

| Module Information                 |             |                       |                                                                                                                                                                                                                               |                |                       |
|------------------------------------|-------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|
| معلومات المادة الدراسية            |             |                       |                                                                                                                                                                                                                               |                |                       |
| Module Title                       | MATHEMATICS |                       | Module Delivery                                                                                                                                                                                                               |                |                       |
| Module Type                        | BASIC       |                       | <input checked="" type="checkbox"/> Theory<br><input type="checkbox"/> Lecture<br><input type="checkbox"/> Lab<br><input type="checkbox"/> Tutorial<br><input type="checkbox"/> Practical<br><input type="checkbox"/> Seminar |                |                       |
| Module Code                        | HTCMT 100   |                       |                                                                                                                                                                                                                               |                |                       |
| ECTS Credits                       | 6           |                       |                                                                                                                                                                                                                               |                |                       |
| SWL (hr/sem)                       | 200         |                       |                                                                                                                                                                                                                               |                |                       |
| Module Level                       |             | One                   | Semester of Delivery                                                                                                                                                                                                          |                | one                   |
| Administering Department           |             | Type Dept. Code       | College                                                                                                                                                                                                                       | HTC            |                       |
| Module Leader                      |             | Dr. Saleh Eesaa Jasim |                                                                                                                                                                                                                               | e-mail         | drzaki_hwj@ntu.edu.iq |
| Module Leader's Acad. Title        |             | Lecture               | Module Leader's Qualification                                                                                                                                                                                                 |                | Ph.D.                 |
| Module Tutor                       |             | Name (if available)   |                                                                                                                                                                                                                               | e-mail         | E-mail                |
| Peer Reviewer Name                 |             | Name                  |                                                                                                                                                                                                                               | e-mail         | E-mail                |
| Scientific Committee Approval Date |             | 20/10/2024            |                                                                                                                                                                                                                               | Version Number | 1.0                   |

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

| <b>Module Aims, Learning Outcomes and Indicative Contents</b><br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <b>Module Aims</b><br>أهداف المادة الدراسية                                                                               | <ol style="list-style-type: none"> <li>1. This course provides important skill-building in basic computational skills.</li> <li>2. The language of mathematics.</li> <li>3. Problem-solving required for pre-college level math courses.</li> <li>4. Applying principles of functions and their graphs.</li> <li>5. Applying principles of limits and continuity.</li> <li>6. Applying principles of differentiation and applications of derivatives.</li> </ol> |

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| <b>Module Learning Outcomes</b><br><br>مخرجات التعلم للمادة الدراسية | 1. Solve problems of functions and their graphs<br>2. Solve problems of limits and continuity<br>3. Solve problems of applications of limits and continuity<br>4. Solve problems of differentiation<br>5. Solve problems of applications of derivatives<br>6. An ability to distinguish, identify, define, formulate<br>7. Solve engineering problems by applying engineering, science and mathematics principles. |
| <b>indicative Contents</b><br><br>المحتويات الإرشادية                |                                                                                                                                                                                                                                                                                                                                                                                                                    |

| <b>Learning and Teaching Strategies</b><br>استراتيجيات التعلم والتعليم |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Strategies</b>                                                      | Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students. |

| <b>Student Workload (SWL)</b><br><b>الحمل الدراسي للطلاب</b>                   |     |                                                                           |     |
|--------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------|-----|
| <b>Structured SWL (h/Sem)</b><br>الحمل الدراسي المنتظم للطلاب خلال الفصل       | 102 | <b>Structured SWL (h/w)</b><br>الحمل الدراسي المنتظم للطلاب أسبوعيا       | 7   |
| <b>Unstructured SWL (h/Sem)</b><br>الحمل الدراسي غير المنتظم للطلاب خلال الفصل | 98  | <b>Unstructured SWL (h/w)</b><br>الحمل الدراسي غير المنتظم للطلاب أسبوعيا | 6.5 |
| <b>Total SWL (h/Sem)</b><br>الحمل الدراسي الكلي للطلاب خلال الفصل              | 200 |                                                                           |     |

