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|  | Ministry of Higher Education and Scientific Research - Iraq<br>Al-Mustaqbal University<br>College for engineering and technology<br>Department of Biomedical Engineering |  |

# MODULE DESCRIPTOR FORM
# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | General Mathematics | | | **Module Delivery** | |
| **Module Type** | **BASIC** | | | **Theory**<br>**Lecture**<br>**Tutorial** | |
| **Module Code** | **UOMU0102011** | | | | |
| **ECTS Credits** | 7 | | | | |
| **SWL (hr/sem)** | 175 | | | | |
| **Module Level** | 1 | | **Semester of Delivery** | 1 | |
| **Administering Department** | CES.PR | | **College** | CES | |
| **Module Leader** | Lect. Saif salam | | **e-mail** | | |
| **Module Leader's Acad. Title** | Lecturer | | **Module Leader's Qualification** | | |
| **Module Tutor** | None | | | None | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Review Committee Approval** | 01/02/2026 | | **Version Number** | 1.0 | |

| Relation With Other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
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| **Prerequisite module** | None | **Semester** | |
| **Co-requisites module** | None | **Semester** | |
| **Module Aims, Learning Outcomes and Indicative Contents**<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | | | |
| **Module Aims**<br>أهداف المادة الدراسية | 1. To develop an understanding with the concepts of calculus and analytic geometry and the applications of these concepts to the solution of engineering problems.<br>2. Introduction to functions, limits, derivatives and their applications.<br>3. Provide practice at developing critical thinking skills, solving open ended problems and to work in teams. | | |
| **Module Learning Outcomes**<br>مخرجات التعلم للمادة الدراسية | 1. Develop a deep understanding of issues related to the basic principles of calculus, and how to solve problems in chemical engineering.<br>2. The ability to understand and analysis problems related to specific field.<br>3. Understanding the necessary of all subject of mathematics in other sciences .<br>4. Understanding the necessary of derivatives and its application in other sciences.<br>5. An ability to apply effective, creative and innovative solutions, both independently and cooperatively, to current and future problems.<br>6. Characterization and analyses the performance of any problems in any object of chemical engineering. | | |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>Preliminaries<br>Real numbers, Interval, Absolute value, Cartesian coordinates in the plane, Domain and range, Even & odd functions, Sum, differences, products & quotients, Composite functions, shifting a graph of a function, Scaling & reflecting a graph of a function.<br>[6 hrs]<br>Limits and Continuity<br>Limits, Finite limits, Horizontal asymptotes, Vertical asymptotes, Continuity.<br>[6 hrs]<br>Transcendental functions<br>Natural logarithms functions, Exponential functions, Logarithms functions, $a^x$ functions, Trigonometric functions , Inverse trigonometric functions , Hyperbolic functions, Inverse hyperbolic functions.<br>[9 hrs] | | |

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| | Tangents & Derivatives<br>Finding a tangent to the graph of a function, Differentiation, Differentiation rules, Second & higher-order derivatives , The derivative as a rate of change , Derivatives of trigonometric functions , The chain rule & parametric equations , The chain rule with powers of a function , Slopes of parameterized curves , Implicit differentiation , Related rates , L' Hopital's rule. [15 hrs]<br>Determinates<br>Properties of determinates, Cramer 's rule [3 hrs]<br>Vector analysis<br>Component form, Vector algebra operations, Unit vectors, Midpoint of a line segment , Vector tangent & normal to the curve , The dot product , Angle between vectors , Perpendicular (orthogonal) vectors , Dot product properties & vector projections , The cross product [6 hrs] |

## Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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| **Strategies** | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive and tutorials. |

## Student Workload (SWL)
الحمل الدراسي للطالب

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| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 63 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 4 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 112 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 8 |
| **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** | 3 | 15% (5) | 4,8,12 | LO #2, 3, 4 and 5 |
| | **Assignments** | 6 | 20% | Continuous | |
| | **Report** | 1 | 5% (5) | 14 | LO # 1 and 6 |
| **Summative assessment** | **Midterm Exam** | 2hr | 10% (10) | 10 | LO # 2, 3, 4 and 5 |

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|---|---|---|---|---|---|
| | **Final Exam** | 2hr | 50% (60) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) | | |

| **Delivery Plan (Weekly Syllabus)**<br>المنهاج الاسبوعي النظري | |
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| | **Material Covered** |
| **Week 1** | Real numbers, Interval, Absolute value, Cartesian coordinates in the plane, Domain and range |
| **Week 2** | Even & odd functions, Sum, differences, products & quotients, Composite functions , Shifting a graph of a function , Scaling & reflecting a graph of a function |
| **Week 3** | Limits, Finite limits |
| **Week 4** | Horizontal asymptotes, Vertical asymptotes , Continuity |
| **Week 5** | Natural logarithms functions, Exponential functions, Logarithms functions , $a^x$ functions |
| **Week 6** | Trigonometric functions, Inverse trigonometric functions |
| **Week 7** | Hyperbolic functions, Inverse hyperbolic functions |
| **Week 8** | Finding a tangent to the graph of a function |
| **Week 9** | Differentiation , Differentiation rules , Second & higher-order derivatives |
| **Week 10** | The derivative as a rate of change , Derivatives of trigonometric functions |
| **Week 11** | The chain rule & parametric equations , The chain rule with powers of a function , Slopes of parameterized curves |
| **Week 12** | Implicit differentiation , Related rates , L'Hopital's rule |
| **Week 13** | Properties of determinates , Cramer 's rule |
| **Week 14** | Component form , Vector algebra operations , Unit vectors , Midpoint of a line segment , Vector tangent & normal to the curve |
| **Week 15** | The dot product , Angle between vectors , Perpendicular (orthogonal) vectors , Dot product properties & vector projections , The cross product |
| **Week 16** | Final Exam |

| **Learning and Teaching Resources**<br>مصادر التعلم والتدريس | | |
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| | **Text** | **Available in the Library?** |
| **Required Texts** | "Thomas' Calculus Early Transcendentals", George B.Thomas, Jr. , Twelfth Edition, Addison-Wesley, | Yes |

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| | 2010 | |
| **Recommended Texts** | "Mathematical Methods in Chemical Engineering", Jenson. V.J. and Jeffereys, G.V, 2nd Edition, Academic Press New York, 1977 | Yes |
| **Websites** | | |

**APPENDIX:**

| **GRADING SCHEME** مخطط الدرجات | | | | |
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| **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 | مقبول بقرار | (45-49) | More work required but credit awarded |
| | **F** – Fail | راسب | (0-44) | Considerable amount of work required |
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Note:

NB 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.

**ملاحظة: هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي**