William Stallings, ( 2003 ), Computer Organization & Architecture, Sixth edition, Preson Education | Yes |
| **Recommended Texts** | 1. "Computer Science Illuminated" by Nell Dale and John Lewis - . | No |
| **Websites** | 1. GCF Global - Computer Basics: https://edu.gcfglobal.org/en/computerbasics/<br>2. Digital Unite - Computer Basics: https://digitalunite.com/technology-guides/computerbasics | |

## 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 | راس ب | (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** | **Module Delivery** | |
| **Module Type** | **Core** | **Theory**<br>**Lecture**<br>**Lab**<br>**Tutorial** | |
| **Module Code** | STUMETC 111 | | |
| **ECTS Credits** | **8** | | |
| **SWL (hr/sem)** | **200** | | |
| **Module Level** | 1 | **Semester of Delivery** | 1 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Assist. Prof. | **Module Leader's Qualification** | Ph.D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 5- Learn the fundamentals and principles of electrical engineering.<br>6- Knowledge of electric circuit elements.<br>7- Analysis of electric circuits.<br>8- Electrical circuits theorems.<br>9- Calculations of currents, voltages and electrical power for DC and AC circuits<br>10- Analysis of resonance in AC circuits (Series and parallel resonance)<br>11- Analysis of Electromagnetic circuits |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Able to Recognize the Basic concepts of electrical circuits, elements and values. Understand Ohm's Law and Power , Efficiency , Energy definitions<br>2. Able to Recognize the resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage drop and UnderstandVoltage divider law internal resistance voltage sources voltage regulation<br>3. Able to Recognize the Parallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuits. Understand series-parallel circuits, series-parallel networks.<br>4. Discuss the Stream sources: converting sources - approved and unaccredited sources and Current sources in series - Current sources in parallel – Limiters.<br>5. Describe Analysis methods: sub-stream method.Grid current method - node voltage method.<br>6. Identify the Arch circles. Understand Transform (delta-star) and (star-delta). 7. Discuss the Network theories: superposition theory - Thevenin theory Norton's theory .<br>1. Able to Recognize the theory of transfer of greatest ability and Melman's theory<br>2. Discuss the AC circuits and sinusoidal quantities. Understand Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factor<br>3. Explain the Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems. Understand Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system.<br>4. Identify the AC circuits: Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor. UnderstandSeries AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency response.<br>5. Explain the Parallel alternating current circuits - tolerance and phase diagram Understand R-L-C, R-C, and R-L circuits in parallel.<br>6. Able to Recognize the Circuits of inductors and reactive power - capacitor circuits. Understand Power triangle - P, Q, S power factor correction.<br>7. Able to Recognize the Magnetic circuits: magnetic field, field intensity, magnetic field strength. Understand Permeability coefficient, magnetic force, and hysteresis.<br>8. Able to Recognize the Magnetic circuits in series and parallel |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A -DC Circuit<br>Basic concepts, introduction to electricalcircuits, elements and valuesof DC circuits, Ohm's Law - Power - Efficiency – EnergySeries circuit: resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage dropVoltage divider law internal resistance voltage sources voltage regulationParallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuitsSeries-parallel circuits: series-parallel networks,Stream sources: converting sources - approved and unaccredited sourcesCurrent sources in series - Current sources in parallel - Limiters [36 hr]<br><br>DC circuitsAnalysis methods I –sub-stream methodGrid current method - node voltage method Arch circles,Transform (delta-star) and (star-delta). [18hrs]<br><br>Network theories: superposition theory - Thevenin theory, Norton's theory, the theory of transfer of greatest ability ,Melman's theory. [36 hr]<br><br>Part B - AC Circuits<br><br>AC Circuits II - AC circuits and sinusoidal quantities Phase relations - average values, effective values - response (resistance - coil and capacitance) to voltage, alternating current - average power and power factor. [18hrs]<br><br>Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systemsArithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system. [18hrs]<br><br>AC circuits:Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor<br>Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency responseParallel alternating current circuits – tolerance, and phase diagramR-L-C, R-C, and R-L circuits in parallel. [18 hr]<br><br>Current bypass law - series circuits - alternating parallel - series and parallel circuits<br>Power in alternating current circuits: resistance circuits - apparent power<br>Circuits of inductors and reactive power-capacitor circuits<br>Power triangle - P, Q, S power factor correction [18 hr]<br><br>Magnetic circuits: magnetic field, field intensity, magnetic field strengthPermeability coefficient, magnetic force, hysteresisMagnetic circuits in series and parallel [18 hr] |

| 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 139 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 9 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 61 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **200** | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (10) | 5 and 12 | LO #1, #3 and # 6, #8 |
| | **Assignments** | 2 | 5% (10) | 8 and 14 | LO #4 and #9, #13 |
| | **Projects** | 1 | 5% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | **Lab Reports and Lap Exam** | 15, 1 | 15%(15) | 1-15,8 | LO #1- #15, LO #1- #8 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Basic concepts andintroduction to electricalcircuits, elements, and valuesDC circuitsOhm's Law - Power - Efficiency - Energy |
| **Week 2** | Series circuit: resistors in series - voltage sources in series - Kirchoff's voltage law - battery signal and voltage dropVoltage divider law internal resistance voltage sources voltage regulation |
| **Week 3** | Parallel circuits: resistors in parallel - parallel networks - Kirchoff's current law - bypass law - open circuits and short circuitsSeries-parallel circuits: series-parallel networks, |
| **Week 4** | Stream sources: converting sources - approved and unaccredited sources, Current sources in series - Current sources in parallel - Limiters |
| **Week 5** | Analysis methods: sub-stream methodGrid current method - node voltage method |
| **Week 6** | Arch circles, Transform (delta-star) and (star-delta). |
| **Week 7** | Network theories: superposition theory - Thevenin theoryNorton's theory - the theory of transfer of greatest ability |
| **Week 8** | Melman's theory ,AC circuits and sinusoidal quantities |
| **Week 9** | Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factorComplex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems |
| **Week 10** | Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase systemAC circuits:Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor |
| **Week 11** | Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency responseParallel alternating current circuits - tolerance and phase diagram |
| **Week 12** | R-L-C, R-C, and R-L circuits in parallelCurrent bypass law - series circuits - alternating parallel - series and parallel circuits |
| **Week 13** | Power in alternating current circuits: resistance circuits - apparent powerCircuits of inductors and reactive power - capacitor circuits |
| **Week 14** | Power triangle - P, Q, S power factor correction, Magnetic circuits: magnetic field, field intensity, magnetic field strength |
| **Week 15** | Permeability coefficient, magnetic force, hysteresis<br>Magnetic circuits in series and parallel |

| | |
|---|---|
| **Week 16** | The preparatory week before the Final Exam |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Lab 1: Color resistance code |
| **Week 2** | Lab 2: Ohm's law |
| **Week 3** | Lab 3: Series and Parallel connection |
| **Week 4** | Lab 4:Kirchhoff's law |
| **Week 5** | Lab 5:Star – Delta connection |
| **Week 6** | Lab 6;Supper position theorem |
| **Week 7** | Lab 7; Thévenin's / Norton's Theorem and Kirchhoff's Laws |
| **Week 8** | Lab 8: : Mesh theorem |
| **Week 9** | Lab 9: Nodal theorem |
| **Week 10** | Lab 10: Impedance elementcharacteristics |
| **Week 11** | Lab 11: A.C Maximumtransfer |
| **Week 12** | Lab 12:RL series circuit |
| **Week 13** | Lab 13:RC series circuit, RLC series circuit |
| **Week 14** | Lab 14:RL parallel circuit, RC parallel circuit |
| **Week 15** | Lab 15:RLC parallel circuit |

| **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<br>A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005<br>Introductory Circuit Analysis, Volume 10, Boylestad | NO |
| **Recommended Texts** | DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents. | No |
| **Websites** | https://www.coursera.org /electrical-engineering | |

| 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 | راس ب | (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** | **Mathematics** | | | **Module Delivery** | |
| **Module Type** | Basic | | | **Theory**<br>**Lecture**<br>**Tutorial** | |
| **Module Code** | STUMETC 113 | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | 150 | | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | 1 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Raed Khalid Hemeed | | **e-mail** | Read.Khalid@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Assist. Lecturer | **Module Leader's Qualification** | | Asst. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To develop problem solving skills and understanding of mathematics through the application of techniques.<br>2. To understand fundamental functions, differentiation, integration.<br>3. This course deals with the basic concepts of differentiation of the functions.<br>4. This is the basic subject for all simple function, polynomials, and power, rational functions.<br>5. To understand problems like derivatives applications, change rate, draw functions, derivatives of trigonometric functions, natural logarithm and exponential functions, log function and other types of functions.<br>6. To develop knowledge and techniques to integrate various types of function and integration application, finding area, volumes, methods of integration. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering.<br>2. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition).<br>3. Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic).<br>4. Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions.<br>5. Derivative of Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$.<br>6. Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule.<br>7. Discussion and review of the previous topics.<br>8. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic)<br>1. Integration of trigonometric and hyperbolic functions.<br>2. Applications of definite integration, area and volume.<br>3. Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$, inverse trigonometric and hyperbolic functions.<br>4. Methods of integration, integration by parts, substitution sin and cos function, partial fraction.<br>5. Methods of integration of special function, of type $\sin^n$, $\cos^n$.<br>6. Discussion and review of the previous topics. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | <u>Part A – define functions</u><br><br>Functions - Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). [12hrs]<br><br><u>Part B – Differentiation functions</u><br><br>Differentiation - Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic).Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions.Derivative of Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$.Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. Discussion and review of the previous topics. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). [24hrs]<br><br>Revision problems [6 hrs]<br><br><u>Part B – Integration functions</u><br><br>Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). Integration of trigonometric and hyperbolic functions. Applications of definite integration, area and volume.Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$, inverse trigonometric and hyperbolic functions.[24hrs]<br><br>Methods of integration, integration by parts, substitution sin and cos function, partial fraction.Methods of integration of special function, of type $\sin^n$, $\cos^n$.[12hrs]<br><br>Discussion and review of the problems.[6hrs]<br><br>Exam preparing. [6 hrs]<br>Exam. [4hrs] |

| 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 94 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 56 | **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<br>Evaluation تقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #3 and #8, #9 |
| | **Assignments** | 2 | 10% (10) | 6 and 13 | LO #5 and #7, #12 |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 30% (20) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.4 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. |
| **Week 2** | Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). |
| **Week 3** | Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic). |
| **Week 4** | Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions. |
| **Week 5** | Derivative of Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$. |
| **Week 6** | Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. |
| **Week 7** | Mid-term Exam |
| **Week 8** | Discussion and review of the previous topics. |
| **Week 9** | Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic) |
| **Week 10** | Integration of trigonometric and hyperbolic functions. |
| **Week 11** | Applications of definite integration, area and volume. |
| **Week 12** | Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function $a^x$,$x^x$, inverse trigonometric and hyperbolic functions. |
| **Week 13** | Methods of integration, integration by parts, substitution sin and cos function, partial fraction. |
| **Week 14** | Methods of integration of special function, of type $\sin^n$, $\cos^n$.Discussion and review. |
| **Week 15** | Final Exam |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **Theory of advanced mathematics with application by Thomas Calculus.** | No |
| **Recommended Texts** | **Books and Literatures in different kinds of Advanced Mathematics.** | No |
| **Websites** | https://www.khanacademy.org/math/calculus-1 | |

| 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 | راس ب | (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** | **Workshops** | **Module Delivery** | |
| **Module Type** | Core | | |
| **Module Code** | STUMETC 125 | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | **Practical** | |
| **Module Level** | 1 | **Semester of Delivery** | 2 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Enable the student to know and understand the theoretical and practical principles of the plumbing workshop.<br>2. Enable the student to know and understand the theoretical and practical principles of the electrical workshop.<br>3. Enable the student to know and understand the theoretical and practical principles of the blacksmithing workshop.<br>4. Enable the student to know and understand the theoretical and practical principles of the turning workshop.<br>5. Enable the student to know and understand the theoretical and practical principles of the automobile workshop.<br>6. Design of various models and Manufacture of some simple products. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Understand the types of fillings<br>2. Understandthe types of blacksmithing.<br>3. Understandthe types ofTurning.<br>4. Understandthe types ofWelding.<br>5. Understandabout plumbing.<br>6. Understand about electricity. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A -Tools<br>Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers, types and uses, drill types and dimensions.[12hrs]<br><br>Measuring toolsSteel miler, Veneer, Micrometer, Height & height gauge hand tools, Saws, Hammers, Files, Scriber, Chisels, Taps and dies, Surface plate, Bench working. [18 hrs]<br><br>Part B – filings<br>The coolant used for wood, the coolant used for iron, the cutting edge, and the means of joining work piecesHow to process refrigerators and their types, taking care of the refrigerator when using it, the proper use of refrigerators and methods of maintaining them[12hrs]<br><br>Part C- blacksmithing<br>Saw, drill, welding machine, cutting rocket, concrete shot gun[12 hrs]<br><br>Part D-LathingWorkshop<br>lathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining.[12 hrs]<br><br>Part E–WeldingWorkshop<br><br>Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot.[12hrs]<br><br>Part F–plumbing<br>Characteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted)[12hrs]<br><br>Part G – electricity<br>Electrical insulation, insulation materials, winding methods, some practical examples, electrical contacts, diagrams, some practical examples[12hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 94 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 6 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 56 | **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** تقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 8 and 12 | LO #1, #4 and #٥, #6 |
| | **Assignments** | 2 | 10% (10) | 5 and 12 | LO #3, #5 and #6, #12 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #2, #4and #6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly work shop. Syllabus)**<br>المنهاج الاسبوعي للورش ة |
|---|

| | Material Covered |
|---|---|
| **Week 1,2, 3** | Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers , types and uses , drill types and dimensions |
| **Week 4,5** | Steel miler , Veneer , Micrometer , Height & height gauge hand tools , Saws, Hammers , Files , Scriber , Chisels , Taps and dies , Surface plate , Bench working. |
| **Week 6,7** | blacksmithing Saw, drill, welding machine, cutting rocket, concrete shot gun |
| **Week 8,9** | Lathing Workshoplathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining |
| **Week 10 ,11** | Welding Workshop Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot. |
| **Week 12, 13** | Part F – plumbingCharacteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted) |
| **Week 14, 15** | electricity, Electrical insulation, insulation materials, winding methods, some practical examples, electrical contacts, diagrams, some practical examples |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Engineering workshop chairs | NO |
| **Recommended Texts** | | 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 | راس ب | (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** | الديمقراطية وحقوق الانسان | **Module Delivery** | |
| **Module Type** | **basic** | **Theory**<br>**Lecture** | |
| **Module Code** | STUMETC 115 | | |
| **ECTS Credits** | 3 | | |
| **SWL (hr/sem)** | 75 | | |
| **Module Level** | 1 | **Semester of Delivery** | 1 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Khairy Bree Yasser | **e-mail** | Khairy.yasser@stu.edu.iq |
| **Module Leader's Acad. Title** | Assist. Prof. | **Module Leader's Qualification** | Ph. D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 4. المعرفة بحقو ق الإنسان.<br>5. تعرف على حقوق الإنسان الطبيعية والمحمية التي توفرها الحكومات والمجتمع الدولي للناس.<br>6. الهدف من هذه الوحد ة الدراسية هو تعريف الطلاب على ماهية الح ق ، وما هي حقوقه م الطبيعية ، وما هي حقوقهم السياسية. |

| | |
|---|---|
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. اعرف ما هو الحق.<br>2. معرفة الحقوق الطبيعية.<br>3. أن يكون الطالب قادراً على التعرف على حقوق الإنسان والحماية التي تمنحها لها الدساتير.<br>4. معرفة الحقوق السياسية.<br>5. معرفة دور المنظمات الدولية.<br>6. معرفة اسس حقوق الانسان في القانون الدولي.<br>7. معرفة الاعتراف الدولي بحقوق الانسان.<br>8. معرفة الحقوق المدنية.<br>9. معرفة حق المساواة امام القانون.<br>10. معرفة مفهوم الحرية وانواعها<br>.<br>11. معرفة الانتخابات كمبدأ من مبادئ حقوق الانسان.<br>12. تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع. |
| **Indicative Contents**<br>المحتويات الإرشادية | طبيعة الحق وماهية حقوق الانسان- مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديان - مميزات القانون الطبيعي – الحقوق الطبيعية [9]<br><br>اهمية حقوق الانسان واسسها – حقوق الانسان في الاديان - حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريفة - ارتباط الواجبات بالحقوق في الشريعة الاسلامية [9]<br><br>اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدين - العرف العاده –الحقوق اللصيقه الكائن الطبيعي - الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسان [9]<br><br>الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمير - حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدنية حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار [9] |

| | |
|---|---|
| | مفهوم الحرية وانواعها – قيود الحرية - الانتخابات كمبدأ من مبادئ حقوق الانسان -تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع [9] |

| 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 15 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SSWL (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 | 2 |
| **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** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #6, #8 |
| | **Assignments** | 2 | 10% (10) | 4 and 12 | LO #3 and #9, #10 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #5 and #8 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | طبيعة الحق وماهية حقوق الانسان |
| **Week 2** | مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديا ن |
| **Week 3** | مميزا ت القانون الطبيعي – الحقوق الطبيعي ة |
| **Week 4** | اهمية حقوق الانسان واسسها – حقوق الانسان في الاديا ن |
| **Week 5** | حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريف ة |
| **Week 6** | ارتباط الواجبات بالحقوق في الشريعة الاسلامية |
| **Week 7** | اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدي ن |
| **Week 8** | العرف العاده –الحقوق اللصيقه الكائن الطبيع ي |
| **Week 9** | الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسا ن |
| **Week 10** | الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمي ر |
| **Week 11** | حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدني ة |
| **Week 12** | حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار |

| | |
|---|---|
| **Week 13** | مفهوم الحرية وانواعها – قيود الحري ة |
| **Week 14** | الانتخابا ت كمبدأ من مبادئ حقوق الانسان |
| **Week 15** | تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | حقوق الانسان . حافظ علوان حمادي . جامعة بغداد كلية العلوم السياسية . 2009 | No |

