

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

| Module Information                 |                    |                               |  |
|------------------------------------|--------------------|-------------------------------|--|
| معلومات المادة الدراسية            |                    |                               |  |
| Module Title                       | Mathematics        |                               | Module Delivery  |
| Module Type                        | Core               |                               | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |
| Module Code                        | UOMU0201034        |                               |  |
| ECTS Credits                       | 6                  |                               |  |
| SWL (hr/sem)                       | 150                |                               |  |
| Module Level                       | University Stage   | Semester of Deliver           | 3  |
| Administering Department           | PM                 | College                       | TE   |
| Module Leader                      | Tayseer Sameer Jaz | e-mail                        |  |
| Module Leader's Acad. Title        | Assist. Professor  | Module Leader's Qualification | Ph. D  |
| Module Tutor                       | Hiba Mohsin Abid   | e-mail                        |  |
| Peer Reviewer Name                 | Name               | e-mail                        | E-mail   |
| Scientific Committee Approval Date |                    | Version Number                | 1.0  |

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

- 1.To enable the student to solve the mathematical problems.
2. To provide a suitable type of discipline in the mind of the learners.
3. To prepare the student for various technical profession.
4. To prepare the student for economic purposeful, productive, creative, and

|   |   |
|---|---|
|   | <p>constructive living.</p> <p>5. To prepare the student for undergraduate as well as postgraduate education.</p> <p>6. To develop in the power of thinking and reasoning.</p> <p>7. To develop in the student the habit of concentration, self-reliance and discovery.</p>   |
| <p><b>Module Learning Outcomes</b></p> <p>مخرجات التعلم للمادة الدراسية</p> | <ol style="list-style-type: none"> <li>1. Solve problems at various levels and in various contexts.</li> <li>2. Learn how to read, understand, and formulate the definitions of mathematical concepts.</li> <li>3. Cultivate how to read and analyze mathematical statements.</li> <li>4. Apply logical deduction and acquire mathematical reasoning through writing formal mathematical proofs.</li> <li>5. Work with ideas and approaches representing the breadth of mathematical sciences, ranging from continuous to discrete and theoretical to applied.</li> </ol> |
| <p><b>Indicative Contents</b></p> <p>المحتويات الإرشادية</p>                | <ol style="list-style-type: none"> <li>1. Evidence an understanding of general fundamental mathematical topics.</li> <li>2. Evidence an understanding of mathematics topics related to engineering and technology.</li> <li>3. Demonstrate ability to analyses and present information and data through the use of graphs and tables, or other similar data presentation methods.</li> </ol>  |

| <p><b>Learning and Teaching Strategies</b></p> <p>استراتيجيات التعلم والتعليم</p> |  |
|---|--|
| <p><b>Strategies</b></p>  | <p>Effective mathematics instruction involves a combination of pedagogical strategies that address conceptual understanding, procedural fluency, and problem-solving abilities. Key strategies include explicit instruction, cooperative learning, hands-on activities, visual aids, and strategic questioning. These strategies can be integrated to create engaging and effective math lessons, ultimately leading to a deeper understanding of mathematical concepts.</p> |

| <p><b>Student Workload (SWL)</b></p> <p>الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا</p>        |            |  |   |
|---|------------|--|---|
| <p><b>Structured SWL (h/sem)</b></p> <p>الحمل الدراسي المنتظم للطالب خلال الفصل</p>       | 63         | <p><b>Structured SWL (h/w)</b></p> <p>الحمل الدراسي المنتظم للطالب أسبوعيا</p>       | 4 |
| <p><b>Unstructured SWL (h/sem)</b></p> <p>الحمل الدراسي غير المنتظم للطالب خلال الفصل</p> | 87         | <p><b>Unstructured SWL (h/w)</b></p> <p>الحمل الدراسي غير المنتظم للطالب أسبوعيا</p> | 6 |
| <p><b>Total SWL (h/sem)</b></p> <p>الحمل الدراسي الكلي للطالب خلال الفصل</p>              | <b>150</b> |  |   |

| Module Evaluation     |                 |             |                  |               |                           |
|-----------------------|-----------------|-------------|------------------|---------------|---------------------------|
| تقييم المادة الدراسية |                 |             |                  |               |                           |
|                       |                 | Time/Number | Weight (Marks)   | Week Due      | Relevant Learning Outcome |
| Formative assessment  | Quizzes         | 4           | 20%(20)          | 5,8,10,and 14 | No                        |
|                       | Assignments     | 4           | 20% (20)         | 2,4,8, and 12 | No                        |
|                       | Projects / Lab. | 0           | 0                | Continuous    | All                       |
|                       | Report          | 0           | 0                | Continuous    | All                       |
| Summative assessment  | Midterm Exam    | 2hr         | 10% (10)         | 7             | LO #1 - #6                |
|                       | Final Exam      | 3hr         | 50% (50)         | 16            | All                       |
| Total assessment      |                 |             | 100% (100 Marks) |               |                           |

| Delivery Plan (Weekly Syllabus) |  |
|---------------------------------|--|
| المنهاج الاسبوعي النظري والعملي |  |
|                                 | Material Covered   |
| Week 1                          | Introduction of Derivatives and Integration                                    |
| Week 2                          | Vector, vector components, vector in space                                     |
| Week 3                          | Complex number, Argand diagram, De Moivre's Theorem                            |
| Week 4                          | Partial derivatives, Chain rule, gradient derivatives, directional derivatives |
| Week 5                          | Double integral, volume by double integral                                     |
| Week 6                          | physical application of double integral  |
| Week 7                          | Triple integral  |
| Week 8                          | Polar coordinates  |
| Week 9                          | Matrices, matrix by matrix product   |
| Week 10                         | Solve equation by inverse matrix method  |
| Week 11                         | Green's theorem  |
| Week 12                         | Line integration   |
| Week 13                         | Maclaurin series   |
| Week 14                         | Taylor series  |
| Week 15                         | Solution of differential equations   |
| Week 16                         | Preparatory week before the final Exam   |

| Grading Scheme<br>مخطط الدرجات |       |         |         |            |
|--------------------------------|-------|---------|---------|------------|
| Group                          | Grade | التقدير | Marks % | Definition |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر |                  |
|--|------------------|
|  | Material Covered |
| Week 1   | No               |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس |  |                           |
|--|--|---------------------------|
|  | Text   | Available in the Library? |
| Required Texts   | George B. Thomas, Jr et al., 2014. Thomas Calculus. Thirteen Edition   | Yes                       |
| Recommended Texts  | H.S. Gangwar and Prabhakar Gupta, 2009. A Textbook of Engineering Mathematics. Second Edition  | Yes                       |
| Websites   | <a href="https://rodrigopacios.github.io/mrpacios/download/Thomas_Calculus.pdf">https://rodrigopacios.github.io/mrpacios/download/Thomas_Calculus.pdf</a><br><a href="https://menso88.weebly.com/uploads/1/7/5/8/17586891/textbook_of_engineering_mathematics.pdf">https://menso88.weebly.com/uploads/1/7/5/8/17586891/textbook_of_engineering_mathematics.pdf</a> |                           |

|                                     |                         |                     |          |                                       |
|-------------------------------------|-------------------------|---------------------|----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A - Excellent</b>    | امتياز              | 90 - 100 | Outstanding Performance               |
|                                     | <b>B - Very Good</b>    | جيد جدا             | 80 - 89  | Above average with some errors        |
|                                     | <b>C - Good</b>         | جيد                 | 70 - 79  | Sound work with notable errors        |
|                                     | <b>D - Satisfactory</b> | متوسط               | 60 - 69  | Fair but with major shortcomings      |
|                                     | <b>E - Sufficient</b>   | مقبول               | 50 - 59  | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 - 49)</b>      | <b>FX – Fail</b>        | (راسب (قيد المعالجة | (45-49)  | More work required but credit awarded |
|                                     | <b>F – Fail</b>         | راسب                | (0-44)   | Considerable amount of work required  |
|                                     |                         |                     |          |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

| Code         | Course/Module Title   | ECTS          | Semester      |
|--------------|-----------------------|---------------|---------------|
| TEMO 200     | Mathematics           | 6             | 3             |
| Class (hr/w) | Lect/Lab./Prac./Tutor | SSWL (hr/sem) | USWL (hr/sem) |
| 3            | 1                     | 63            | 87            |

#### Description

The proficiencies of Understanding, Fluency, Problem Solving, and Reasoning are fundamental to learning mathematics and working mathematically and are applied across all three strands Number and Algebra, Measurement and Geometry, and Statistics and Probability.

Understanding refers to students building a robust knowledge of adaptable and transferable mathematical concepts and structures. Students make connections between related concepts and progressively apply the familiar to develop new ideas. They develop an understanding of the relationship between the ‘why’ and the ‘how’ of mathematics. Students build understanding when they:

- connect related ideas
- represent concepts in different ways
- identify commonalities and differences between aspects of content
- describe their thinking mathematically
- interpret mathematical information