## 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 | راس ب | (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** | جرائم حزب البعث البائد | **Module Delivery** | |
| **Module Type** | **basic** | **Theory<br>Lecture** | |
| **Module Code** | STUMETC 126 | | |
| **ECTS Credits** | 2 | | |
| **SWL (hr/sem)** | 50 | | |
| **Module Level** | 1 | **Semester of Delivery** | 2 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Khairy Bree Yasser | **e-mail** | Khairy.yasser@stu.edu.iq |
| **Module Leader's Acad. Title** | Assist. Prof. | **Module Leader's Qualification** | Ph. D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1- المعرفة بانتهاكات الحقوق والحريات من قبل النظام البعثي البائد.<br>2- المعرفة باساليب البعث البائد الظالمه التي اثرت على الميدان النفسي والاجتماعي .<br>3- المعرفة باثر القمع والحروب على البيئة والسكان . |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- معرفة نبذة وصفية عن الانظمة السياسية في العراق )1921-2003(.<br>2- معرفة إنتهاكات النظام البعثي للحقوق والحريات العامة .<br>3- معرفة أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة<br>4- معرفة أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية<br>5- معرفة اساليب البعث البائد الظالمة التي اثرت على الميدان النفس ي<br>6- معرفة اساليب البعث البائد الظالمة التي اثرت على الميدان الاجتماعي<br>7- معرفة تعامل حزب البعث البائد مع الدين ومفهوم الدول ة<br>8- معرفة اساليب حزب البعث البائد يف الثقافة السيئة والاعلام المسيس<br>9- معرفة عسكرة المجتمع<br>10- معرفة أستعمال الاسلحة المحرمة دوليا من قبل حزب البعث البائد والتلوث البيئى<br>11- معرفة سياسة الارض المحروقة من قبل حزب البعث البائد<br>12- معرفة تجفيف الاهوار والهجرة القسرية من قبل حزب البعث البائد<br>13- معرفة تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي من قبل حزب البعث البائد<br>14- معرفة المقابر الجماعية وقصف دور العبادة من قبل حزب البعث البائد |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | إنتهاكات الحقوق والحريا ت<br>نبذة وصفية عن الانظمة السياسية في العراق )1921-2003( - إنتهاكات النظام البعثي للحقوق والحريات العامة- أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة- أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية [ 01]<br><br>الميدان النفسي- الميدان الاجتماعي- الدين والدولة- الثقافة والاعلام وعسكرة المجتمع [ 01]<br><br>أثر القمع والحروب على البيئة والسكان<br>أستعمال الاسلحة المحرمة دوليا والتلوث البيئى- سياسة الارض المحروقة- تجفيف الاهوار والهجرة القسرية- تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي- المقابر الجماعية وقصف دور العبادة [ 10] |

| **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 15 اسبوع | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 2 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | |
| **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 and 10 | LO #1, #2 and #6, #8 |
| | **Assignments** | 2 | 10% (10) | 4 and 12 | LO #3 and #9, #10 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #5 and #8 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | نبذة وصفية عن الانظمة السياسية في العراق )1921-2003( |
| **Week 2** | إنتهاكات النظام البعثي للحقوق والحريات العامة |
| **Week 3** | أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة |
| **Week 4** | |
| **Week 5** | أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية |
| **Week 6** | الميدان النفس ي |
| **Week 7** | الميدان الاجتماعي |
| **Week 8** | الدين والدول ة |
| **Week 9** | الثقافة والاعلام |
| **Week 10** | عسكرة المجتمع |
| **Week 11** | أستعمال الاسلحة المحرمة دوليا والتلوث البيئى |
| **Week 12** | سياسة الارض المحروق ة |
| **Week 13** | تجفيف الاهوار والهجرة القسرية |
| **Week 14** | تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي |
| **Week 15** | المقابر الجماعية وقصف دور العبادة |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | منهاج جرائم حزب البعث البائد 2023- وزارة التعليم العالي والبحث العلمي – دائرة الدراسات والتخطيط والمتابعة | No |

| **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 | راس ب | (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** | Advance Mathematics | **Module Delivery** | |
| **Module Type** | basic | **Theory**<br>**Lecture**<br>**Tutorial** | |
| **Module Code** | STUMETC 234 | | |
| **ECTS Credits** | 5 | | |
| **SWL (hr/sem)** | 125 | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Raed Khalid Hemeed | **e-mail** | Read.Khalid@stu.edu.iq |
| **Module Leader's Acad. Title** | Assist.Lecturer | **Module Leader's Qualification** | Asst. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To understand fundamental of partial functions, partial differentiation of two and three variables, understanding the chain rule principles.<br>2. To understand the ordinary differential equations, first and order and their solutions<br>3. The use of Laplace transforms of various functions and invers of Laplace transforms. Then extending to the use of that technique for solving differential equations.<br>4. To develop knowledge of understanding vectors and basic mathematical procedure of vectors, adding, subtracting, dot product, cross product and applications.<br>5. To understand the sequence and series of Taylor and maclaurin for functions and their presentations.<br>6. To understand the Fourier series for functions and their presentations. Knowing odd and even function and their graphs. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Describe elementary of functions with two and more variables.<br>2. Understanding of partial derivatives and the chain rule principles.<br>3. Understanding of principles of the ordinary differential equations, first order type.Skills ofsolving first order differential equations, separation of variables and the use of integration factor.<br>4. Understanding of principles of the ordinary differential equations, second order type.<br>5. Skills of solving second order differential equations, homogenous and nonhomogenous types.<br>6. Developing knowledge of Laplace transforms and anti-Laplace transforms.<br>7. Applications of Laplace transforms in solving differential equations.<br>8. Discussion and review of the previous topics.<br>• Define the vectors term and its mathematical procedures.<br>• The use of dot product and cross product.<br>• Define the sequence term and solving the related problems.<br>• Define the Taylor and Maclaurin series for the functions and solving related problems.<br>• Define the Fourier series for the functions and solving related problems.<br>• Discussion and review of the previous topics. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A – define functions of two and three variables<br><br>Describe elementary of functions with two and more variables. Understanding of partial derivatives and the chain rule principles. [10hrs]<br><br>Part B – Differential equations<br><br>Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor.Understanding of principles of the ordinary differential equations, second order type. Skills of solving second order differential equations, homogenous and non-homogenous types. [15hrs]<br><br>Part C – Laplace transforms<br><br>Developing knowledge of Laplace transforms and anti-Laplace transforms. Applications of Laplace transforms in solving differential equations.[10hrs]<br><br>Revision problems [5hrs]<br><br>Part D – Vectors<br><br>Define the vectors term and its mathematical procedures. The use of dot product and cross product. [10hrs]<br><br>Part E – Sequences and series<br><br>Define the sequence term and solving the related problems.Define the Taylor and Maclaurin series for the functions and solving related problems. Define the Fourier series for the functions and solving related problems. [15hrs]<br><br>Discussion and review of the problems. [6 hrs]<br><br>Exam preparing. [5hrs]<br>Exam. [4 hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 79 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 46 | **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) | 5 and 10 | LO #3, #4 and #6, #8 |
| | **Assignments** | 2 | 10% (10) | 8 and 14 | LO #5 and #13 |
| | **Report** | 1 | 10% (10) | 15 | LO #4, #6 and #12 |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 20% (20) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

**Delivery Plan (Weekly Syllabus)**
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Partial differentiation Function with two independent variables or more Partial differentiation for first and higher order of derivatives. |

| | |
|---|---|
| **Week 2** | Change of variables (Chain rule) of two independent variables or more. |
| **Week 3** | Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor. |
| **Week 4** | Understanding of principles of the ordinary differential equations, second order type. |
| **Week 5** | Skills of solving second order differential equations, homogenous and non-homogenous types. |
| **Week 6** | Developing knowledge of Laplace transforms and anti-Laplace transforms. |
| **Week 7** | Applications of Laplace transforms in solving differential equations. |
| **Week 8** | Mid-term Exam |
| **Week 9** | Define the vectors term and its mathematical procedures. |
| **Week 10** | The use of dot product and cross product. |
| **Week 11** | Define the sequence term and solving the related problems. |
| **Week 12** | Define the Taylor and Maclaurin series for the functions and solving related problems. |
| **Week 13** | Define the Fourier series for the functions and solving related problems. |
| **Week 14** | Discussion and review of the previous topics. |
| **Week 15** | Final Exam |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Theory of advanced mathematics with application by Thomas Calculus. | Yes |
| **Recommended Texts** | Books and Literatures in different kinds of Advanced Mathematics. | No |
| **Websites** | https://www.khanacademy.org/math/calculus-1 | |

## 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 | راس ب | (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** | Electrical and Electronic Circuits | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture**<br>**Lab**<br>**Tutorial** | |
| **Module Code** | STUMETC 233 | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.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** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1.<br>2. Understand the dimensional Analysis of Electrical and electronic circuits. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory, and application of Electrical and electronic circuits.<br>3. To analysis of Electrical and electronic circuits.<br>4. To select and apply the appropriate analysis techniques.<br>5. Know the engineering methodologies. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Able to recognize the First Order Circuit the Source-free RC Circuit. Understand the Source-free RL Circuit – Singularity Functions.<br>2. Able to recognize the Step Response of an RC Circuit and Understand Step Response of an RL circuit<br>3. Able to recognize the Second Order Circuit: - Finding Initial and Final Values Understand The Source-Free Series RLC Circuit.<br>4. Discuss the source-Free Parallel RLC Circuit and unaccredited Step Response of a Series RLC Circuit<br>5. Discuss step Response of a parallel RLC circuit and general second-0rder circuits.<br>6. Able to recognize the operation of magnetically Coupled Circuits: - Mutual Inductance. Understand Energy in a Coupled Circuit – Linear Transformers. Discuss the Ideal Transformers.<br>7. 8. Able to Recognize the three-Phase Transformers. Understand Frequency Response: - Transfer Function<br>9. Discuss the Decibel Scale - Bode Plots. Understand Series Resonance.<br>10. Explain the parallel Resonance. Understand Active Filters.<br>11. Identify the Two Port Networks: - Impedance Parameters. Understand Admittance Parameters.<br>12. Explain the hybrid Parameters .Understand Transmission Parameters.<br>13. Able to Recognize the Three-Phase Circuits: -Balanced Three-Phase Voltages. Understand Balanced Wye-WyeConnection - Balanced Wye-DeltaConnection.<br>14. Able to Recognize the Balanced Delta-Delta Connection. Understand Balanced Delta-Wye Connection - Power in a Balanced System.<br>15. Able to Recognize the unbalanced three Phase Systems. Understand ThreePhase Power Measurement |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A -The Source of circuits<br>First Order Circuit: -The Source-free RC Circuit, The Source-free RL Circuit – Singularity Functions, Step Response of an RC Circuit, Step Response of an RL circuit, Second Order Circuit:- Finding Initial and Final Values, The Source-Free Series RLC Circuit, The Source-Free parallel RLC Circuit, Step Response of a Series RLC Circuit, General Second-Order Circuits [35 hrs]<br><br>Part B - Magnetic circuits<br><br>Magnetically Coupled Circuits: - Mutual Inductance. Energy in a Coupled Circuit– Linear Transformers, Ideal Transformers, Ideal Autotransformers, Three-Phase Transformers, Frequency Response:- Transfer Function [21hrs]<br><br>The Decibel Scale -Bode Plots. Series Resonance, Parallel Resonance, Active Filters [21hrs]<br><br>Part C Two Port Networks<br>Two Port Networks: -Impedance Parameters. Admittance Parameters, Hybrid Parameters, Transmission Parameters [21hrs]<br><br>Three-Phase Circuits: -Balanced Three-Phase voltages, balanced wye-Wye Connection – balanced wye-delta Connection. Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System, unbalanced three phase systems, Three-Phase Power Measurement [21hrs] |

| **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)

الحمل الدراسي للطالب محسوب لـ 15 اسبوع ا

| | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 124 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 8 |

| | | | |
|---|---|---|---|
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 26 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **150** | | |

| **Module Evaluation** تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 9 and 12 | LO #1, #8 and #8, #11 |
| | **Assignments** | 2 | 5% (5) | 5 and 12 | LO #3, #5 and #6, #9 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| | **Lab Report and Lap Exam** | 15, 1 | 15%(15) | 1-15,8 | LO #1- #15, LO #1- #8 |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2.5 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)** المنهاج الاسبوعي النظري | |
|---|---|
| **Week 1** | First Order Circuit: -The Source-free RC Circuit, the Source-free RL Circuit – Singularity Functions |
| **Week 2** | Step Response of an RC Circuit, Step Response of an RL circuit |
| **Week 3** | Second Order Circuit:- Finding Initial and Final Values, The Source-Free Series RLC Circuit |
| **Week 4** | The Source-Free Parallel RLC Circuit, Step Response of aSeries RLC Circuit |
| **Week 5** | Step Response of a Parallel RLC Circuit, General Second-Order Circuits |
| **Week 6** | Magnetically Coupled Circuits: - Mutual Inductance, Energy in a Coupled Circuit – Linear Transformers |
| **Week 7** | Ideal Transformers, Ideal Autotransformers |
| **Week 8** | Three-Phase Transformers ,Frequency Response:- Transfer Function |

| | |
|---|---|
| **Week 9** | The Decibel Scale -Bode Plots, Series Resonance. |
| **Week 10** | Parallel Resonance, Active Filters. Two Port Networks: -Impedance Parameters. |
| **Week 11** | Admittance Parameters, Hybrid Parameters. |
| **Week 12** | Transmission Parameters, Three -Phase Circuits: -Balanced Three-Phase voltages |
| **Week 13** | Three-Phase Circuits: -Balanced Three-Phase voltages, Balanced Delta-Delta Connection |
| **Week 14** | Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System |
| **Week 15** | Unbalanced Three Phase Systems ,Three-Phase Power Measurement |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Nodal Theorem |
| **Week 2** | Series RL Circuits |
| **Week 3** | Series Rc Circuits |
| **Week 4** | Natural Response of a Series RLC Circuit |
| **Week 5** | Step Response of a Series RLC Circuit |
| **Week 6** | parallel RLC Natural responses Circuits |
| **Week 7** | parallel RLC step responses Circuits |
| **Week 8** | Low-pass Filters |
| **Week 9** | High -pass Filters |
| **Week 10** | ower Factor correction |
| **Week 11** | Transformer |
| **Week 12** | Transformer |
| **Week 13** | Transformer |
| **Week 14** | Transformer |
| **Week 15** | Transformer |

## Learning and Teaching Resources

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<br><br>A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005<br><br>Electronic Circuits - Fundamentals and Applications" by Mike Tooley BA | NO |

| **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 | راس ب | (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** | Electrical devices and measurements | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 241 | | |
| **ECTS Credits** | 8 | | |
| **SWL (hr/sem)** | 200 | | |
| **Module Level** | 2 | **Semester of Delivery** | 4 |
| **Administering Department** | ESTE | **College** | METC |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.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** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Illustration and discussion the theory of measurement including static characteristics of instruments, various standards, error analysis, classifications and statistical analysis.<br>2. Illustrate the principles design theory of various dc and ac analogue voltmeters, Ammeters Watt meters, and single phase energy meter.<br>3. Discuss and analyze various dc and ac bridges used for the measurement of resistances, impedances and associated parameters like inductance, capacitance and frequency.<br>4. Explain the various active and passive transducers; also it includes a detail discussion of the theory and application of some transducers for example, strain gauges, LVDT, thermister, piezoelectric, etc.<br>5. Illustration and discussion of CRT and the various parts of CRO. And the theory of operation of the instrument.<br>6. Giving knowledge and unfolds the details of various signal analyzers such as distortion, waveform and spectrum analyzers.<br>7. Illustrate the certain advantages of electronic meters as compared to analogue. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Enable a starting back ground to the students aquatinting them with various electrical and electronic instruments for their principle, operation, calibration and application<br><br>2- Enable student to get the knowledge and understanding of the basic measurement techniques such as accuracy, precision, standards which is absolute necessary for the use of sophisticated systems<br><br>3- Enable student to become aware how to operate and develop various electrical and electronic systems<br><br>4- Enable student to understand the measuring technique, construction and working principle of various measuring instruments<br><br>5- The student will understand the working principles of electrical devices and measurements<br><br>6- Recognize types of errors and their calculations<br><br>7- Understand theory of analogue measuring instruments<br><br>8- Understand Bridges and their applications: dc bridges<br><br>9- Identify the construction and operation of Cathode Ray Oscilloscope (CRO)<br><br>10- Know primary sensing elements<br><br>11- Learn Signal analysis<br><br>12- Recognize the construction and operation of spectrum analyzer<br>13- Realize the construction and operation of Digital instruments |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity-Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units- fundamental and derived units, electric and magnetic units- Measurement errors-Absolute error - types of errors and their calculations- limiting error, random error [21 hrs]<br><br>General theory of analogue measuring instruments- indicating type; PMMC-moving iron electrodynamometer- thermal instrument- Watt meters-integrating type (energy kWh meter) [21 hrs]<br><br>Recording type; self balancing strip chart recorder- X-Y recorder- Bridges and their applications: dc bridges (Wheatstone)- Kelvin, Kelvin double bridge); ac bridges( Maxwell, Hay's, Schering, Wien)- Cathode Ray Oscilloscope (CRO)CRT, block diagram [21 hrs]<br><br>vertical and horizontal Reports deflection systems; applications-Transducers-primary sensing elements (displacement, LVDT)-strain gauge, piezoelectric, acceleration, thermo electric- Signal analysis -wave analyzer, harmonic distortion analyzer [21 hrs]<br><br>spectrum analyzer- Electronic analogue measuring instruments- direct coupled, FET bridge type, dc &ac voltagecurrent, and power and resistance measurement-Digital instruments: D/A &A/D, voltage, current and resistance measurements-digital display sensitivity of DMM (digital multimeter), resolution of decimal display [21 hrs] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |

| | | | |
|---|---|---|---|
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **200** | | |

## Module Evaluation تقييم
المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 10 | LO #3 and #6, #8 |
| | **Assignments** | 2 | 5% (5) | 4 and 13 | LO #3 and #12 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #1,#2, #3, #4 and #5 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-7 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity……etc<br>Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units |
| **Week 2** | fundamental and derived units, electric and magnetic units.<br>Measurement errors: Absolute error |
| **Week 3** | types of errors and their calculations<br>limiting error, random error |
| **Week 4** | General theory of analogue measuring instruments indicating<br>type; PMMC |

| | |
|---|---|
| **Week 5** | moving iron electrodynamometer thermal instrument |
| **Week 6** | Watt meters integrating type (energy kWh meter) |
| **Week 7** | Recording type; self balancing strip chart recorder (pot. Bridge, LVDT)<br>X-Y recorder |
| **Week 8** | Bridges and their applications: dc bridges (Wheatstone)<br>Kelvin, Kelvin double bridge); ac bridges( Maxwell, Hay's, Schering, Wien) |
| **Week 9** | Cathode Ray Oscilloscope (CRO)<br>CRT, block diagram |
| **Week 10** | vertical and horizontal Reports deflection systems; applications<br>Transducers: classification and selection |
| **Week 11** | primary sensing elements (displacement, LVDT) strain gauge, piezoelectric, acceleration, thermo electric |
| **Week 12** | Signal analysis<br>wave analyzer, harmonic distortion analyzer |
| **Week 13** | spectrum analyzer<br>Electronic analogue measuring instruments |
| **Week 14** | direct coupled, FET bridge type, dc &ac voltage current, and power and resistance measurement |
| **Week 15** | Digital instruments: D/A &A/D, voltage, current and resistance measurements digital display sensitivity of DMM (digital multimeter), resolution of decimal display |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction to electrical devices & measurements<br>How to use ( the oscilloscope , function generator , Dc powers supply , digital multimeter ) |
| **Week 2** | How to test ( Diode , LED Diode , Zener diode )<br>How to test a fuse |
| **Week 3** | Passive and Active filters |
| **Week 4** | low & high pass filters |
| **Week 5** | Band pass filter |
| **Week 6** | Using Of Kilvanometer |
| **Week 7** | Transducers ( sensors and actuators) |
| **Week 8** | Relay using and testing |
| **Week 9** | Calibration of Ammeter |

| | |
|---|---|
| **Week 10** | Tungsten Filament |
| **Week 11** | incandescent Lamp |
| **Week 12** | D.C. Bridge Measurement |
| **Week 13** | Wheatstone bridge |
| **Week 14** | Design and construction of analogue multimeter |
| **Week 15** | Calibration of Voltmeter |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | "Electrical and Electronics Measurements and Instrumentation" by Prithwiraj Purkait and Budhaditya Biswas | No |
| **Recommended Texts** | Electronic Instrumentation and Measurements" by David A Bell | No |

## 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 | راس ب | (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** | Electrical Machines | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 231 | | |
| **ECTS Credits** | 8 | | |
| **SWL (hr/sem)** | 200 | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.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** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To understand the construction and operation of DC generators.<br>2. To understand the construction and operation of DC motors.<br>3. To understand the construction and operation of single phase transformers.<br>4. To understand the construction and operation of Three phase transformers.<br>5. To understand the construction and operation induction motor |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Recognize the construction and principle of DC generator.<br>2. Know the lap and wave winding, EMF and torque equation<br>3. Understand armature reaction and commutation, types of generators.<br>4. Understand equivalent circuit of DC generators.<br>5. Know the construction and principle of DC motor, types of motors, armature torque characteristics.<br>6. Recognize the equivalent circuit of the motor, torque speed characteristics<br>7. Estimate Losses and efficiency of the DC motors, and understand starting and braking.<br>8. Explain speed control methods of DC motors.<br>9. Understand the Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests.<br>10. Understand Voltage regulation, losses and efficiency of single phase transformer. Know parallel operation, the operation of auto transformer and instrumental transformers.<br>11. Understand the Construction and principle of 3- phase transformer, transformer connection group.<br>12. Understand the parallel operation of 3- phase transformer.<br>13. Understand the construction and principle of induction motor, equivalent circuit and phasor diagram, Power flow diagram.<br>14. Understand the losses and efficiency of induction motor, open and short circuit tests, torque speed characteristics.<br>15. Understand the method of starting induction motor , method of speed control of induction motor. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A - DC generators construction and principle of DC generator - lap and wave winding, EMF and torque equation-armature reaction and commutation-types of generators- equivalent circuit of DC generators. [ hrs 28]<br><br>Part b - DC motors construction and principle of DC motor-types of motors-armature torque characteristics- equivalent circuit of the motor-torque speed characteristics- Losses and efficiency of the DC motors-starting and braking- speed control methods of DC motors [ hrs28]<br><br>Part c - transformers<br>Construction and principle of single phase transformer- Equivalent circuit and phasor digram-Voltage and current ratio- Open ,short and polarity tests- Voltage regulation, losses and efficiency of single phase transformer-parallel operation- the operation of auto transformer and instrumental transformers- Construction and principle of 3- phase transformer- transformer connection group- parallel operation of 3-phase transformer [28 hrs]<br><br>Part d - Induction motors construction and principle of induction motor-equivalent circuit and phasor diagram-Power flow diagram- losses and efficiency of induction motor- open and short circuit tests- torque speed characteristics- starting induction motor , method of speed control of induction motor [21 hrs] |

| **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 اسبوع ا |
|---|

| | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **200** | | |

| **Module Evaluation** تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 3 and 8 | LO #1, #2 and #6 |
| | **Assignments** | 2 | 5% (5) | 10 and 14 | LO#8, #9 and #11, #12, #13 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #1, #2 and #3 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-7 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)** المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction, Construction and principle of DC generator |
| **Week 2** | Lap and wave winding, EMF and torque equation |
| **Week 3** | Armature reaction and commutation, Types of generators |
| **Week 4** | Equivalent circuit of DC generators |
| **Week 5** | Construction and principle of DC motor, Types of motors, armature torque characteristics |

| | |
|---|---|
| **Week 6** | Equivalent circuit of the motor, Torque speed characteristics |
| **Week 7** | Losses and efficiency of the DC motors, Starting and braking |
| **Week 8** | Speed control methods of DC motors |
| **Week 9** | Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests |
| **Week 10** | Voltage regulation, Losses and efficiency of single phase transformer, parallel operation Auto transformer and Instrumental transformers |
| **Week 11** | Construction and principle of 3- phase transformer, Transformer connection group |
| **Week 12** | Parallel operation of 3- phase transformer |
| **Week 13** | Construction and principle of induction motor, Equivalent circuit and phasor diagram, Power flow diagram |
| **Week 14** | Losses and efficiency of induction motor, open and short circuit tests, Torque speed characteristics |
| **Week 15** | Method of starting induction motor , method of speed control of induction motor |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Operation of the Separately Excited DC shunt Generator<br>Loaded Operation of the Separately Excited DC Shunt Generator |
| **Week 2** | No-Load operation of the self excited DC shunt Generator<br>Loaded Operation of the Self Excited DC Shunt Generator |
| **Week 3** | Swinburne's Test on a DC Shunt generator<br>No-Load Operation of the DC Series Generator |
| **Week 4** | Loaded Operation of the DC Series Generator<br>Load Characteristics of a DC cumulatively Compound Generator |
| **Week 5** | Load Characteristics of a DC differentially Compound Generator |
| **Week 6** | Study of Operational Working and Principle of DC Shunt Motor |

| | |
|---|---|
| **Week 7** | Study of running and reversing phenomenon of DC Shunt Motor<br>Study of No Load Characteristic of DC Shunt Motor |
| **Week 8** | Study of Load Characteristic of DC Shunt Motor<br>Brake Test on a DC Shunt Motor |
| **Week 9** | Brake Test on a DC Series Motor |
| **Week 10** | Retardation test on a DC machine |
| **Week 11** | Study of speed control of DC Shunt Motor using armature voltage control and flux field control method |
| **Week 12** | Study and Determine the losses of DC shunt motor and correspondingly calculate the efficiency of DC Motor by Swinburn's Test Method |
| **Week 13** | Hopkinson's test on a pair of DC machines<br>OC & SC Tests on a Single Phase Transformer |
| **Week 14** | Direct Load Test on a Single Phase Transformer<br>Separation of Constant losses of a Single Phase Transformer |
| **Week 15** | Sumpner's Test<br>Parallel Operation of two dissimilar Single Phase Transformers<br>OC & SC Tests on a Three Phase Transformer |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **A Textbook of Electrical Technology Volume II, AC and DC machines,<br>B.L. THERAJA. A.K. THERAJA, 2006** | No |

| 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 | راس ب | (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** | Electronics | | **Module Delivery** | | |
| **Module Type** | Core | | **Theory**<br>**Lecture**<br>**Lab** | | |
| **Module Code** | STUMETC 242 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | | | **Semester of Delivery** | 4 | |
| **Administering Department** | ETE | | **College** | METC | |
| **Module Leader** | Wael Hussein Zayer | | **e-mail** | wael.zayer@stu.edu.iq | |
| **Module Leader's Acad. Title** | Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Ahmed thamer radhi | | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | 18/02/2025 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | - To provides a knowledge of electronic circuits.<br>- Illustration and discussion the principles of electronics structureselection and description.<br>- To select an electronics circuit for a given use based on considerations of cost and performance.<br>- The ability to analyze and solve problems. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Able to tell the structure and the operation of transistors and recognize the different types of transistors.<br>2- Recognizes the different configurations of circuits with transistors and the characteristics of these circuits and compares these circuits.<br>3- Analyzes transistor dc biasing.<br>4- Explains the operation of transistor dc biasing circuits.<br>5- Able to explain different circuits with transistors.<br>6- Explains the amplification in amplifier circuits with transistors.<br>7- Analyzes and performs measurements in different amplifier circuits.<br>8- Calculates the hybrid parameters of the equivalent circuit of a transistor.<br>9- Explains cascade amplifier circuits<br>10- Calculates parameters in cascade amplifier circuits. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –various<br><br>Electronics_ccttypes, structure and analyses Theory<br>Bipolar Transistor, Basic constriction ,Biasing& stability study for different circuit models of a transistor ,Plot Discrete-Time Signal In Matlab ,Transistor as switch<br>Two port network analysis. [15 hrs]<br><br>Transistor model with parameter, Π-equivalent circuit using two port network ideas<br>T-Equivalent circuit of C, B. transistor ,h- Parameter uses to find out input impedance, output impedance, current voltage gain ,Relationship of h- parameter for different circuit modes. [15 hrs]<br><br>Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis<br>Low frequency / high frequency circuit analysis using Equivalent circuit to get high cutoff frequency. [15 hrs]<br><br>Revision problem classes [6 hrs]<br><br>Part B –Properties of electronic cct<br>Power amplifiers, class A, class B, class AB, class C power amplifiers ,Feedback, positive & negative feedback studies ,Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability. [15hrs]<br>Differential amplifiers, common mode rejection ratio ,Operational amplifiers with their applications ,Implementation of LP FIR Filters ,Timer "555" and its applications<br>Implementation of HP FIR Filters. [15 hrs]<br><br>Active filters, Basic filter responses for different modes. [7 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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<br>تقييمEvaluation<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 10 | LO #3, #4 and #8 |
| | **Assignments** | 2 | 5% (5) | 4 and 8 | LO #2 and #6 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #8 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-7 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Bipolar Transistor, Basic constriction ,Biasing & stability study for different circuit models of a transistor |
| **Week 2** | Plot Discrete-Time Signal In Matlab ,Transistor as switch |
| **Week 3** | Two port network analysis , Transistor model with hparameter, Π-equivalent circuit using two port network ideas |

| | |
|---|---|
| **Week 4** | T-Equivalent circuit of C, B. transistor , h- Parameter uses to find out input impedance, output impedance, current&voltage gain |
| **Week 5** | Relationship of h- parameter for different circuit modes ,Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis |
| **Week 6** | Low frequency / high frequency circuit analysis using Π equivalent circuit to get high cutoff frequency |
| **Week 7** | Power amplifiers, class A, class B, class AB, class C power amplifiers |
| **Week 8** | Feedback, positive & negative feedback studies |
| **Week 9** | Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability |
| **Week 10** | Differential amplifiers, common mode rejection ratio , |
| **Week 11** | Operational amplifiers with their applications |
| **Week 12** | Implementation of LP FIR Filters |
| **Week 13** | Timer "555" and its applications |
| **Week 14** | Implementation of HP FIR Filters |
| **Week 15** | Active filters, Basic filter responses for different modes |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Input and output Characteristics BJT transistor common Emitter , BJT transistor as switch |
| **Week 2,3,4** | Input and output Characteristics BJT transistor common Emitter , Characteristics FET transistor , Characteristics JFET transistor |
| **Week 5,6,7** | Characteristics MOSFET transistor , BJT Amplifier common Emitter , BJT Amplifier common Base |
| **Week 8,9** | BJT Amplifier common collector , BJT Amplifier common Emitter with voltage divider |
| **Week 10,11** | Operation Amplifier IC-741 non inverting , Operation Amplifier IC-741 inverting |
| **Week 12,13** | Operation Amplifier IC-741 summing , Operation Amplifier IC-741 integral |
| **Week 14** | Operation Amplifier IC-741 differential |

## Learning and Teaching Resources

## مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Electronic Devices and Circuit Theory , 11 edition , Boylested, 2013. | Yes |
| **Recommended Texts** | - Power Electronics , K. B. Khanchandani, second edition, 2008 | No |
| **Websites** | https://mohamadramdhani.staff.telkomuniversity.ac.id/files/2016/08/Electronic-Devicesand-Circuit-Theory-11th-Edition-Ebook.pdf | |

## 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 | راس ب | (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/2 | **Module Delivery** | |
| **Module Type** | Basic | **Theory**<br>**Lecture** | |
| **Module Code** | STUMETC 235 | | |
| **ECTS Credits** | 3 | | |
| **SWL (hr/sem)** | 75 | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Wael Hussein Zayer | **e-mail** | wael.zayer@stu.edu.iq |
| **Module Leader's Acad. Title** | Professor | **Module Leader's Qualification** | Ph.D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Develop students skills in understanding the basic grammars of English.<br>2. Develop students' speaking skills in English.<br>3. Develop students' listening skills in English.<br>4. Develop students' reading skills in English.<br>5. Develop students' reading skills in English. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Understand the rule of Possessive 's, Verbs, conversations as Vocabulary<br>2- Understand the usage of Questions and answers, Present Simple 1, Times as Vocabulary.<br>3- Understand the grammars of Present Simple 2, Present Simple 3, Adverbs of frequency, words that go together as Vocabulary .<br>4- Understand the grammars of some / any, There is / are, adjectives and numbers as Vocabulary .<br>5- Understand the grammars of can / could, was / were, present simple and past Simple , noun + noun as Vocabulary.<br>6- Understand the grammars of past Simple 1, past Simple 2, adjectives as Vocabulary.<br>7- Understand the grammars of past Simple 3, Adverbs, in, at, or on? as Vocabulary.<br>8- Understand the grammars of like and would like, some, any, much, many, Food and drink as Vocabulary.<br>9- Understand the grammars of directions, comparatives and superlatives, superlatives, places as Vocabulary.<br>10-Understand the grammars of Present Continuous, social expressions as Vocabulary.<br>11-Understand the grammars of going to and past simple, suggestions, he weather as Vocabulary.<br>12-Understand the grammars of present perfect 1, take, get and go as Vocabulary.<br>13-Understand the grammars of anything, something, nothing, everything, months of the year as Vocabulary.<br>14-Understand the grammars of present perfect 2, Verb + noun as Vocabulary. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | The grammars of Possessive 's, Present Simple 1, Present Simple 2, Present Simple 3, Adverbs of frequency. Verbs, conversations, times and Words that go together as Vocabulary. [9]<br><br>The grammars of some / any, There is / are, can / could, was / were, Present Simple and Past Simple, Past Simple 1, Past Simple 2 . Adjectives, Numbers, Noun + noun as Vocabulary. [9].<br><br>The grammars of Question Past Simple 3, Adverbs, like and would like, some, any, much, many, directions, comparatives and superlatives, superlatives . in, at, or on?, Food and drink, places as Vocabulary. [9].<br><br>The grammars of present continuous, going to and past simple, suggestions, present perfect 1 . Social expressions, the weather, take, get, go as Vocabulary. [9].<br><br>The grammars of anything, something, nothing, everything, present perfect 2. months of the year, verb + noun as vocabulary. [6]. |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SSWL (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 | 2 |
| **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** | 3 | 15% (10) | 3, 8 and 12 | LO #1and #5and #10 |
| | **Assignments** | 3 | 15% (10) | 4, 9 and 12 | LO #3, #8 and #11 |
| | **Report** | 1 | 10% (10) | 14 | LO #4, #9 and #13 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Unit one : At the airport<br>Grammar: Possessive 's<br>Vocabulary: Verbs, Conversations |
| **Week 2** | Unit two : Going shopping<br>Grammar: Questions and answers, Present Simple 1 Vocabulary:<br>Times |
| **Week 3** | Unit three: In a cafe<br>Grammar: Present Simple 2, Present Simple 3, Adverbs of frequency Vocabulary:<br>Words that go together |
| **Week 4** | Unit four : Making suggestions<br>Grammar: some / any, There is / are<br>Vocabulary: Adjectives, Numbers |
| **Week 5** | Unit Five : Social expressions<br>Grammar: can / could, was / were, Present Simple and Past Simple Vocabulary:<br>Noun + noun |
| **Week 6** | Unit six : What time is it?<br>Grammar: Past Simple 1, Past Simple 2 Vocabulary:<br>Adjectives |
| **Week 7** | Unit seven :<br>Grammar: Past Simple 3, Adverbs Vocabulary:<br>in, at, or on? |

| | |
|---|---|
| **Week 8** | Unit eight :<br>Grammar: like and would like, some, any, much, many Vocabulary:<br>Food and drink |
| **Week 9** | Unit nine :<br>Grammar: Directions, Comparatives and superlatives, Superlatives Vocabulary:<br>Places |
| **Week 10** | Unit ten:<br>Grammar: Present Continuous<br>Vocabulary: Social expressions |
| **Week 11** | Unit eleven:<br>Grammar: going to and Past Simple, Suggestions Vocabulary:<br>The weather |
| **Week 12** | Unit twelve:<br>Grammar: Present Perfect 1<br>Vocabulary: take, get, go |
| **Week 13** | Unit thirteen:<br>Grammar: anything, something, nothing, everything Vocabulary:<br>Months of the year |
| **Week 14** | Unit fourteen:<br>Grammar: Present Perfect 2<br>Vocabulary: Verb + noun |
| **Week 15** | assessment |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | New headway, Liz and John Soars, OXFORD | No |
| **Recommended Texts** | English Grammar in Use, 5th Edition by Raymond Murphy. | No |
| **Websites** | https://elt.oup.com/student/headway/elementary4/?cc=global&selLanguage=en | |

## 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 | راس ب | (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 computer/2 | | | **Module Delivery** | |
| **Module Type** | Basic | | | Theory<br>Lab | |
| **Module Code** | STUMETC 245 | | | | |
| **ECTS Credits** | 3 | | | | |
| **SWL (hr/sem)** | 75 | | | | |
| **Module Level** | | 2 | **Semester of Delivery** | | 4 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ghadah Salim Khefi | | **e-mail** | g.s.khefi@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Assist. Lecturer | **Module Leader's Qualification** | | Asst. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1-To develop problem-solving skills and an understanding of the computer through the application of techniques<br>2- To understand the work of the electronic computer and the possibility of dealing with it<br>3- To develop and understand of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks.<br>3- To develop practical skills in software development, including programming, debugging, testing, and documentation.<br>4- To develop problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools. 5- To develop and understand of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide.<br>6- To develop and understand of the role of computer science in society, including its impact on industry, government, healthcare, and education.<br>7- To understand the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Understand the fundamentals of networking protocols and technologies, such as TCP/IP, DNS, DHCP, Ethernet, and wireless networking.<br>2. Know how to design, implement, and troubleshoot computer networks, including local area networks (LANs), wide area networks (WANs), and wireless networks.<br>3. Understand network security concepts, such as firewalls, intrusion detection/prevention systems, and virtual private networks (VPNs).<br>4. Understand the principles of network management and be able to configure and manage network devices, such as routers, switches, and access points.<br>5. Understand the basics of network administration, including user and group management, file sharing, and printer sharing.<br>6. Be able to diagnose and troubleshoot common network problems, including connectivity issues, slow performance, and security breaches.<br>7. Understand the importance of network monitoring and be able to use network monitoring tools to identify and resolve network issues.<br>8. Understand the role of networking in cloud computing and be able to design and implement cloud-based networks.<br>9. Understand the principles of virtualization and be able to implement virtualized networks using technologies such as VMware and Hyper-V.<br>10. Be able to communicate effectively with other IT professionals and non-technical stakeholders about networking concepts and issues. |

| | |
|---|---|
| | 11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords<br>12. develop skills in creating, editing and formatting documents, spreadsheets and presentations. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br><u>Part A - Fundamentals of networks and the Internet</u><br><br>Introduction to networks- Define networks.Network components - Types of networks The Internet - Extranet.(8 hrs)<br>E-mail - E-mail features - Create an e-mail account<br>Skype chat program - program installation - program features(8hrs)<br>Skype chat program - program installation - program features<br>Internet law and types of infringements in the digital world(8hrs) - Part review (2hrs)<br><br><u>Part B-the internet and its ethics</u><br>Internet Information Security - Security Problems - - Weaknesses in the Internet - computer fragility–(8hrs)<br>Computer and information protection<br>The negative effects of using the Internet on health and society–(8hrs) -Part review (3hrs) |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | Supervised learning: This is a commonly used technique in which the neural network is trained on a labeled dataset. The network is fed input data, and the corresponding output is also provided as a label. The network adjusts its weights and biases to minimize the difference between its output and the actual label.<br>Unsupervised learning: This technique involves training a neural network on an unlabeled dataset. The network tries to find patterns and relationships in the data without any supervision. Clustering, dimensionality reduction, and generative models are some examples of unsupervised learning.<br>Reinforcement learning: This technique involves training a neural network to take actions in an environment to maximize a reward signal. The network learns from feedback in the form of rewards or penalties based on its actions.<br>Transfer learning: This refers to using a pre-trained neural network to solve a new task. The pre-trained network is used as a starting point, and its weights and biases are fine-tuned to the new task. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 49 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 26 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **75** | | |

| Module<br>Evaluation تقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 7 and 13 | LO #2, #3، and #7, #8، |
| | **Assignments** | 2 | 5% (5) | 3 and 10 | LO #1, #4 and #5, #6،#9 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 14 | LO #10, #11 and #12 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-7 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 3hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to networks- Define networks |
| **Week 2** | Network components - Types of networks |
| **Week 3** | The Internet - Extranet |
| **Week 4** | Cloud Computing - Cloud computing applications |
| **Week 5** | Types of cloud computing - Areas of using the Internet |
| **Week 6** | Web browsers - Internet Explorer browser |
| **Week 7** | Search on the Internet - use search engines - advanced search |
| **Week 8** | E-mail - E-mail features - Create an e-mail account |
| **Week 9** | Skype chat program - program installation - program features |

| | |
|---|---|
| **Week 10** | Internet law and types of infringements in the digital world |
| **Week 11** | Internet Information Security - Security Problems - |
| **Week 12** | Weaknesses in the Internet - computer fragility |
| **Week 13** | Computer and information protection |
| **Week 14** | The negative effects of using the Internet on health and society |
| **Week 15** | **Preparatory week before the final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to Excel<br>1- Spreadsheet - A grid of cells used to organize, analyze and manipulate data.<br>2. Workbook - A file containing one or more worksheets.<br>3. Worksheet - A single sheet within a workbook where data is entered and analyzed.<br>4. Cell - The intersection of a row and a column in a worksheet where data is entered. |
| **Week 2** | : Basic Excel FunctionsSUM<br>1- A function used to add up a range of values in a worksheet.<br>2. AVERAGE - A function used to calculate the average of a range of values in a worksheet.<br>3. MAX - A function used to find the highest value in a range of values in a worksheet |
| **Week 3** | Formatting in Excel<br>1. Cell formatting - Changing the appearance of a cell, including font, color, and alignment. 2. Number formatting - Changing the way numbers are displayed, such as currency or percent.<br>3. Conditional formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value. |
| **Week 4** | Data Analysis in Excel<br>1- Sorting - Arranging data in a specific order, such as from highest to lowest.<br>2- Filtering - Hiding certain rows or columns based on specific criteria |

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|---|---|
| **Week 5** | Advanced Functions in Excel<br>1- VLOOKUP - A function used to search for a value in a table and return a corresponding value from another column in the same table.<br>2- IF - A function used to perform a calculation based on a logical condition. |
| **Week 6** | Advanced Data Analysis in Excel<br>1. Goal Seek - A tool used to find the input value needed to achieve a specific output value in a formula.<br>2. Scenario Manager - A tool used to analyze how changing certain variables affects the outcome of a formula. |
| **Week 7** | What-if Analysis in Excel<br>1. Data Tables - A tool used to compare different sets of data by substituting different variables.<br>2. Scenario Analysis - A tool used to analyze how changing different variables affects the outcome of a formula. |
| **Week 8** | : Macros in Excel<br>1. Macro - A set of instructions used to automate repetitive tasks in Excel.<br>2. VBA - Visual Basic for Applications, a programming language used to create macros in Excel. |
| **Week 9** | Working with Large Data Sets in Excel<br>1. Tables - A range of data that can be sorted, filtered, and analyzed as a single unit in Excel.<br>2. Data Validation - A tool used to control what data can be entered into a cell or range of cells. |
| **Week 10** | Advanced Charting Techniques in Excel<br>1. Combo Chart - A chart that combines two or more chart types to display different data sets.<br>2. Sparkline - A small chart that provides a visual representation of data in a single cell. |
| **Week 11** | : Advanced Formatting in Excel<br>1. Custom Number Formats - A tool used to display numbers in a specific format, such as phone numbers or social security numbers.<br>2. Conditional Formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value. |

| | |
|---|---|
| **Week 12** | Collaboration in Excel<br>1- Sharing - A tool used to share a workbook with other users and allow them to edit it simultaneously.<br>2- Track Changes - A tool used to track changes made to a workbook by different users. |
| **Week 13** | Excel Add-Ins and Customization<br>1. Add-Ins - Additional programs or features that can be added to Excel to extend its functionality.<br>2. Ribbon - The toolbar at the top of the Excel window that contains commands and options. |
| **Week 14** | Data Import and Export in Excel<br>1- Data Import - Bringing data from external sources into Excel, such as from a database or text file.<br>2- Data Export - Saving data from Excel to external sources, such as a database or text file. |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | William Stallings, ( 2003 ), Computer Organization & Architecture, Sixth edition, Preson Education | Yes |
| **Recommended Texts** | 1. "Networks, Crowds, and Markets: Reasoning About a Highly Connected World" by David Easley and Jon Kleinberg. | No |
| **Websites** | Nothing | |

## 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 | راس ب | (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** | Programming | | | **Module Delivery** | |
| **Module Type** | basic | | | **Theory**<br>**Lab** | |
| **Module Code** | STUMETC 244 | | | | |
| **ECTS Credits** | 5 | | | | |
| **SWL (hr/sem)** | 125 | | | | |
| **Module Level** | 2 | **Semester of Delivery** | | 4 | |
| **Administering Department** | ETE | **College** | | METC | |
| **Module Leader** | Ghadah Salim Khefi | **e-mail** | | g.s.khefi@stu.edu.iq | |
| **Module Leader's Acad. Title** | Assist. Lecturer | **Module Leader's Qualification** | | Asst. | |
| **Module Tutor** | Name (if available) | **e-mail** | | E-mail | |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Understanding and knowing how programming languages work<br>2. Dealing with problems and analyzing them logically.<br>3. Problem-solving using programming.<br>4. Choose the best way to perform the tasks programmatically.<br>5. Implementation and translation of ideas appropriately to meet my needs and the needs of others from the program. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Knowing how the program works and how the program is translated from natural languages into machine language.<br>2- The ability to deal with program inputs and outputs.<br>3- The ability to understand the different types of data and how to manage them during the implementation of the program.<br>4- The ability to perform various mathematical and logical operations on variables and constants.<br>5- The ability to control the progress of the program according to the status of the variables, depending on the conditions.<br>6- The ability to repeat certain operations according to the change in the state of the variables.<br>7- The ability to manage a sequential set of data in arrays and perform various operations on them. |
| **Indicative Contents**<br>المحتويات الإرشادية | Introduction –[History Of Programming Languages, Editors, Compilers, Write First Program][5Hrs].<br>Input And Output Operator – Comments[ Cout Statements ,Cin Statement, Single And Multi Line Comments, CHARACTERS AND LITERALS][5Hrs].<br>Data Type – Variables And Constants[Variables And Their Declarations, Initializing Variables, Objects, Variables, And Constants, Numeric Data Types, The Boolean Type, Character Types, Integer Types][5Hrs]<br>Operators[Arithmetic Operators, The Increment And Decrement Operators, Composite Assignment Operators][10 Hrs]<br>Selection[The If Statement, The If..Else Statement, Comparison Operators, Boolean Expressions, Nested Selection Statements, The Else If Construct, The Switch Statement][15 Hrs]<br>Loop[The While Statement, Terminating A Loop, The Do..While Statement, The For Statement, The Break Statement, The Continue Statement, The Goto Statement][20 Hrs].<br>Array[Introduction, Initializing An Array, The Linear Search Algorithm, The Bubble Sort Algorithm, The Binary Search Algorithm][10 Hrs].<br>String[INTRODUCTION, C-STRINGS, STRING I/O][5hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 79 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 46 | **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 | 5% (5) | 5 and 12 | LO #1, #2,#3 and #6, #7 |
| | **Assignments** | 2 | 5% (5) | 4 and 10 | LO #3, #4 and #6, #7 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | **Lab report and Lab exam** | 7, 1 | 15% (15) | | |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 7 | LO #1 - #4 |
| | **Final Exam** | 2.5 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

**Delivery Plan (Weekly Syllabus)**
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|

| | |
|---|---|
| **Week 1** | Introduction |
| **Week 2** | Input and output operator - comments |
| **Week 3** | Data type – Variables and constants |
| **Week 4** | Operators |
| **Week 5** | Increment and decrement |
| **Week 6** | Selection |
| **Week 7** | Selection |
| **Week 8** | Selection |
| **Week 9** | Loop |
| **Week 10** | Loop |
| **Week 11** | Loop |
| **Week 12** | Loop |
| **Week 13** | Array |
| **Week 14** | Array |
| **Week 15** | **String** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction - |
| **Week 2** | Input and output operator - comments |
| **Week 3** | Data type – Variables and constants |
| **Week 4** | Operators |
| **Week 5** | Increment and decrement |
| **Week 6** | Selection |
| **Week 7** | Selection |
| **Week 8** | Selection |
| **Week 9** | Loop |
| **Week 10** | Loop |
| **Week 11** | Loop |

| | |
|---|---|
| **Week 12** | Loop |
| **Week 13** | Array |
| **Week 14** | Array |
| **Week 15** | **String** |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | SCHAUM'S OUTLINE OF THEORY AND PROBLEMS of PROGRAMMING WITH C++ Second Edition | No |

## 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 | راس ب | (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** | Strength of Materials | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 243 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | 2 | **Semester of Delivery** | 4 | | |
| **Administering Department** | ETE | **College** | METC | | |
| **Module Leader** | Jawad Kareem Zebun | **e-mail** | jawad.kareem@stu.edu.iq | | |
| **Module Leader's Acad. Title** | Assist. Prof. | **Module Leader's Qualification** | Ph.D. | | |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail | | |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. 2. It provides the main features of the strength materials.<br>3. Illustration and discussion the stress concept as well as types of stresses. Illustrated the Internal forces in beams, how to draw shear force and bending moment diagrams.<br>4. Understanding of stress strain relationship and solving relevant problems.<br>5. To understand the limits of materials and the change of their properties with use. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. 2. An understanding of stresses concept<br>3. 4. An understanding of beam, stresses in beams beam theory and shear<br>5. 6. An understanding of torsion in shafts determination of shear<br>7. stresses and twisting.<br>Discuss the buckling in colums.<br>Describe Mohr's Circle.<br>Define thermal stresses.<br>8. Identify the principle stresses.<br>9. Can know how to employ the understanding od strength of material to analysis the stress on different sections. |
| **Indicative Contents**<br>المحتويات الإرشادية | <u>Part A –various stresses</u><br>Concept of stress(Tension and compression)- poison's ratio Hook's low, Application ofPoison's ratio onbiaxial stresses- Joint stress- Statically indeterminate problems. [15 hrs]<br><br>Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft, Shear stress, Strain and twisting, [15 hrs]<br><br>Stresses and bending stress – Stress Transformation and Mohr's Circle. [10 hrs]<br><br>Stresses on thinwall vessels - Stresses on thik wall vessels. [15 hrs]<br><br>Revision problem classes [6 hrs]<br><br><u>Part B –Beam and bending moment and bending streses</u><br><br>Beams, deflection of Beams - Stress on beams. [15 hrs]<br><br>Shear force diagram in beams- Beams loading. [7 hrs]<br><br>Bending stresses of beams-Failer theory [15 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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<br>Evaluation تقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 8 | LO #3 and #6 |
| | **Assignments** | 2 | 5% (5) | 4 and 6 | LO #3and #5 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #4 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-7, 8 | All, 1-4 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Concept of stress(Tension and compression)-Poison's ratio Hook's low |
| **Week 2** | Application of Poison's ratio on biaxial stresses– Axial load on composite bar. |
| **Week 3** | Thermal stresses- Composite rodand pipes. |
| **Week 4** | Stresses on thin wall vessels- Stresses on thick wall vessels. |
| **Week 5** | Joint stress- Statically indeterminate problems. |
| **Week 6** | Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft. |
| **Week 7** | Shear stress, strain and twisting. |
| **Week 8** | Maximum shear stress and Torque-Bending moment diagram and shear force diagram. |
| **Week 9** | Beams, deflection of Beams - Stress on beams |
| **Week 10** | Shear force diagram in beams- Beams loading |
| **Week 11** | Stresses and bending stress – Stress Transformation and Mohr's Circle. |
| **Week 12** | Mohr's Circle -axial stress and strain theory |
| **Week 13** | Columns-Buckling of columns. |
| **Week 14** | Moment area method-Theory of shear stress and strain |
| **Week 15** | Bending stresses of beams-failer theory |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | Material Covered |
|---|---|
| **Week 1-2** | Tensile test |
| **Week 3-5** | compression test |
| **Week 6-8** | Impact test |
| **Week 9-10** | Torsion test |
| **Week 11** | Spring test |
| **Week 12** | Fatigue test |
| **Week 13-15** | Bending test – Deflection test |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | Strength of Materials (Fourth Edition) Ferdinand L. Singer , Andrew Pytel<br>Mechanics of Materials (sixth Edition) Ferdinand P. Beer, E. Russell Johnston, Jr. | Yes |
| **Recommended Texts** | Mechanics of Materials (Seventh Edition) R.C. Hibbeler. | No |
| **Websites** | https://www.amazon.com/Mechanics-Materials-7th-Russell-Hibbeler/dp/0132209918 | |

| 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 | راس ب | (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** | Thermodynamic and fluid | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 232 | | |
| **ECTS Credits** | 8 | | |
| **SWL (hr/sem)** | 200 | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Waleed Khalaf Jabaar | **e-mail** | Waleed.allamy@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To provide a knowledge of thermodynamics and energy concept.<br>2. Illustration and discussion the principles of heat engine principles and description.<br>3. To understand a cycles for a given use based on energy and heat generation and performance.<br>4. To be able to know aentropy concept that will have some desirable propertiese.<br>5. To understand the fluid and flow types which limit of fluidproperties. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. An understanding of definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations.<br>2. List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram.<br>3. Understand tables of thermodynamic properties.<br>4. Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables.<br>5. Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only.<br>6. Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation.<br>7. Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device.<br>8. Discuss the thermodynamic reversible process ( pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process<br>9. Identify the thermodynamic irreversible process ( pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –1. An understanding of Definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations.<br>**1-** List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram.<br>**2-** understand tables of Thermodynamic Properties.<br>**3-** Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables.. [15 hrs]<br><br>**4-** Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only.<br>**5-** Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation.<br>**6-** Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device. [15 hrs]<br><br>Part B –8. Discuss the thermodynamic reversible process ( pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process<br>9. Identify the thermodynamic irreversible process ( pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling.[15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 91 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |

| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 |
|---|---|

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 5% (5) | 5 and 8 | LO # 3 and #6 |
| | Assignments | 2 | 5% (5) | 4 and 12 | LO #3 and # 8 |
| | Projects | 1 | 5% (5) | Continuous | All |
| | Report | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | Lab report and Lab exam | 7, 1 | 15% (15) | 1-7, 8 | All, 1-4 |
| Summative assessment | Midterm Exam | 1.5hr | 10% (10) | 7 | LO #1 - #7 |
| | Final Exam | 2.5hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | Material Covered |
| Week 1 | dimensions, energies, phases of matter and units of measurement and fluids and thermodynamicsproperties |
| Week 2 | definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations. |
| Week 3 | properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram and tables of Thermodynamic Properties "steam and R134a"Thermal. |
| Week 4 | the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only |
| Week 5 | first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation |
| Week 6 | engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device |

| | |
|---|---|
| **Week 7** | thermodynamic reversible process ( pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process |
| **Week 8** | thermodynamic irreversible process ( pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling |
| **Week 9** | constant volume process representation on P-V,T-S and P-h Diagrams Constant temperature process representation on PV,T-S and P-h Diagrams Hyperbolic process representation on P-V,T-S and P-h Diagrams Adiabatic process ,polytrobic process representation on PV,T-S and P-h Diagrams |
| **Week 10** | Principleoffluidmotional flow classification |
| **Week 11** | bernoulli's equation |
| **Week 12** | Entropy concept |
| **Week 13** | Conservation of energy and conservation of mass |
| **Week 14** | Entropyproduction |
| **Week 15** | Nozzle and Boundarylayerkinds |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction to thermodynamics experiment |
| **Week 2** | carnnot cycle test |
| **Week 3** | energy test |
| **Week 4** | ideal gaslaw test |
| **Week 5** | bernoulli's ANALYSIS |
| **Week 6** | Lab 6: flow types |
| **Week 7** | Lab 7: entropy test. |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | Advances of thermodynamics 1, An introduction to Their Properties and Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996. | Yes |

| | |
|---|---|
| **Websites** | https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf |

## 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 | راس ب | (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** | communications | | | **Module Delivery** | |
| **Module Type** | Core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 353 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | 3 | | **Semester of Delivery** | 5 | |
| **Administering Department** | ETE | | **College** | METC | |
| **Module Leader** | Wael Hussein Zayer | | **e-mail** | wael.zayer@stu.edu.iq | |
| **Module Leader's Acad. Title** | Professor | | **Module Leader's Qualification** | Ph.D. | |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Ahmed thamer radhi | | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | 18/02/2025 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To provide a knowledge of communications.<br>2. Illustration and discussion the principles of communications system, description of type of signals , filters and modulation(AM,FM and PM) as well as transportation lines with basic equations and analysis.<br>3. To understand the components of signals, their types, and the operations that are performed on them.<br>4. To understand the analysis of communication systems and how to obtain the best designs. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Able to Recognize Signal analysis. Understand the Types of signs and their Classification.<br>2. Able to Recognize the Fourier series and understand the spectrum.<br>3. Able to Recognize the Complex Fourier series. UnderstandFourier integration.<br>4. Discuss the power and spectrum power and understand modulation and demodulation.<br>5. Describe Amplitude modulation frequency analysisAM wave generation Detect amplitude-modulated signals. UnderstandFrequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals.<br>6. Identify the Segmentation by using time distribution. UnderstandSegmentation by usingfrequency.<br>7. Discuss Digital modulation and demodulation.Understandmodeling.<br>8. Able to Recognize PPM and understand PWM.<br>1- Discuss the PAM and understandPCM.<br>2- Explain the DM and understand FSK.<br>3- Identify the ASK and understandPSK.<br>4- Explain the transportation lines and basic equations and analysis. Understand Impedance.<br>5- Able to recognize the propagation constant. Understand standing waves.<br>6- Able to Recognize the Compatible lines. Understand Smith chart.<br>7- Able to recognize the antennas.Understandcoding and decoding. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A -Signal analysis<br>Types of signs and theirclassification,Fourier series,discrete spectrum,Complex Fourier series,Fourier integration, power and spectrum power[24hrs]<br><br>Modulation and demodulation,Amplitude modulationfrequency analysisAM wave generationDetect amplitude modulatedsignals,Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals,Segmentation by using timedistribution,Segmentation by usingfrequency. [25hrs]<br><br>Part B - Digital modulation anddemodulation<br><br>Digital modulation anddemodulation,modeling,PPM,PWM,PAM,PCM,DM,FSK,ASK,PSK. [35hrs]<br><br>transportation lines andbasic equations and analysis,Impedance,propagation constant,standing waves,Compatible lines,Smith chart,The antennas,coding and decoding. [28hrs] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |

| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 |
|---|---|

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 2 | 5% (5) | 5 and 12 | LO #1, #3 and #6, #8 |
| | Assignments | 2 | 5% (5) | 8 and 13 | LO #5 and #6, #12 |
| | Projects | 1 | 5% (5) | Continuous | All |
| | Report | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | Lab Report and Lap Exam | 15, 1 | 15%(15) | 1-15,8 | LO #1- #15, LO #1- #8 |
| Summative assessment | Midterm Exam | 1.5hr | 10% (10) | 8 | LO #1 - #7 |
| | Final Exam | 2.5hr | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | Material Covered |
| Week 1 | Signal analysis, Types of signs and theirclassification |
| Week 2 | Fourier series, discrete spectrum, Complex Fourier series |
| Week 3 | Fourier integration, Fourier integration |
| Week 4 | power and spectrum power, modulation and demodulation |
| Week 5 | Amplitude modulationfrequency analysis, AM wave generationDetect amplitude modulatedsignals , Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals |
| Week 6 | Segmentation by using timedistribution, Segmentation by usingfrequency, |
| Week 7 | Digital modulation anddemodulation, modeling |
| Week 8 | PPM, PWM. |
| Week 9 | PAM, PCM. |

| | |
|---|---|
| **Week 10** | DM, FSK |
| **Week 11** | ASK, PSK. |
| **Week 12** | Transportation lines andbasic equations and analysis, Impedance. |
| **Week 13** | Propagation constant, standing waves. |
| **Week 14** | Compatible lines, Smith chart. |
| **Week 15** | The antennas, coding and decoding. |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction &sampling |
| **Week 2** | Introduction to digital signaling |
| **Week 3** | Amplitude modulation |
| **Week 4** | Amplitude modulation |
| **Week 5** | Double side band modulation |
| **Week 6** | Single side band modulation |
| **Week 7** | Pulse width modulation |
| **Week 8** | Pulse position modulation |
| **Week 9** | Sampling theorem |
| **Week 10** | Delta modulation |
| **Week 11** | Adaptive delta |
| **Week 12** | Pulse code modulation(Multiplexer/Demultiplexer) |
| **Week 13** | Pulse Code Modulation (PCM) |
| **Week 14** | Amplitude Shift Keying |
| **Week 15** | Filters |

## Learning and Teaching Resources

مصادر التعلم والتدريس

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

| | | |
|---|---|---|
| **Required Texts** | 1.M. Schwartz, Information Transmission, Modulation, and Noise, 4/e,McGraw- Hill, 1990.<br>2.P. H. Young, Electronic Communication Techniques, 4/e, Prentice-Hall,1998.<br>3. L. W. Couch II, Digital and Analog Communication Systems, 5/e, PrenticeHall,1997. | NO |
| **Recommended Texts** | H. P. Hsu, Analog and Digital Communications, McGraw-Hill, 1993. | 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 | راس ب | (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 and Vibration Theory | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 362 | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | 150 | | | | |
| **Module Level** | | 3 | **Semester of Delivery** | | 6 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ahmed thamer radhi | | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Lecturer | **Module Leader's Qualification** | | M.SC |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To provide a knowledge of control and vibration theory.<br>2. Illustration and discussion the principles of control and vibration theory.<br>3. The aim of this course is to study control and vibration theory.<br>4. To be able to create a new material that will have some desirable properties. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. An understanding of Dimensions and units of measurement.<br>2. An understanding of Dimensional Analysis, control and vibration theory. To show knowledge and understanding of the concepts, theory and application of control and vibration theory.<br>3. Solution of problems involving basic control and vibration theory.<br>4. Selection and application of appropriate analysis techniques.<br>5. Observation and recording of experimental data.<br>6.<br>7. Preparation of technical report. |
| **Indicative Contents**<br>المحتويات الإرشادية | Part A – simple pendulum, [20 hrs]<br><br>mass-spring-system. [25 hrs]<br><br>Torsion Vibration. [15 hrs]<br><br>Part B –<br><br>Two Degree of Freedom Tensional Vibration. [15 hrs]<br><br>whirling of shafts [7 hrs]<br><br>Forced Vibration with Negligible Damping[15 hrs] |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 41 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 8 | LO #3 and #6 |
| | **Assignments** | 2 | 5% (5) | 4 and 6 | LO #3, and #5 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #4 |
| | **Lab report and Lab exam** | 7, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction |
| **Week 2-6** | Simple pendulum. |
| **Week 7-11** | Mass-spring systems |
| **Week 12-16** | Torsion Vibration |
| **Week 17-21** | Two degree of freedom torsion vibration |

| | |
|---|---|
| **Week 22-26** | Whirling of shafts |
| **Week 27-30** | Forced Vibration with negligible damping |
| **Week 16** | **Preparatory week before the final Exam** |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1-2** | Simple Pendulum |
| **Week 3-5** | Mass –Spring Systems |
| **Week 6-8** | Torsion Vibration |
| **Week 9-10** | Two Degree of Freedom Torsion vibration |
| **Week 11-13** | Whirling of shafts |
| **Week 13-15** | Force Vibration with Negligible Damping |
| **Week 16** | Preparation and study of the micro Structure of pure metals like Iron, copper and aluminum. |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | A Textbook of Vibration with Control inman, Danil J.:Books-. | Yes |
| **Websites** | https://books.google.iq/books?hl=en&lr=&id=HbvuDQAAQBAJ&oi=fnd&pg=PR11&dq=+Vibration+with+Control+inman,+Danil+J.:.&ots=VQDdxF47NH&sig=mvQz6hlSesFL8911kuZrPBb9Yd4&redir_esc=y#v=onepage&q=Vibration%20with%20Control%20inman%2C%20Danil%20J.%3A.&f=false | |

## 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 | راس ب | (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 Systems | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 351 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | 3 | **Semester of Delivery** | 5 | | |
| **Administering Department** | ETE | **College** | METC | | |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.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** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1- To introduce the students to the general structure of the network for transferring power from generating stations to the consumers.<br><br>2- To expose the students to the different electrical & mechanical aspects of the power network along with its environmental and safety constraints.<br><br>3- To know solution and analysis of power systems using digital computers |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Ability to design and analyze the real time electrical transmission system with respect to various electrical parameters considering environmental and economic obligations.<br><br>2. Develop the ability to implement the appropriate safety equipments for design of electrical power system with enhancing the efficiency of the transmission and distribution system with environment friendly technology.<br><br>3. Ability to implement the knowledge of basic mathematical ,physical and electrical principles to formulate significant electrical hazards.<br><br>4. Judge the suitability of installing overhead and underground power transmission strategies considering electrical, mechanical, environmental, performance, safety and economic constraints.<br><br>5. Chose the appropriate type of power generating station following norms and guidelines related to cost, environment, societal and ethical issues. Also review the different tariff systems available and determine the one most appropriate for a given scenario to optimize the revenue earned.<br><br>6. Recognize the need to continuously follow the advancements in technology and incorporating them in the present system to improve efficiency. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | GENERATION OF ELECTRICAL ENERGY- SOURCES OF ENERGY- GENERATING STATIONS- TYPES OF GENERATING STATIONS- ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION- LOAD CURVES AND LOAD FACTORS-<br>BASE LOAD AND PEAK LOAD ON POWER STATION [ 28 hrs ]<br><br>Over head transmission lines<br>PERFORMANCE OF TRANSMISSION LINES- TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE- MECHANICAL DESIGN OF TRANSMISSION LINE TRANSIENTS IN TRANSMISSION LINE- TRANSMISSION LINE POWERFLOW AND POWER CIRCLE-<br>INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS [28 hrs]<br><br>DISTRIBUTION SYSTEM GENERAL<br>DISTRIBUTION SYSTEM CONFIGURATION- VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS- DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS- DISTRIBUTION PARAMETRS ((RADIAL,RING)-DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS- CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS- CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS [28 hrs]<br><br>Cables<br>COSTRUCTION OF CABLES-INSULATING MATERERIALS FOR CABLES- UNDER GROUND CABLES, TYPE OF CABLES- UNDER GROUND CABLES, TYPE OF CABLES [14 hrs]<br><br>ELECTRICAL SUBSTATION |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 8 and 13 | LO #3 and #4 |
| | **Assignments** | 2 | 5% (5) | 12 and 14 | LO#5 and #6 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2.5hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | GENERATION OF ELECTRICAL ENERGY<br>SOURCES OF ENERGY |
| **Week 2** | GENERATING STATIONS, TYPES OF GENERATING STATIONS |
| **Week 3** | ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION |

| | |
|---|---|
| **Week 4** | LOAD CURVES AND LOAD FACTORS<br>BASE LOAD AND PEAK LOAD ON POWER STATION |
| **Week 5** | PERFORMANCE OF TRANSMISSION LINES<br>OVERHEAD TRANSMISSION LINES |
| **Week 6** | TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)<br>TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL) |
| **Week 7** | GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE<br>MECHANICAL DESIGN OF TRANSMISSION LINE<br>TRANSIENTS IN TRANSMISSION LINE |
| **Week 8** | TRANSMISSION LINE POWERFLOW AND POWER CIRCLE<br>INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS |
| **Week 9** | DISTRIBUTION SYSTEM GENERAL<br>DISTRIBUTION SYSTEM CONFIGURATION |
| **Week 10** | VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS<br>DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS |
| **Week 11** | DISTRIBUTION PARAMETRS ((RADIAL,RING)<br>DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS |
| **Week 12** | CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS<br>CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS |
| **Week 13** | COSTRUCTION OF CABLES<br>INSULATING MATERERIALS FOR CABLES |
| **Week 14** | UNDER GROUND CABLES, TYPE OF CABLES<br>UNDER GROUND CABLES, TYPE OF CABLES |
| **Week 15** | ELECTRICAL SUBSTATION |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Three phase Transformer Turns Ratio Test set TTR |
| **Week 2** | MIT ( 10KV Diagnostic insulation resistance tester ) |
| **Week 3** | OiL insulation test |
| **Week 4** | Protection Relay |
| **Week 5** | Grounding system |
| **Week 6** | NGR ( the neutral grounding resistance ) |
| **Week 7** | Power Transmission line Model Study |
| **Week 8** | Voltage Distribution and String Efficiency of Model Suspension Insulator |
| **Week 9, 10, and 11** | Power Transmission line performance Study |
| **Week 12, 13, and 14** | Load flow analysis using power world SIMULATOR |
| **Week 15** | Voltage Control in Power System |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | M.E. El-Hawary, “Electrical Energy Systems”,1st Ed., CRC, 2000<br><br>Hadi, Saadat, “Power System Analysis”, 2nd Ed., McGraw-Hill 2002<br><br>Electrical power systems. {Weedy, B.M. } | No |

| 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 | راس ب | (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** | Electromechanical designs | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture** | |
| **Module Code** | STUMETC 364 | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | | |
| **Module Level** | 3 | **Semester of Delivery** | 6 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Cover the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and Characteristics of the principal types of mechanical elements.<br><br>2. Offer a practical approach to the subject through a wide range of real-world applications and examples.<br><br>3. Identify appropriate analytical models to describe and predict the behavior of standard machine components; |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Make appropriate use of available computer aided design software for Electromechanical designs.<br><br>2- Understand measurement and instrumentation in modern electromechanical systems<br><br>3- Conceptualise, design and evaluate an electro-mechanical systems.<br><br>4- Apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of simple machine elements;<br><br>5- Select appropriate mechanical components from manufacturers' catalogues.<br><br>6- Apply codes and standards to machine component design.<br><br>7- Understand safety and reliability concepts in the design of machine elements.<br><br>8- Communicate the results of a design assignment by means of drawings and a design report. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Materials in electromechanical design- Design for different types of loading- Electromotor and controls [15 hrs]<br><br>Shaft design- Key- Rolling control Bearing [15 hrs]<br><br>Belt drives chain drives- pulleys- Gears [15 hrs]<br><br>Bolted connections- riveted connections- welded joints[15 hrs]<br><br>Clutches- Brakes- couplings[15 hrs] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **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 | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| | **Quizzes** | 2 | 10% (10) | 3 and 8 | LO #1, #2 and #6 |

| | | | | | |
|---|---|---|---|---|---|
| **Formative assessment** | **Assignments** | 2 | 10% (10) | 4 and 13 | LO#3, #5 and #6 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #1, #2 and #3 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Materials in electromechanical design |
| **Week 2** | Design for different types of loading |
| **Week 3** | Electromotor and controls |
| **Week 4** | Shaft design |
| **Week 5** | Key |
| **Week 6** | Rolling control Bearing |
| **Week 7** | Belt drives chain drives |
| **Week 8** | pulleys |
| **Week 9** | Gears |
| **Week 10** | Bolted connections |
| **Week 11** | riveted connections |
| **Week 12** | welded joints |
| **Week 13** | Clutches |
| **Week 14** | Brakes |
| **Week 15** | couplings |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | **Joseph E. Shigley, STANDARD HANDBOOK OF MACHINE DESIGN, 2nd Edition , McGraw Hill, 1996**<br><br>**Richard G. Budynas, J. Keith Nisbett, Shigley's Mechanical Engineering Design, 8th Edition , McGraw Hill, 2006** | No |

| **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 | راس ب | (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 and Numerical Analysis | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Tutorial** | |
| **Module Code** | STUMETC 365 | | | | |
| **ECTS Credits** | 5 | | | | |
| **SWL (hr/sem)** | 125 | | | | |
| **Module Level** | | 3 | **Semester of Delivery** | | 6 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Read Khalid Hemeed | | **e-mail** | Read.Khalid@stu.edu.iq | |
| **Module Leader's Acad. Title** | | **Assist. Lecturer** | **Module Leader's Qualification** | | Asst. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. An understanding of engineering and numerical analysis.<br>2. understanding of the concept engineering and numerical analysis 3.<br>Solution of problems involving engineering and numerical analysis.<br>4. Selection and application of appropriate analysis techniques.<br>5. Solution of problems involving engineering and numerical analysis.<br>6. At the end of the year the student should be able demonstrate knowledge and understanding of the concept engineering and numerical analysis. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Able to recognizethesolution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching method Bisection methods.UnderstandOpen Methods (iterative methods) Newton – Raphson Secant method.<br>2. Able to Recognize Curves Fitting the Least square method linear regression Polynomial regression.Understand the Linearization of nonlinear models.<br>3. Discuss the Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backwardandUnderstandLagrange Interpolation.<br>4. Describe the Numerical Solution of linear equations systems Direct Methods- Gauss show elimination method Gauss – Jordan method.Indirect Methods Gauss - Jacobi method Gauss – Siedel method.<br>5. Identify the Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. UnderstandNumerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule..<br>6. Discuss Simpson's (3/8) rule of Double Integration.Understandthe Numerical solution of ordinary differential equations (1st order) Euler's methodModified Euler's method.<br>7. Able to Recognize the Runge-Kutta method 2 nd order 4 th order and understand Partial DifferentialEquationsClassification of PDESolution of PDE byseparation of variables.<br>8. Discuss the Wave Equation and understandHeat Equation.<br>9. Explain the Laplace Equation and understand the Solution of Ordinary Differential Equations by Power seriesClassification of ODE.<br>10. Identify the Solution Methods Undetermined Coefficients Method. And understand the Fresenius Method Case I.<br>11. Explain the Fresenius Method Case IIand Case III.<br>12. Able to recognize Z transform Sequences- Table of Z – Transform andUnderstand Properties of Z – Transform.<br>13. Able to Recognize the Inverse Z – Transform. Understand solving the recurrence relations.<br>14. Able to recognize theFourier transform Complex Fourier series.Understandsome special functions and their transforms even functions-Odd functions- Top-hat function.<br>15. Able to recognize the Properties of Fourier transform Linearity. UnderstandTime shaftingFrequency shafting |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –Numerical Methods<br>Solution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching methods Bisection methods.Open Methods (iterative methods) Newton – Raphson Secant method.Curves Fitting the Least square method linear regression -Polynomial regression. Linearization of nonlinear models. Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backward and Lagrange Interpolation. Numerical Solution of linear equations systems Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method. Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. Numerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule [20hrs]<br><br>Simpson's (3/8) rule Double Integration. Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method.<br>Able to Recognize the Runge-Kutta method 2 nd order 4 th order[6hrs]<br><br>Part B –DifferentialEquations<br>Differential Equations Classification of PDESolution of PDE by separation of variables. Wave Equation and understandHeat Equation. Laplace Equation Solution of Ordinary Differential Equations by Power seriesClassification of ODE. Solution Methods Coefficients Method. And understand the Fresenius Method Case I. Fresenius Method Case II and Case III. [18hrs]<br><br>Z transform Sequences- Table of Z – Transform and Understand Properties of Z – Transform, Inverse Z – Transform. Understand solving the recurrence relations. Fourier transforms Complex Fourier series.Some special functions and their transforms even functions- Odd functions- Top-hat function. Properties of Fourier transform Linearity,Time shaftingFrequency shafting[16hrs] |

| **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 15 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 63 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 62 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **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) | 5 and 12 | LO #1, #3 and #8 |
| | **Assignments** | 2 | 10% (10) | 13 and 15 | LO #12 and #14 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #4, #8 and #12 |
| **Summative assessment** | **Midterm Exam** | 1 hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

**Delivery Plan (Weekly Syllabus)**
المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | solution of non-Linear Equations by Numerical Methods. Closed Methods (Bracketing methods)Searching method Bisection methods. Open Methods (iterative methods) Newton – Raphson Secant method. |
| **Week 2** | Curves Fitting- the Least square method -linear regression -Polynomial regression. Linearization of nonlinear models. |
| **Week 3** | Interpolation Gregory – Newton interpolation formula- Forward difference- backward difference- Center difference- Gauss forward-Gauss backward and Lagrange Interpolation. |

| | |
|---|---|
| **Week 4** | The Numerical Solution of linear equations systems- Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method. |
| **Week 5** | Numerical Differentiation- Derivatives based on Newton's forward interpolation- Derivatives based on Newton's backward interpolation- Numerical integration- Midpoint ruleTrapezoidal rule-Simpson's (1/3) rule. |
| **Week 6** | Simpson's (3/8) rule of Double Integration, Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method. |
| **Week 7** | Runge-Kutta method 2 nd order 4 th order, Partial Differential Equations Classification of PDESolution of PDE by separation of variables. |
| **Week 8** | Wave Equation,Heat Equation. |
| **Week 9** | The Laplace Equation, the Solution of Ordinary Differential Equations by Power seriesClassification of ODE. |
| **Week 10** | Solution Methods Undetermined Coefficients Method, Fresenius Method Case I. |
| **Week 11** | Fresenius Method Case II and Case III. |
| **Week 12** | Z transform Sequences- Table of Z – Transform, Properties of Z – Transform. |
| **Week 13** | Inverse Z – Transform, solving the recurrence relations. |
| **Week 14** | The Fourier transform Complex Fourier series,some special functions and transforms even function- Odd functions- Top-hat function. |
| **Week 15** | Able to recognize the Properties of Fourier transform Linearity,Time shaftingFrequency shafting |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Moin, P. (2010). Frontmatter. In Fundamentals of Engineering Numerical Analysis (pp. I-Iv).Cambridge: Cambridge University Press | NO |
| **Recommended Texts** | | No |
| **Websites** | | |

## Grading Scheme مخطط الدرجات

| Group | Grade | التقدير | Marks % | Definition |
|---|---|---|---|---|
| | **A -** Excellent | امتياز | 90 - 100 | Outstanding Performance |

| | | | | |
|---|---|---|---|---|
| **Success Group (50 - 100)** | **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 | راس ب | (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/3 | | | **Module Delivery** | |
| **Module Type** | Basic | | | | |
| **Module Code** | STUMETC 355 | | | | |
| **ECTS Credits** | 3 | | | | |
| **SWL (hr/sem)** | 75 | | | **Theory** | |
| **Module Level** | | 3 | **Semester of Delivery** | | 5 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Wael Hussien Zayer | | **e-mail** | wael.zayer@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Develop students skills in understanding the grammars of English.<br>2. Develop students' speaking skills in English.<br>3. Develop students' listening skills in English.<br>4. Develop students' reading skills in English.<br>5. Develop students' reading skills in English. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1- Understand the rule of Tenses, Question words. Words with two meanings, Adjectives ending in -ed and -ing as Vocabulary<br>2- Understand the usage of Present Simple / Continuous, Short answers. Making conversation, Things I like doing as Vocabulary.<br>3- Understand the grammars of past Simple or Continuous. In, at, on as Vocabulary .<br>4- Understand the grammars of Count / Uncount nouns, Articles. Having dinner together as Vocabular .<br>5- Understand the grammars of Verb patterns, Future forms. Phrasal verbs - literal as Vocabulary.<br>6- Understand the grammars of superlatives. Synonyms as Vocabulary.<br>7- Understand the grammars of Present Perfect, For and since. Antonyms as Vocabulary.<br>8- Understand the grammars of should / must / have to. So and such as Vocabulary.<br>9- Understand the grammars of Past Perfect and Past Simple, Joining sentences. Question tags as Vocabulary.<br>10- Understand the grammars of Passives. Words that go together as Vocabulary.<br>11- Understand the grammars Present Perfect Simple / Continuous. Thank you and goodbye as Vocabulary.<br>12- Understand the grammars First conditional. Prepositions as Vocabulary.<br>13- Understand the grammars of Second conditional. Phrasal verbs, idiomatic as Vocabulary.<br>14- Understand the grammars of Tenses. Adverbs as Vocabulary. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | The grammars of Tenses, Question words, Present Simple / Continuous, Short answers, Past Simple or Continuous. Words with two meanings, Adjectives ending in -ed and -ing, Making conversation, Things I like doing, in, at, on as Vocabulary. [6]<br><br>The grammars of Count / Uncount nouns, Articles, Verb patterns, Future forms, Superlatives. Having dinner together, Verb patterns, Future forms, Synonyms as Vocabulary. [6]<br><br>The grammars of Present Perfect, For and since, should / must / have to, Past Perfect and Past Simple, Joining sentences . Antonyms, So and such, Question tags as Vocabulary. [6]<br><br>The grammars of Passives, Present Perfect Simple / Continuous, First conditional. Words that go together, hank you and goodbye, prepositions as Vocabulary. [6]<br><br>The grammars of second conditional, Tenses. Phrasal verbs - idiomatic, Adverbs as Vocabulary. [4] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 33 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 2 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 42 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |

| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 75 |
|---|---|

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 15% (10) | 3, 8 and 12 | LO #1and #5 and #11 |
| | Assignments | 3 | 15% (10) | 4, 9 and 14 | LO #3, #8 and #13 |
| | Report | 1 | 10% (10) | 13 | LO #4, #8 and #12 |
| Summative assessment | Midterm Exam | 1hr | 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 | Unit one : Agree with me<br>Grammar: Tenses, Question words<br>Vocabulary: Words with two meanings, Adjectives ending in -ed and -ing |
| Week 2 | Unit two : At the doctor's<br>Grammar: Present Simple / Continuous, Short answers Vocabulary:<br>Making conversation, Things I like doing |
| Week 3 | Unit three: Bad news<br>Grammar: Past Simple or Continuous Vocabulary:<br>in, at, on |
| Week 4 | Unit four : Good news<br>Grammar: Count / Uncount nouns, Articles<br>Vocabulary: Having dinner together |
| Week 5 | Unit Five : Making conversation<br>Grammar: Verb patterns, Future forms Vocabulary:<br>Phrasal verbs - literal |
| Week 6 | Unit six : On the phone<br>Grammar: Superlatives<br>Vocabulary: Synonyms |

| | |
|---|---|
| **Week 7** | Unit seven :<br>Grammar: Present Perfect, For and since<br>Vocabulary: Antonyms |
| **Week 8** | Unit eight :<br>Grammar: should / must / have to 1, should / must / have to 2 Vocabulary:<br>So and such |
| **Week 9** | Unit nine :<br>Grammar: Past Perfect and Past Simple, Joining sentences Vocabulary:<br>Question tags |
| **Week 10** | Unit ten:<br>Grammar: Passives 1, Passives 2<br>Vocabulary: Words that go together |
| **Week 11** | Unit eleven:<br>Grammar: Present Perfect Simple / Continuous Vocabulary:<br>Thank you and goodbye |
| **Week 12** | Unit twelve:<br>Grammar: First conditional<br>Vocabulary: Prepositions |
| **Week 13** | Unit thirteen:<br>Grammar: Second conditional<br>Vocabulary: Phrasal verbs - idiomatic |
| **Week 14** | Unit fourteen:<br>Grammar: Tenses<br>Vocabulary: Adverbs |
| **Week 15** | assessment |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | New headway, Liz and John Soars, OXFORD | No |
| **Recommended Texts** | English Grammar in Use, 5th Edition by Raymond Murphy. | No |
| **Websites** | https://elt.oup.com/student/headway/preint4/?cc=global&selLanguage=en | |

## 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 | راس ب | (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** | Theory of machines | **Module Delivery** | |
| **Module Type** | Core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 354 | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | | |
| **Module Level** | 3 | **Semester of Delivery** | 5 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To understand fundamentalof the static and dynamic problem Static method - dynamic method.<br>2. To understand the linear and angular velocity, Velocity and acceleration problems.<br>3. The use of Spur gear theory, Parameters of the spur gear.<br>4. To evaluate the Gear train theory, Theory of belt drives.<br>5. To develop knowledge of balancing theory, Turning moment diagram and flywheel.<br>6. To understand the Theory of friction clutch, Theory used in the analysis of friction clutch, Cone clutch, Centrifugal clutches. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism.<br>2. Linear and angular velocity - power, torque, moment of inertia and acceleration.<br>3. Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.<br>4. Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear.<br>5. Review of all the application and different problem of the spur gear.<br>6. Gear train theory, compound gear train, inverted gear train,relevant problems. Theory of belt drives, Modification for V – grooved pulley, Examples and problem.<br>7. Discussion and review of the previous topics.<br>8.<br>1- Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane.<br>2- Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.<br>3- Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.<br>4- Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.<br>5- Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches.<br>6- Discussion and review of the previous topics. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br><br>Part A – define of velocity and acceleration<br><br>Interview of the static and dynamic problem, Static method - dynamic method, Linear and angular velocity - power, torque, moment of inertia and acceleration.Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.Slider Crank Mechanism. [21hrs]<br><br>Part B – Spur Gear<br><br>Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear.Review of all the application and different problem of the spur gear.[14hrs]<br><br>Part C – Gear Train and belts<br><br>Gear train theory, compound gear train, inverted gear train, relevant problems.Theory of belt drives, Modification for V – grooved pulley, Examples and problem.[14hrs]<br><br>Revision problems [7hrs]<br><br>Part D – Balancing theory<br><br>Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane.Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.[14hrs]<br><br>Part D – Theory of flywheel clutches<br><br>Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. [21 hrs]<br><br>Discussion and review of the problems. [7hrs] |

| |
|---|
| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 41 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **150** | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 13 | LO #1, #2 and #6, #8 |
| | **Assignments** | 2 | 5% (5) | 4 and 12 | LO #3, #4 and #6, #7 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | **Lab report and Lab exam** | 7, 1 | 15% (15) | | |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 7 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism |
| **Week 2** | Linear and angular velocity - power, torque, moment of inertia and acceleration. |
| **Week 3** | Understanding of Velocity and acceleration diagram, Velocity and acceleration problem. |
| **Week 4** | Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear. |
| **Week 5** | Review of all the application and different problem of the spur gear. |
| **Week 6** | Gear train theory, compound gear train, inverted gear train, relevant problems. |
| **Week 7** | Theory of belt drives, Modification for V – grooved pulley, Examples and problem. |
| **Week 8** | Mid-term Exam |
| **Week 9** | Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane. |
| **Week 10** | Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem. |
| **Week 11** | Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim. |
| **Week 12** | Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch. |
| **Week 13** | Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. |
| **Week 14** | Discussion and review of the previous topics. |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Slider Crank Mechanism. |
| **Week 2** | Rope Belt Friction. |
| **Week 3** | The Governor. |
| **Week 4** | Balancing of Rotating Masses. |
| **Week 5** | Gear Trains. |
| **Week 6** | Fly Wheel. |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Theory of Machines and Mechanisms<br><br>idu.ac.id https://ftp.idu.ac.id › uploads › ebook › tdg › The...<br><br>John J. Uicker, Emeritus Dean of ... Kinematics and Dynamics of Machine Systems | No |
| **Recommended Texts** | Books and Literatures in different kinds of theory of machines. | No |

| **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 | راس ب | (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** | Heat transfer and Hydraulic systems | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC **352** | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | | 3 | **Semester of Delivery** | | 5 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Mahmoud Aziz Muhammad | | **e-mail** | mahmmodaziz@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Professor | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To define the heat transfer modes concepts.<br>2. To define the theoretical basics of the conduction heat transfer Coincided with a laboratory experiment.<br>3. To define the theoretical basics of the forced and free convective heat transfer Coincided with a laboratory experiment.<br>4. To define the theoretical basics of the radiation heat transfer.<br>5. To define the theoretical basics of the heat exchangers Coincided with a laboratory.<br>6. To define the theoretical basics of the mixed modes of heat transfer. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1- Able for solving the heat conduction questions through different geometrical shapes (plane wall, cylinder, sphere)<br><br>2- Able for solving the questions deals with extended surfaces<br><br>3- Able for solving the questions deals with conduction through two dimensional fields analytically and numerically<br><br>4- Able for solving the questions deals with conduction through one and two dimensional fields analytically and numerically in unsteady state conditions<br><br>5- Introduce the basics of fluid flow and the related equations<br><br>6- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by forced convection<br><br>7- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by free convection<br><br>8- Introduce the calculating approach of the heat radiated and exchanged from different bodies temperatures<br><br>9- Introduce the student to the main equations for designing heat exchangers |
| **Indicative Contents**<br>المحتويات الإرشادية | Conduction heat transfer (1D) [21 hrs]<br><br>Heat transfer through fins- Two dimensional steady state heat conduction- One and Two dimensional unsteady state heat conduction [21hrs]<br><br>Convective heat transfer- Forced convection- Natural convection- Thermal radiation [35 hrs]<br><br>Heat exchangers [28 hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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**تقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 8 and 13 | LO #3 and #4 |
| | **Assignments** | 2 | 5% (5) | 12 and 14 | LO#5 and #6 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2.5hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1-Week 3** | Conduction heat transfer (1D) |
| **Week 4** | Heat transfer through fins |
| **Week 5** | Two dimensional steady state heat conduction |
| **Week 6** | One and Two dimensional unsteady state heat conduction |
| **Week 7** | Convective heat transfer |
| **Week 8** | Forced convection |
| **Week 9** | Natural convection |
| **Week 10-11** | Thermal radiation |
| **Week 12-15** | Heat exchangers |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | linear Heat Conduction |
| **Week 2** | |
| **Week 3** | |
| **Week 4** | |
| **Week 5** | Radial Heat Conduction |
| **Week 6** | |
| **Week 7** | |
| **Week 8** | |
| **Week 9** | calibration of Thermocouple |
| **Week 10** | Cross-Flow Heat Exchanger |
| **Week 11** | Gear Trains Radiation Heat Transfer |
| **Week 12** | Boiling Heat Transfer |
| **Week 13** | |
| **Week 14** | |
| **Week 15** | |

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

| | | |
|---|---|---|
| **Required Texts** | -Heat Transfer, ten edition,(J, P.Holman,2002).<br>-Fundamental of heat and mass transfer,(F.P.Incropera,1981). | No |

## 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 | راس ب | (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** | Industrial Engineering | | | **Module Delivery** | |
| **Module Type** | core | | | Theory<br>Lecture | |
| **Module Code** | STUMETC 363 | | | | |
| **ECTS Credits** | 6 | | | | |
| **SWL (hr/sem)** | 150 | | | | |
| **Module Level** | 3 | **Semester of Delivery** | 6 | | |
| **Administering Department** | ETE | **College** | METC | | |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | | |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC | | |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail | | |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To provide a knowledge of Industrial engineering.<br>2. Illustration and discussion the principles of the scope of Industrial Engineering and the Management Process.<br>3. To understand of the fundamentals of production and the productivity. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Recognize solving minimization problems<br>2. Recognize graphical Solution 3- Recognize assignment Model<br>4- Recognize maximization problems<br>5- Recognize assignment Model<br>6- Recognize d Vogal's Approximation Method -<br>7- Recognize stone Method<br>8- Recognize spanning Tree Technique<br>9- Recognize sequencing Models<br>10-Recognize processing N Jobs through One Machine<br>11-Recognize processing N Jobs through Two Machines<br>12-Recognize processing N Jobs through Three machines- inventory control models & material requirement planning 13- Recognize quality control |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | The production and the productivity -Computing Productivity Factors that affect Productivity-Productivity Improvement Break Even Analysis [20 hrs]<br><br>Solving Minimization Problems-Solving Maximization Problems Assignment Model [15 hrs]<br><br>Transportation Model- Setting up Transportation Problem Developing an Initial Solution- Northwest Corner Method- Least–Cost Method [15 hrs]<br><br>Vogal's Approximation Method -Stepping Stone Method Network Models - Minimal – Spanning Tree Technique- Sequencing Models -Processing N Jobs through One Machine Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning [15 hrs]<br><br>Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts- Control Charts for Variables- Six Sigma, ISO,TQM [5 hrs] |

| 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 72 | **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 تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 8 and 13 | LO #3 and #4 |
| | **Assignments** | 2 | 10% (10) | 12 and 14 | LO#5 and #6 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| **Summative assessment** | **Midterm Exam** | 1hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | The production and the productivity |
| **Week 2** | Computing Productivity |
| **Week 3** | Factors that affect Productivity |
| **Week 4** | Productivity Improvement Break Even Analysis |
| **Week 5** | Solving Minimization Problems |
| **Week 6** | Solving Maximization Problems |
| **Week 7** | Solving maximization problems |
| **Week 8** | Assignment Model |
| **Week 9** | Transportation Model- Setting up Transportation Problem |
| **Week 10** | Developing an Initial Solution |
| **Week 11** | Northwest Corner Method- Least–Cost Method |
| **Week 12** | Vogal's Approximation Method -Stepping Stone Method |
| **Week 13** | Network Models - Minimal – Spanning Tree Technique- Sequencing Models - Processing N Jobs through One Machine |
| **Week 14** | Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning |
| **Week 15** | Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts-Control Charts for Variables- Six Sigma, ISO,TQM |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | **Hamdy A. Taha " Operations Research : an introduction" 6th edition ( 1997), Prentice-Hall.** | No |

| 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 | راس ب | (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** | Synchronous and special Machines | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab**<br>**Tutorial** | |
| **Module Code** | STUMETC 361 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | | 3 | **Semester of Delivery** | | 6 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ahmed Thamer Radhi | | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Module Leader's Acad. Title** | | **Assist. Prof.** | **Module Leader's Qualification** | | Ph. D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 13. To provide a knowledge of synchronous & special machines .<br>14. Illustration and discussion the principles of synchronous & special machines, description of the machine, as well as its operation in synchronous & special machines.<br>15. To analyses existing of synchronous & special machines and contribute to new designs. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | Able to recognize synchronous generators Composition and working principle Ways to stir coils. Understand Equivalent circuit and phase diagram Armature reaction-Voltage regulation.<br>Able to recognize the E.M.F. Understand open and short circuit Characteristics, generators work in parallel, load angle control.<br>Discuss the characteristics of the power angle of the machines with prominent cylindrical rotor and understand the conditions for generators to work in parallel, transient stability of synchronousgenerators work with infinite bars.<br>Describe the synchronous motor's composition and working principle. Understand the Equivalent circuit and phase diagram principle of a DC motor.<br>Identify the Steady-state properties. Understand synchronous motor ratings.<br>Discuss the power angle curve. Understand the Velocity-torque curve.<br>Able to recognize the effect of field current change on the properties of synchronous motors and understand synchronous capacitors.<br>Discuss the special machines, single phase induction motors' composition and working principle and understand of equivalent circuit and phase diagram, positive and negative sequence analysis.<br>Explain the split phase motor<br>Identify the universal motors' composition, working principle, equivalent circuit and phase diagram. understand the repulsion motor's composition, working principle equivalent circuit and phase diagram properties.<br>Explain the step motors' composition, working principle, equivalent circuit and phase diagram. Understand variable impedance motors.<br>Able to recognize the Linear and nonlinear analysis of Market circles characteristics.<br>Able to Recognize the permanent magnet synchronous motors, composition , working principle, equivalent circuit and phase diagram. Understand DC motors with permanent magnets composition, working principle, equivalent circuit and phase diagram.<br>Able to recognize the brushless DC motors composition, working principle, equivalent circuit and phase diagram.<br>Understand servo 'motors composition, working principle, equivalent circuit and phase diagram.<br>Able to recognize the synchronizers composition, working principle, equivalent circuit and phase diagram<br>Understand modern technologies to control the speed of electric motors. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –synchronous generators<br>Synchronous generators composition and working principle. Ways to stir coils- Equivalent circuit- phase diagram- armature reaction- voltage regulation- .open and short circuit characteristics- Generators work in parallel- Load angle control- The Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Directorthogonal axes theory and understand the Conditions for generators to work in parallel Transient stability of synchronousgenerators work with infinite bars. [24hrs]<br><br>Synchronous motor's Composition and working principle. Equivalent circuit and phase diagram principle of a DC motor. Steady-state properties. Synchronous motor ratings. The power angle curve. The Velocity-torque curve. Effect of field current change on the properties of synchronous motors,and synchronous capacitors.Special machines Single phase induction motors' Composition and working principle, of Equivalent circuit and phase diagram, positive and negative sequence analysis. Split phase motor permanent expansion motor starting capacitorMotorshaded pole motor,Speed controlmethods. universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods the Repulsion motor's Composition and working principle Equivalent circuit and phase diagramProperties. [56hrs]<br><br>Part B - step motors' Composition<br><br>Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motorspermanent magnet motors hybrid engines Different stirring methods Momentum prediction theory. Linear and nonlinear analysis of Market circles -characteristics, Speed control methods, Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyed impedance Speed control methods. [16hrs]<br><br>Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. Servo motors' Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods. Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology. [24hrs] |

| 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 124 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 8 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 51 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 3 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 8 | LO #1, #3 and #6 |
| | **Assignments** | 2 | 5% (5) | 4 and 14 | LO #3 and #6, #13 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #5, #8 and #10 |
| | **Lab Report and Lap Exam** | 15, 1 | 15%(15) | 1-15,8 | LO #1- #15, LO #1- #8 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Synchronous generators Composition and working principle- ways to stir coils- Equivalent circuit and phase diagram-Armature reaction-Voltage regulation. |
| **Week 2** | E.M.F- Open and short circuit characteristics- generators work in parallel -Load angle control. |
| **Week 3** | Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Direct-orthogonal axes theory, conditions for generators to work in parallel- Transient stability of synchronousgenerators work with infinite bars. |
| **Week 4** | Synchronous motor's Composition and working principle-Equivalent circuit and phase diagram-principle of a DC motor. The Special machines- single phase induction motors'- composition and working principle- Equivalent circuit and phase diagram, positive and negative sequence analysis. |
| **Week 5** | Steady-state properties, synchronous motor ratings. |
| **Week 6** | Power angle curve. Velocity-torque curve |
| **Week 7** | The Effect of field current change on the properties of synchronous motors,and synchronous capacitors. |
| **Week 8** | Special machines- single phase induction motors'- composition and working principle- equivalent circuit and phase diagram, positive and negative sequence analysis. |
| **Week 9** | Split phase motor permanent expansion motor starting capacitor motor shaded pole motor ,speed control methods. |
| **Week 10** | the universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods , Repulsion motor's Composition and working principle Equivalent circuit and phase diagramProperties. |
| **Week 11** | Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motors permanent magnet motors hybrid engines Different stirring methods Momentum prediction theory. |
| **Week 12** | Linear and nonlinear analysis of Market circles -characteristics Speed control methods Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyedimpedance Speed control methods. |
| **Week 13** | Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. |

| | |
|---|---|
| **Week 14** | Able to recognize the Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.Servo 'motors Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods. |
| **Week 15** | Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Alternator Regulation |
| **Week 2** | Alternator Characteristics |
| **Week 3** | Load Test on a Three Phase Induction Motor |
| **Week 4** | Open Circuit and Short Circuit Test on a Three Induction Motor |
| **Week 5** | Synchronous Motor Operation |
| **Week 6** | Load Test on Synchronous Motor and Measurement of Power Angle |
| **Week 7** | Determination of Parameters of Synchronous Machine |
| **Week 8** | : NO load operation of 3 phasesynchronous machine as generator |
| **Week 9** | Short circuit test of the three-phasesynchronous generator |
| **Week 10** | Connecting the three-phase synchronous alternator in parallel with network |
| **Week 11** | Obtaining the V curve of the synchronous motor operating it at load |
| **Week 12** | Short circuit test for the 3-phasesynchronous generator |
| **Week 13** | Power factor correction in three-phase circuit |
| **Week 14** | Power factor correction using 3 phase synchronous motor |
| **Week 15** | discussion |

## Learning and Teaching Resources

مصادر التعلم والتدريس

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

| | | |
|---|---|---|
| **Required Texts** | 1- A Textbook of Electrical Technology Volume II, AC and DC machines,B.L. THERAJA. A.K. THERAJA, 20062.<br>2- Electrical Machines and Transformers –Principles and Applications, P. F. Ryff, D.Platnick and J. A. Karnas, Printice Hall | NO |
| **Recommended Texts** | Electrical Machinery_Dr. P S Bimbhra | 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 | راس ب | (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** | Air conditioning and cooling systems | **Module Delivery** | |
| **Module Type** | Core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 483 | | |
| **ECTS Credits** | 8 | | |
| **SWL (hr/sem)** | 200 | | |
| **Module Level** | 4 | **Semester of Delivery** | 8 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To understand fundamental of air conditioning and refrigeration principles, psychometric processes and psychometric chart, air mixing process.<br>2. To understand the estimation of cooling load and the use of the related properties of various buildings materials.<br>3. The use of relevance charts of duct system designs and fan power.<br>4. To evaluate the heating load of buildings.<br>5. To develop knowledge of understanding piping systems of cold and hot water supplies.<br>6. To understand the Carnot and ideal vapor compression cycles and refrigeration systems. The absorption refrigeration cycle. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Describe of basic concepts of air conditioning and comfort properties.Understanding of thepsychometric chart principles and various air processes.<br>2. Understanding of principles of the by-pass factor and air mixing processes.<br>3. Understanding of cooling load estimations of buildings. Learning the use of various properties of materials.<br>4. Skills of solving cooling load problems, estimations of the required cooling load. Developing knowledge of duct system designs of conditioned air.<br>5. Understanding of the use of the required fan power for proper air supplies.<br>6. Studding piping system design of cold and hot water and relevant applied examples.<br>7. Estimations of heating load and reviewing various material types.<br>8.<br>9. Discussion and review of the previous topics.<br>10. Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples.<br>11. Reviewing relevant examples of Carnot and ideal vapor compression cycles.<br>12. The absorption refrigeration cycle, advantages and disadvantages, basic concepts.<br>13. The use of solar absorption refrigeration systems.<br>14. Discussion and review of the previous topics. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | <u>Part A – define of basic air conditioning concepts and psychometric chart</u><br><br>Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes. Understanding of principles of the by-pass factor and air mixing processes. [16hrs]<br><br><u>Part B – Cooling load, duct design, fan power</u><br><br>Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. Skills of solving cooling load problems, estimations of the required cooling load. Developing knowledge of duct system designs of conditioned air. Understanding of the use of the required fan power for proper air supplies. [32hrs]<br><br><u>Part C – Piping systems, heating load</u><br><br>Studding piping system design of cold and hot water and relevant applied examples. Estimations of heating load and reviewing various material types. [16hrs]<br><br>Revision problems [8hrs]<br><br><u>Part D – Refrigeration</u><br><br>Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. Reviewing relevant examples of Carnot and ideal vapor compression cycles. The absorption refrigeration cycle, advantages and disadvantages, basic concepts.The use of solar absorption refrigeration systems. [32hrs]<br><br>Discussion and review of the problems. [8hrs] |

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

| | |
|---|---|
| **Strategies** | The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 124 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 8 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 76 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 10 | LO #3, #4 and #4, #8 |
| | **Assignments** | 2 | 5% (5) | 2 and 12 | LO #3, #4 and #6, #7 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 14 | LO #5, #8 and #13 |
| | **Lab report and Lab exam** | 7, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes. |
| **Week 2** | Understanding of principles of the by-pass factor and air mixing processes. |
| **Week 3** | Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. |
| **Week 4** | Skills of solving cooling load problems, estimations of the required cooling load. |
| **Week 5** | Developing knowledge of duct system designs of conditioned air. |
| **Week 6** | Understanding of the use of the required fan power for proper air supplies. |
| **Week 7** | Studding piping system design of cold and hot water and relevant applied examples. |
| **Week 8** | Mid-term Exam |
| **Week 9** | Estimations of heating load and reviewing various material types. |
| **Week 10** | Discussion and review of the previous topics. |
| **Week 11** | Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. |
| **Week 12** | Reviewing relevant examples of Carnot and ideal vapor compression cycles. |
| **Week 13** | The absorption refrigeration cycle, advantages and disadvantages, basic concepts. The use of solar absorption refrigeration systems. |
| **Week 14** | Discussion and review of the previous topics. |
| **Week 15** | Final Exam |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Effect ofwindspeedon relative humidity |
| **Week 2** | Psychometric processes |
| **Week 3** | Learn about the main air conditioning and refrigeration system |
| **Week 4** | Air Conditioner Unit performance |
| **Week 5** | Heat pump unit performance |
| **Week 6** | Electric Refrigerator Training Panel |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1- Dr. Abbas A.S. Al-Jeebori, "Fundamentals of Air conditioning and Refrigeration"' Al-Qadisiya University, 2006.<br>2- مبادىء هندسة التكييف الهواء والتثليج, الدكتورخالد احمد الجودي, كلية الهندسة-جامعة البصرة, ١٩٩٨<br>3- Wilbert F., Stoecker and Lekold W. Jones, “Refrigeration and Air conditioning", McGraw-Hill, 1982.<br>4- "ASHRAE fundamentals Handbook for air conditioning and Refrigeration", SI, 1997. | No |
| **Recommended Texts** | Books and Literatures in different kinds of air conditioning and Refrigeration. | No |
| **Websites** | https://www.youtube.com/watch?v=1TPKbia4NC0 | |

| 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 | راس ب | (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** | Automation and Control | **Module Delivery** | |
| **Module Type** | core | **Theory<br>Lecture** | |
| **Module Code** | STUMETC 473 | | |
| **ECTS Credits** | 7 | | |
| **SWL (hr/sem)** | 175 | | |
| **Module Level** | 4 | **Semester of Delivery** | 7 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Wael Hussein Zayer | **e-mail** | wael.zayer@stu.edu.iq |
| **Module Leader's Acad. Title** | Professor | **Module Leader's Qualification** | Ph.D. |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. It provides a working knowledge of control systems.<br>2. Illustration and discussion the principles of control systems and system description.<br>3. To select a suitable control system for a given use based on considerations of application and performance.<br>4. To be able to create a new control system model stable that will have some desirable properties.<br>5. To understand the limits of control systems and the change of their properties with use. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. An understanding of automation control and representation. List<br>2. the various techniques associated with automation control and representation.<br>3. Summarize what is meant by a basic of automation control and systems.<br>4. Discuss the structure, properties and application on of different automation control.<br>5. It provides a working knowledge of Automation and control.<br>6. Illustration and discussion the principles of Automation and control.<br>7. The ability to analyze and Solve problems of control systems . |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –various automation and control types, structure and Theory of representation classification of automation and control, Advanced of control system , applications-Types. [15 hrs]<br><br>Basic elements of automation and production control system- types of Advanced automation function and industry levels types and properties, Hardware components to control the automation process. [15 hrs]<br><br>Intelligent control systems (artificial neural network).<br>Effective functions used in artificial networks ,Topology of neural networks ,Types of neural networks Neural network controller models [15 hrs]<br>,Implementation of fuzzy groups-Fuzzy inference systems ,The control infrastructure is fuzzy -Genetic algorithm (introduction and biological background) [15 hrs]<br><br>Genetic algorithm steps, Genetic algorithm operator ,Microprocessor (brief description and definition). [15 hrs]<br>Revision problem classes [6 hrs]<br><br><u>Part B –</u>PLC<br><br>Characteristics, uses, and programming of the microprocessor<br>Microcontroller ,Differences between microprocessor and microcontroller [15 hrs]<br>,Microcontroller chip ,Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram . [7 hrs]<br>Building PLC in automated systemsDescription (operating system and application software) of the plc [15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

## Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوع ا

| | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 64 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 111 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 7 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | **175** | | |

## Module Evaluation تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #3, #4 |
| | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #3, #4 and #6, #7 |
| | **Projects** | 1 | 10% (10) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #4 |
| **Summative assessment** | **Midterm Exam** | 1.5 hr | 10% (10) | 7 | LO #1 - #4 |
| | **Final Exam** | 2.5 hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | **Material Covered** |
|---|---|
| **Week 1** | Introduction to control and automation technology |
| **Week 2** | Basic elements of automation and production control system |
| **Week 3** | Advanced automation function and industry levels |
| **Week 4** | Hardware components to control the automation process |
| **Week 5** | DC sensors, actuators and servo motors |
| **Week 6** | z transform for control systems |
| **Week 7** | Intelligent control systems (artificial neural network). |
| **Week 8** | Effective functions used in artificial networks |

| | |
|---|---|
| **Week 9** | Topology of neural networks, Types of neural networks ,Neural network controller models |
| **Week 10** | Implementation of fuzzy groups |
| **Week 11** | Fuzzy inference systems , The control infrastructure is fuzzy |
| **Week 12** | Genetic algorithm (introduction and biological background) |
| **Week 13** | Genetic algorithm steps, Genetic algorithm operator |
| **Week 14** | Microprocessor (brief description and definition)**,** Characteristics, uses, and programming of the microprocessor |
| **Week 15** | Microcontroller **,** Differences between microprocessor and microcontroller, **Microcontroller chip** |
| **Week 16** | Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Modern Control Engineering, Katsuhiko Ogata. .<br>Automatic Control System, S. Hasan Saeed. | No |
| **Recommended Texts** | Modern Control Engineering<br>Automatic Control System | No |
| **Websites** | http://docs.znu.ac.ir/members/pirmohamadi_ali/Control/Katsuhiko%20Ogata%20_%20Modern%20Control%20Engineering%205th%20Edition.pdf | |

## 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 | راس ب | (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 Aided Design and Manufacturing | **Module Delivery** | |
| **Module Type** | **core** | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC **474** | | |
| **ECTS Credits** | 6 | | |
| **SWL (hr/sem)** | 150 | | |
| **Module Level** | 4 | **Semester of Delivery** | 7 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Module Leader's Acad. Title** | Lecturer | **Module Leader's Qualification** | M.SC |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. To provide a knowledge of computer aided design and manufacturing (CAM CAD).<br>2. Learn to draw in 2D and 3D.<br>3. Drawing some manufacturing drawings by auto CAD. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Solution of problems involving basic CAD CAM<br>2. Selection and application of appropriate analysis techniques Observation<br>3. and recording of experimental data .<br>4. Preparation of technical report. |
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –application of AutoCAD overview of AutoCAD-Ways to enter the command, Ways to enter the command. [15 hrs]<br><br>Full explanation of drawing, line, circle, square orrectangle.etc [15 hrs]<br><br>Execute key board drawing on. [10 hrs]<br><br>The right application for everything. [15 hrs]<br><br>Part B –2D&3D drawing<br><br>Learn to draw in2D& 3D. [25 hrs]<br><br>Drawing some manufacturing drawings by AutoCAD. [7 hrs]<br><br>Introduction to finite element method-Solve problems by finite element method[15 hrs]. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم |
|---|

| | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 41 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 2 |
| **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 and 10 | LO #1 and #3 |
| | **Assignments** | 2 | 5% (5) | 6 and 8 | LO #3, and #4 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #4 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #3 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |

| | |
|---|---|
| **Week 1** | An overview of AutoCAD-ways to enter the command |
| **Week 2** | Ways to enter the command. |
| **Week 3-4** | Full explanation of drawing, line, circle, square or rectangle. |
| **Week 5-6** | Execute keyboard drawing on. |
| **Week 7-8** | The right application for everything. |
| **Week 9-10** | Learn to draw in2D |
| **Week 11-12** | Learn to draw in3D. |
| **Week 13-14** | Drawing some manufacturing drawings by AutoCAD. |
| **Week 15** | Introduction to finite element method-Solve problems by finite element method |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1-3** | Way to enter the command |
| **Week 4-6** | Full explanation of drawing, line, circle, square orrectangle.etc |
| **Week 8-9** | Execute keyboard drawing |
| **Week 10** | The right application for everything |
| **Week 11-12** | Learn to drawn 2D |
| **Week 13-14** | Learn to drawn 3D |
| **Week 15** | Drawing some manufacturing drawing by AutoCAD |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | **Text** | **Available in the Library?** |
|---|---|---|
| **Required Texts** | Computer Aided Design and Manufacturing, C.B. Besant, 1986<br>CAD/CAM, Mc Mahan and Browne, 1998.<br>Computer Aided Manufacture, Chang and Richard, 2006.<br>CAD/CAM Principles and Applications, Rao, 2010. | No |
| **Recommended Texts** | CAD/CAM Principles and Applications, Rao, 2010. Computer Aided manufacturing, S. Vishal, 2013 | No |
| **Websites** | 1- https://www.amazon.com/Cad-Cam-Principles-Applications-3Ed/dp/0070681937 | |

| 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 | راس ب | (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** | Electromechanical Devices | **Module Delivery** | |
| **Module Type** | core | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 472 | | |
| **ECTS Credits** | 7 | | |
| **SWL (hr/sem)** | 175 | | |
| **Module Level** | 4 | **Semester of Delivery** | 7 |
| **Administering Department** | ETE | **College** | METC |
| **Module Leader** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.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** | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1- To provide a knowledge of electromechanical devices.<br>2- Illustration and discussion the principles of electromechanical devices.<br>3- The student should be able demonstrate knowledge and understanding of the concepts, theory and application of electromechanical devices |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | Upon completion of the course, the student will be able to demonstrate a proficiency in basic electromechanical devices with strong emphasis on motors.<br>1- understand the Components of Servo-Mechanisms.<br>2- understand the working concept of Transducers<br>3- understand Reduction Rules<br>1. understand the operation of Sensors<br>2. understand Industrial Detection Sensor<br>3. understand the operation of Relays<br>4. understand Pressure Control Systems<br>5. understand Flow Rate Control Systems |
| **Indicative Contents**<br>المحتويات الإرشادية | Components of Servo-Mechanisms- Transducers- Reduction Rules. [21 hrs]<br>Sensors- Industrial Detection Sensor- Gears. [21 hrs]<br>Relays- Theoretical and Experimental- Pressure Control Systems. [21 hrs]<br>Flow Rate Control Systems- Level Control Systems- PLC Applications [42 hrs] |

| 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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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**تقييم
المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 8 and 13 | LO #3 and #4 |
| | **Assignments** | 2 | 5% (5) | 12 and 14 | LO#5 and #6 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 7 | LO #1 - #6 |
| | **Final Exam** | 2.5hr | 50% (50) | 15 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

**Delivery Plan (Weekly Syllabus)**

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| **Week 1** | Components of Servo-Mechanisms |
| **Week 2** | Transducers |
| **Week 3** | Reduction Rules |
| **Week 4** | Sensors |
| **Week 5** | Industrial Detection Sensor |
| **Week 6** | Gears |
| **Week 7** | Relays |
| **Week 8** | Theoretical and Experimental |
| **Week 9** | Pressure Control Systems |
| **Week 10** | Flow Rate Control Systems |
| **Week 11** | Level Control Systems |
| **Week 12** | |
| **Week 13** | |
| **Week 14** | |
| **Week 15** | PLC Applications |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Characteristics of a Signal Conditioning Circuits |
| **Week 2** | Characteristics of a Signal Converter Circuits |

| | |
|---|---|
| **Week 3** | Temperature Characteristics of the LM 35 Integrated Circuit |
| **Week 4** | Pneumatic system control |
| **Week 5** | SELF – HOLDING CIRCUIT |
| **Week 6** | CLOSED LOOP ON-OFF CONTROL OFTHE LEVELWITH PRESSURE SENSOR |
| **Week 7** | Open loop and Closed loop control for D.C motor |
| **Week 8** | Speed and Position Control by using Thyristor |
| **Week 9** | Stepper Motor Operation and Control Mode |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | Electromechanical Devices & Components Illustrated Sourcebook 1st Edition by Brian Elliott (Author) | No |

## 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 | راس ب | (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/4 | | | **Module Delivery** | |
| **Module Type** | Basic | | | | |
| **Module Code** | STUMETC **484** | | | | |
| **ECTS Credits** | 3 | | | | |
| **SWL (hr/sem)** | 75 | | | **Theory Lecture** | |
| **Module Level** | 4 | | **Semester of Delivery** | | 8 |
| **Administering Department** | ETE | | **College** | METC | |
| **Module Leader** | Wael Hussein Zayer | | **e-mail** | wael.zayer@stu.edu.iq | |
| **Module Leader's Acad. Title** | Professor | | **Module Leader's Qualification** | | Ph.D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | Ahmed thamer radhi | | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | 18/02/2025 | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. Develop students skills in understanding the grammars of English.<br>2. Develop students' speaking skills in English.<br>3. Develop students' listening skills in English.<br>4. Develop students' reading skills in English.<br>5. Develop students' reading skills in English. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | • Understand the rule of Auxiliary verbs. Words that go together Vocabulary<br>• Understand the usage of Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2. Free time activities, Jobs as Vocabulary.<br>• Understand the grammars of Past Simple or Continuous, Past Simple or Past Perfect, Past tenses. Giving opinions, Silent letters Vocabulary .<br>• Understand the grammars of have to / be allowed to, Modal verbs. Phrasal verbs as Vocabulary .<br>• Understand the grammars of I think / I don't think + will. Prefixes as Vocabulary.<br>• Understand the grammars of questions with like, what, which and who. -ed and -ing adjectives, Adjective + noun as Vocabulary.<br>• Understand the grammars Present Perfect, Present Perfect Active / Passive, Time expressions. : Likes and dislikes as Vocabulary.<br>• Understand the grammars of Reduced infinitive, Verb patterns. Body idioms as Vocabulary.<br>• Understand the grammars of Conditionals 1, Conditionals 2. Words with similar meaning as Vocabulary.<br>• Understand the grammars of Articles, Possessives. Compound nouns 1, Compound nouns 2as Vocabulary.<br>• Understand the grammars Modal verbs of probability: Past, Modal verbs of probability: Present. Expressing attitude as Vocabulary.<br>• Understand the grammars of reported speech. Clichés as Vocabulary.<br>• Understand the grammars of reporting verbs. Phrasal verbs 2 as Vocabulary.<br>• Understand the grammars of will/going to. Requests and offers as Vocabulary. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | The grammars of Auxiliary verbs, Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2, Past Simple or Continuous, Past Simple or Past Perfect, Past tenses. Words that go together, Free time activities, Jobs, Giving opinions, Silent letters as Vocabulary. [12]<br><br>The grammars of have to / be allowed to, Modal verbs, I think / I don't think + will, Questions with like, What, which and who. Phrasal verbs, Prefixes, -ed and -ing adjectives, Adjective + noun as Vocabulary. [12]<br><br>The grammars of Present Perfect, Present Perfect Active / Passive, Time expressions, Reduced infinitive, Verb patterns, Conditionals 1, Conditionals 2. Likes and dislikes, Body idioms, words with similar meaning as Vocabulary. [12]<br><br>The grammars of articles, possessives, Modal verbs of probability: Past, Modal verbs of probability: Present<br>, Reported speech . Compound nouns 1, Compound nouns 2, Expressing attitude, Clichés, as Vocabulary. [12]<br><br>The grammars of reporting verbs, will / going to . Phrasal verbs 2, requests and offers as Vocabulary. [8] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 63 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 12 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | |

| Total SWL (h/sem)<br>الحمل الدراسي الكلي للطالب خلال الفصل | 75 |
|---|---|

| Module<br>Evaluationتقييم<br>المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
| Formative assessment | Quizzes | 3 | 15% (10) | 3, 8 and 12 | LO #1and #5 and #11 |
| | Assignments | 3 | 15% (10) | 4, 9 and 14 | LO #3, #8 and #13 |
| | Report | 1 | 10% (10) | 13 | LO #4, #8 and #12 |
| Summative assessment | Midterm Exam | 1hr | 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 | Unit one : Expressing attitude<br>Grammar: Auxiliary verbs<br>Vocabulary: Words that go together |
| Week 2 | Unit two : Making a hotel reservation<br>Grammar: Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2<br>Vocabulary: Free time activities, Jobs |
| Week 3 | Unit three: Making small talk<br>Grammar: Past Simple or Continuous, Past Simple or Past Perfect, Past tenses Vocabulary: Giving opinions, Silent letters |
| Week 4 | Unit four : Making the right noises<br>Grammar: have to / be allowed to, Modal verbs<br>Vocabulary: Phrasal verbs |
| Week 5 | Unit Five :<br>Grammar: I think / I don't think + will Vocabulary:<br>Prefixes |
| Week 6 | Unit six :<br>Grammar: Questions with like, What, which and who<br>Vocabulary: -ed and -ing adjectives, Adjective + noun |

| | |
|---|---|
| **Week 7** | Unit seven :<br>Grammar: Present Perfect, Present Perfect Active / Passive, Time expressions Vocabulary: Likes and dislikes |
| **Week 8** | Unit eight :<br>Grammar: Reduced infinitive, Verb patterns Vocabulary:<br>Body idioms |
| **Week 9** | Unit nine :<br>Grammar: Conditionals 1, Conditionals 2<br>Vocabulary: Words with similar meaning |
| **Week 10** | Unit ten:<br>Grammar: Articles, Possessives<br>Vocabulary: Compound nouns 1, Compound nouns 2 |
| **Week 11** | Unit eleven:<br>Grammar: Modal verbs of probability: Past, Modal verbs of probability: Present Vocabulary: Expressing attitude |
| **Week 12** | Unit twelve:<br>Grammar: Reported speech Vocabulary:<br>Clichés |
| **Week 13** | Unit thirteen:<br>Grammar: Reporting verbs<br>Vocabulary: Phrasal verbs 2 |
| **Week 14** | Unit fourteen:<br>Grammar: will / going to<br>Vocabulary: Requests and offers |
| **Week 15** | assessment |

## Learning and Teaching Resources

مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | New headway, Liz and John Soars, OXFORD | No |
| **Recommended Texts** | English Grammar in Use, 5th Edition by Raymond Murphy. | No |
| **Websites** | https://elt.oup.com/student/headway/int/?cc=global&selLanguage=en | |

## 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 | راس ب | (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** | Microprocessors and Microcontrollers | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 482 | | | | |
| **ECTS Credits** | 8 | | | | |
| **SWL (hr/sem)** | 200 | | | | |
| **Module Level** | | 4 | **Semester of Delivery** | | 8 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Wael Hussein Zayer | | **e-mail** | wael.zayer@stu.edu.iq | |
| **Module Leader's Acad. Title** | | Professor | **Module Leader's Qualification** | | Ph. D. |
| **Module Tutor** | Name (if available) | | **e-mail** | E-mail | |
| **Peer Reviewer Name** | | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1- To provide a knowledge of microprocessors and microcontrollers.<br><br>2- Illustration and discussion the principles of microprocessors and microcontrollers in digital systems, description of the digital control concepts using microprocessors and micro controllers and it`s applications.<br><br>3- To understand the hardware and software of the 8086 microprocessor and 8051 microcontroller<br><br>4- To understand the 8086 microprocessor and 8051 microcontroller architecture and assembly language. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | 1. Able to recognize the Block diagram of Intel 8086. Understand the 8086 instruction set and its classification<br>2. Able to recognize the 8086 emulators. Understand Numbering and coding systems with 8086 emulators.<br>3. Able to recognize the 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). Understand the 8086 microprocessor addition and subtraction (ADD, SUB).<br>4. Discuss the 8086 microprocessor multiplication and division (MUL, DIV).and Understandthe8086 microprocessor increment and decrement (INC, DEC).<br>5. Describe the 8086 microprocessor logical instructions (AND, OR, XOR, NOT).<br>and understand the 8086 microprocessor logical instructions (SHIFT &ROTATE)<br>6. Identify the 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP) and understand the flag control instructions.<br>7. Discuss the string manipulation instructions. Understand the a sci code manipulation instructions.<br>8. Able to recognize the software interrupts instructions, block diagram of Intel 8051 microcontroller.<br>9. Discuss the EDSim51 Emulator for the 8051 microcontrollers. Understand the<br>8051 Instruction Set and Assembly programming<br>10. Explain the 8051 microcontroller data transfer instruction. Understand the 8051 microcontroller arithmetic instructions<br>11. Identify the 8051 microcontroller loop and jump instructions. Understand the 8051 microcontroller call instructions.<br>12. Explain the 8051 microcontroller time delay instructions. Understand the led display using the 8051 microcontrollers.<br>13. Able to Recognize the Interfacing of the 8051 microcontrollers with the 7-<br>Segment Display. Understand the stepper Motor Control Using the 8051 Microcontroller<br>14. Able to Recognize the Digital Analog Converter Interfacing with the 8051 Microcontroller. Understand the analog to Digital Converter Interfacing with the 8051 Microcontroller.<br>15. Able to Recognize the DC Motor Speed Control using the 8051 microcontrollers. Understand the 8051 Microcontroller-based system design |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A -Intel 8086<br>Block diagram of Intel 8086. 8086 instruction set and its classification8086 emulators. Numbering and coding systems with 8086 emulators. 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB).The 8086 microprocessor multiplication and division (MUL, DIV). 8086 microprocessor increment and decrement (INC, DEC).8086 microprocessor logical instructions (AND, OR, XOR, NOT). 8086 microprocessor logical instructions (SHIFT &ROTATE) , 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP)[42 hrs]<br><br>Flag control instructions. String manipulation instructions. Understand the asci code manipulation instructions. Software interrupts instructions[20 hrs]<br><br>Part B - Intel 8051microcontroller<br><br>The 8086 microprocessor logical instructions (SHIFT &ROTATE),and 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions. Discuss the String manipulation instructions. Asci code manipulation instructions. Software interrupts instructions. Block Diagram of Intel 8051 microcontroller.EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming, 8051 microcontroller data transfer instruction. 8051 microcontroller arithmetic instructions, 8051 microcontroller loop, and jump instructions. 8051 microcontroller call instructions. [24hrs]<br><br>8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers .Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 microcontroller digital Analog Converter Interfacing with the 8051 Microcontroller. Analog to Digital Converter Interfacing with the 8051 Microcontroller. DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design[38hrs] |

| **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 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 124 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 8 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 76 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 4 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 | | |

| Module Evaluation تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 12 | LO #4 and #8 |
| | **Assignments** | 2 | 5% (5) | 4 and 14 | LO #3 and #13 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 13 | LO #8 |
| | **Lab Report and Lap Exam** | 15, 1 | 15%(15) | 1-15,8 | LO #1- #15, LO #1- #8 |
| **Summative assessment** | **Midterm Exam** | 1.5hr | 10% (10) | 8 | LO #1 - #7 |
| | **Final Exam** | 2.5hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| Delivery Plan (Weekly Syllabus)<br>المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Block diagram of Intel 8086. 8086 instruction set and its classification |
| **Week 2** | The 8086 emulators. Numbering and coding systems with 8086 emulators. |
| **Week 3** | The 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB). |

| | |
|---|---|
| **Week 4** | The 8086 microprocessor multiplication and division (MUL, DIV). the 8086 microprocessor increment and decrement (INC, DEC). |
| **Week 5** | The 8086 microprocessor logical instructions (AND, OR, XOR, NOT). The 8086 microprocessor logical instructions (SHIFT &ROTATE) |
| **Week 6** | 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions. |
| **Week 7** | String manipulation instructions. Asci code manipulation instructions. |
| **Week 8** | Software interrupts instructions. Block Diagram of Intel 8051 microcontroller. |
| **Week 9** | EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming |
| **Week 10** | 8051 microcontroller data transfer instruction. The 8051 microcontroller arithmetic instructions |
| **Week 11** | The 8051 microcontroller loop and jump instructions. 8051 microcontroller call instructions. |
| **Week 12** | The 8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers. |
| **Week 13** | Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 Microcontroller |
| **Week 14** | Digital Analog Converter Interfacing with the 8051 Microcontroller. Analog Digital Converter Interfacing with the 8051 Microcontroller. |
| **Week 15** | The DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Block diagram of Intel 8086, 8086 instruction set and its classification |
| **Week 2** | 8086 emulator, Numbering and coding systems with8086 emulator |
| **Week 3** | The 8086 microprocessor data transfer instruction (MOV, XCHG,IN, OUT) |
| **Week 4** | The 8086 microprocessor addition and subtraction (ADD, SUB), The 8086 microprocessor multiplication and division (MUL,DIV), The 8086 microprocessor increment and decrement (INC, DEC) |
| **Week 5** | Lab 5: The 8086 microprocessor logical instructions (AND, OR, XOR, NOT), The 8086 microprocessor logical |
| **Week 6** | Lab 6;The 8086 microprocessor control transfer instructions (JMP, LOOP,CMP), Flag control instructions |

| | |
|---|---|
| **Week 7** | Lab 7; String manipulation instructions, Asci code manipulation instructions, |
| **Week 8** | Lab 8: : Software interrupts instructions, Block Diagram of Intel 8051microcontroller |
| **Week 9** | Lab 9: EDSim51 Emulator for 8051 microcontrollers, The 8051 Instruction Set and assembly Programming |
| **Week 10** | Lab 10: The 8051 microcontroller data transfer instruction, The 8051 microcontroller arithmetic instructions |
| **Week 11** | Lab 11: The 8051 microcontroller loop and jump instructions, the 8051 microcontroller call instructions |
| **Week 12** | Lab 12: The 8051 microcontroller time delay instructions, Led display Using the 8051 microcontroller |
| **Week 13** | Lab 13: Interfacing the 8051 microcontrollers with the 7-Segment Display, Stepper Motor Control Using the8051 Microcontroller |
| **Week 14** | Lab 14: Stepper Motor Control Using the8051 Microcontroller, Analog to Digital Converter Interfacing with the 8051Microcontroller |
| **Week 15** | Lab 15: DC Motor Speed Control Using the 8051 Microcontroller, 8051 Microcontroller-Based System Design |

## Learning and Teaching Resources
مصادر التعلم والتدريس

| | Text | Available in the Library? |
|---|---|---|
| **Required Texts** | THE INTEL MICROPROCESSORS 8086/8088 Architecture, Programming, and Interfacing, Eighth Edition, by Barry B. Brey, PEARSON 2009. | NO |
| **Recommended Texts** | THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS Using assembly and C, second Edition, by Muhammad Ali Mazidi, PEARSON 2005. | No |

## 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 | راس ب | (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 and Drive | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 471 | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | | 4 | **Semester of Delivery** | | 7 |
| **Administering Department** | | ETE | **College** | METC | |
| **Module Leader** | Ahmed Thamer Radhi | | **e-mail** | ahmed.radhi@stu.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** | | Ahmed thamer radhi | **e-mail** | Ahmed.radhi@stu.edu.iq | |
| **Scientific Committee Approval Date** | | 18/02/2025 | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1- To provide a knowledge of Power electronics and drive.<br><br>2- Illustration and discussion the principles of power electronics and drive.<br><br>3- To select a suitable electronics and drive for a given use based on considerations of application and performance<br><br>4- To be able to create a new power electronics and drive system model that will have some desirable properties.<br><br>5- To acquire in-depth knowledge of power electronic circuits for realtime applications.<br><br>6- To solve problems in power electronics.<br><br>7- To analyze power electronics using existing modern tools for enhancement of knowledge. |

| | |
|---|---|
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | - Describe the role of Power Electronics as an enabling technology in various applications such as flexible production systems, energy conservation, renewable energy, transportation etc.<br><br>- Identify a switching power-pole as the basic building block and to use pulse Width Modulation to synthesize the desired output.<br><br>- Design the switching power-pole using the available power semiconductor devices, their drive circuitry.<br><br>- Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous modes and be able to analyze basic converter topologies.<br><br>- Using the average model of the building block, quickly simulate the dynamic performance of dc-dc converters and compare them with their switching counterparts.<br><br>- Design controllers for dc-dc converters in voltage and peak-current mode.<br><br>- Design, using simulations, the interface between the power electronics equipment and single-phase and three-phase utility using diode rectifiers and analyze the total harmonic distortion.<br><br>- Design the single-phase power factor correction (PFC) circuits to draw sinusoidal currents at unity power factor.<br><br>- Learn basic magnetic concepts, analyze transformer-isolated switch-mode power supplies and design high-frequency inductors and transformers.<br><br>- Learn basic concepts of soft-switching and their applications to dc-dc converters, compact fluorescent lamps (CFL) and induction heating.<br><br>- Learn the requirements imposed by electric drives (dc and ac) on converters and synthesize these converters using the building block approach.<br><br>- Understand, simulate and design single-phase and three-phase thyristor converters.<br><br>- Learn the role of Power Electronics in utility-related applications which are becoming extremely important. |

| | |
|---|---|
| **Indicative Contents**<br>المحتويات الإرشادية | Part A –various Power electronics and drivetypes, structure and Theory of representation<br>Introduction to power semiconductor devices and their applications, single phase and three phase ACDC converter (Rectifier) ,DC-AC converter (Inverter). [15 hrs]<br><br>DC-DC converter (DC chopper) ,AC-AC converter (AC voltage regulator and cycloconverter). [15 hrs]<br><br>Revision problem classes [6 hrs]<br><br>Part B –Speed control of DC motors ,Second semester exam-1 st attempt [15 hrs]<br>Speed control of AC motors (Induction and Synchronous motors),Second semester exam-2nd attempt ,General review[15 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ 15 اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 109 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 7 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 66 | **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

تقيم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 2 | 5% (5) | 5 and 8 | LO #3 and #6 |
| | Assignments | 2 | 5% (5) | 8 and 14 | LO #4 and #13 |
| | Projects | 1 | 5% (5) | Continuous | All |
| | Report | 1 | 10% (10) | 13 | LO #3, #4 and #5 |
| | Lab reports and lab exam | 15, 1 | 15% (15) | 1-15, 8 | All, 1-6 |
| Summative assessment | Midterm Exam | 2hr | 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 to power semiconductor devices and their applications |
| Week 2 | Single phase and three phase ACDC converter (Rectifier) |
| Week 3 | |
| Week 4 | |
| Week 5 | DC-AC converter (Inverter) |
| Week 6 | DC-DC converter (DC chopper) |
| Week 7 | AC-AC converter (AC voltage regulator and cyclo converter) |
| Week 8 | |
| Week 9 | Speed control of DC motors |
| Week 10 | |
| Week 11 | |
| Week 12 | Speed control of AC motors (Induction and Synchronous motors) |

| | |
|---|---|
| **Week 13** | |
| **Week 14** | |
| **Week 15** | |

## Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Single phase half wave uncontrolled rectifier R-load & RL-load |
| **Week 2** | Single phase full wave (mid-point) or center tap uncontrolled rectifier R-load |
| **Week 3** | Single phase full wave uncontrolled rectifier (bridge) R-load &RL-load |
| **Week 4** | Three phases half wave uncontrolled rectifier R-load & RL-load |
| **Week 4** | Three phases full wave uncontrolled rectifier (bridge) R-load &RL-load |
| **Week 5** | Characteristics of (SCR) Thyristor |
| **Week 6** | R-trigger circuit of (SCR) ,UJT trigger circuit of (SCR) |
| **Week 7** | Single phase full wave (mid-point) or center tap controlled rectifier R-load , |
| **Week 8** | Single phase full wave controlled rectifier (bridge) R-load &RL-load |
| **Week 9** | Three phases half wave controlled rectifier , R-load & RL-load |
| **Week 10** | Three phases full wave controlled rectifier (bridge) R-load &RL-load |
| **Week 11** | Characteristics of DIAC , |
| **Week 12** | Characteristics of TRIAC |
| **Week 13** | Characteristics of MOSFET |
| **Week 14** | Characteristics of MOSFET |
| **Week 15** | Characteristics of IGBT |

## Learning and Teaching Resources
مصادر التعلم والتدريس

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

| | | |
|---|---|---|
| **Required Texts** | Power Electronics and Motor Drive Systems<br>1st Edition - November 8, 2016<br><br>Author: Stefanos Manias | No |
| **Recommended Texts** | Power Electronics in Motor Drives (E-book) | No |
| **Websites** | https://shop.elsevier.com/books/power-electronics-and-motor-drive-systems/rogers/978-0-12-811798-9 | |

| **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 | راس ب | (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 | | | **Module Delivery** | |
| **Module Type** | core | | | **Theory**<br>**Lecture**<br>**Lab** | |
| **Module Code** | STUMETC 481 | | | | |
| **ECTS Credits** | 8 | | | | |
| **SWL (hr/sem)** | 200 | | | | |
| **Module Level** | 4 | **Semester of Delivery** | 8 | | |
| **Administering Department** | ETE | **College** | METC | | |
| **Module Leader** | Raed Khalid Hemeed | **e-mail** | Raed.khalid@stu.edu.iq | | |
| **Module Leader's Acad. Title** | Assist. Lecturer | **Module Leader's Qualification** | Asst. | | |
| **Module Tutor** | Name (if available) | **e-mail** | E-mail | | |
| **Peer Reviewer Name** | Ahmed Thamer Radhi | **e-mail** | ahmed.radhi@stu.edu.iq | | |
| **Scientific Committee Approval Date** | 18/02/2025 | **Version Number** | 1.0 | | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الاخرى | | | |
|---|---|---|---|
| **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 | 1. 2. To provide a knowledge of Signals and systems.<br>3. Illustration and discussion the principles of Signals and systems.<br>4. The ability to analyze and solve problems.<br>To be able to create a new signals and systems that will have some desirable properties.<br>5. To understand the limits of signals and systems properties. |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | An understanding of signals and systems and operation.<br>1. 2. List the various terms associated with signals and systems.<br>3. 4. Summarize what is meant by a basic of signals and systems selection. Discuss the structure, properties and application on of different signals and systems.<br>5. Known the operation of signals and systems according to modern techniques methods that support all applications.<br>6. Identify the principle of different techniques of analysis's .<br>7. Identify the properties of different analyses techniques. |

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| **Indicative Contents**<br>المحتويات الإرشادية | Part A signals and system types , analyses, theory<br><br>Representation of basic signals and sequences in MATLAB , plot continuous and discrete time, plot discrete-time signal in Matlab, plot special signals with discrete time , elementary transformations of the independent variable in Matlab. [15 hrs]<br><br>Revision problem classes [6 hrs]<br><br><u>Part B –Properties of materials</u><br><br>Operations on continuous signals, fourier transform and its Properties, sampling Theorem, autocorrelation & cross correlation Between Signals. [15 hrs]<br><br>Convolution between two signals, discrete fourier transform (DFT) & Inverse DFTC computation ,fast fourier transform (FFT). [15 hrs]<br><br>Implementation of LP FIR Filters, Implementation of HP FIR Filters.[10 hrs] |

| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا | | | |
|---|---|---|---|
| **Structured SSWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 124 | **Structured SSWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 8 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 76 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5 |

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|---|---|
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 200 |

| **Module Evaluation** تقييم المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning Outcome** |
| **Formative assessment** | **Quizzes** | 2 | 5% (5) | 5 and 8 | LO #1 and #3 |
| | **Assignments** | 2 | 5% (5) | 4 and 14 | LO #3 and #6 |
| | **Projects** | 1 | 5% (5) | Continuous | All |
| | **Report** | 1 | 10% (10) | 14 | LO # 3 |
| | **Lab reports and lab exam** | 15, 1 | 15% (15) | 1-15, 8 | All, 1-4 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 7 | LO #1 - #4 |
| | **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)** المنهاج الاسبوعي النظري | |
|---|---|
| | **Material Covered** |
| **Week 1** | Representation of basic Signals and Sequences in MATLAB |
| **Week 2** | Plot Continuous and Discrete Time |
| **Week 3** | Plot Discrete-Time Signal In Matlab |
| **Week 4** | Plot Special signals with discrete time |
| **Week 5** | Elementary transformations of the independent variable in Matlab |
| **Week 6** | Operations on Continuous signals |
| **Week 7** | Fourier Transform and its Properties |
| **Week 8** | Sampling Theorem |

| | |
|---|---|
| **Week 9** | Autocorrelation & Cross correlation Between signals |
| **Week 10** | Convolution between Two signals |
| **Week 11** | Discrete Fourier Transform (DFT) |
| **Week 12** | Inverse DFT Computation |
| **Week 13** | Fast Fourier Transform (FFT) |
| **Week 14** | Implementation of LP FIR Filters |
| **Week 15** | Implementation of HP FIR Filters |

## Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

| | **Material Covered** |
|---|---|
| **Week 1** | Representation of Basic Signals and Sequences in MATLAB |
| **Week 2** | Plot continuous and discrete time basic signals |
| **Week 3** | Plot Discrete-Time Signal in MATLAB |
| **Week 4** | Plot Special signals with discrete time |
| **Week 5** | Elementary transformations of the independent variable in MATLAB |
| **Week 6** | Operations on Continuous signals |
| **Week 7** | Fourier Transform and its Properties |
| **Week 8** | Sampling Theorem |
| **Week 9** | Autocorrelation & Cross correlation between signals |
| **Week 10** | Convolution between Two signals |
| **Week 11** | Discrete Fourier Transform (DFT) |
| **Week 12** | Inverse DFT computation |
| **Week 13** | Fast Fourier Transform (FFT) |
| **Week 14** | Implementation of LP FIR Filters |
| **Week 15** | Implementation of HP FIR Filters |

## Learning and Teaching Resources

مصادر التعلم والتدريس

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

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|---|---|---|
| **Required Texts** | Hwei P. Hsu, " Theory and Problems of signals and systems", McGraw-Hill, 1995. - | No |
| **Recommended Texts** | Fundamentals of Signals and Systems, Benoit Boulet & Boston Massachusetts, 2005 | No |
| **Websites** | https://mlichouri.files.wordpress.com/2013/10/fundamentals-of-signals-and-systems.pdf | |

**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 | راس ب | (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.