| <b>Module Evaluation</b><br><b>تقييم المادة الدراسية</b> |                        |             |                |            |                           |
|----------------------------------------------------------|------------------------|-------------|----------------|------------|---------------------------|
|                                                          |                        | Time/Number | Weight (Marks) | Week Due   | Relevant Learning Outcome |
| <b>Formative assessment</b>                              | <b>Quizzes</b>         | 2           | 10% (10)       | 5, 10      | LO #1, 2, 3,8,9,10        |
|                                                          | <b>Assignments</b>     | 2           | 10% (10)       | 2, 12      | LO # 3, 4, 6 and 7        |
|                                                          | <b>Projects / Lab.</b> | 1           | 10% (10)       | Continuous |                           |
|                                                          | <b>Report</b>          | 1           | 10% (10)       | 13         | LO # 5, 8 and             |

|                             |                     |      |                  |    |          |
|-----------------------------|---------------------|------|------------------|----|----------|
|                             |                     |      |                  |    | 10       |
| <b>Summative assessment</b> | <b>Midterm Exam</b> | 2 hr | 10% (10)         | 7  | LO # 1-7 |
|                             | <b>Final Exam</b>   | 3hr  | 50% (50)         | 16 | All      |
| <b>Total assessment</b>     |                     |      | 100% (100 Marks) |    |          |

| <b>Delivery Plan (Weekly Syllabus)</b><br>المنهاج الاسبوعي النظري |                                                                                                                                                                 |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                   | <b>Material Covered</b>                                                                                                                                         |
| <b>Week 1</b>                                                     | Functions and their Graphs: -Functions; Domain and Range, Graphs of Functions, Trigonometric Functions                                                          |
| <b>Week 2</b>                                                     | Piecewise-Defined Functions, Even and Odd Functions, Common Functions, Inverse Functions, Laws of Exponents, The General Exponential Function $a^x$             |
| <b>Week 3</b>                                                     | Graphs of: -, Exponential Functions, Natural Logarithms, Inverse Trigonometric Functions, Hyperbolic Functions                                                  |
| <b>Week 4</b>                                                     | Limits and Continuity: -Rates of Change and Tangents to Curves, Limit Laws, The Sandwich Theorem,                                                               |
| <b>Week 5</b>                                                     | One-Sided Limits, Continuity, Limits Involving Infinity; Asymptotes of Graphs.                                                                                  |
| <b>Week 6</b>                                                     | Differentiation: -Tangents and the Derivative at a Point, The Derivative as a Function, One-Sided Derivatives, Differentiability and Continuity on an Interval, |
| <b>Week 7</b>                                                     | Differentiation Rules, Second- and Higher-Order Derivatives, Derivatives of Trigonometric Functions,                                                            |
| <b>Week 8</b>                                                     | Indeterminate Forms and L'Hôpital's Rule, The Chain Rule, Implicit                                                                                              |

|                |                                                                                                                                                      |
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|                | Differentiation, Linearization and Differentials.                                                                                                    |
| <b>Week 9</b>  | Midterm Exam.                                                                                                                                        |
| <b>Week 10</b> | Functions and Their Derivatives, Logarithmic Differentiation, The Derivative of Exponential Functions.                                               |
| <b>Week 11</b> | Applications of Derivatives: -Extreme Values of Functions, The Mean Value Theorem,                                                                   |
| <b>Week 12</b> | Graphical Behavior of Functions from Derivatives, Examples from Mathematics and Physics.                                                             |
| <b>Week 13</b> | Integration: -Area and Estimating with Finite Sums, The Definite Integral, Integrable and Nonintegrable Functions, Properties of Definite Integrals. |
| <b>Week 14</b> | Examples                                                                                                                                             |
| <b>Week 15</b> | Review, Practice                                                                                                                                     |
| <b>Week 16</b> | Preparatory week before the final Exam                                                                                                               |

| <b>Learning and Teaching Resources</b><br><b>مصادر التعلم والتدريس</b> |                                                                  |                                  |
|------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------|
|                                                                        | <b>Text</b>                                                      | <b>Available in the Library?</b> |
| <b>Required Texts</b>                                                  | Thomas' Calculus 11 ed. 2004                                     | Yes                              |
| <b>Recommended Texts</b>                                               | Calculus 9ed Anton                                               | Yes                              |
| <b>Websites</b>                                                        | <a href="#">MATH 1210 - Slope of a Line - University of Utah</a> |                                  |

| <b>Grading Scheme</b><br>مخطط الدرجات                                                                                                                                                                                                                                                                                                                                                            |                         |                     |           |                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------------------|-----------|---------------------------------------|
| Group                                                                                                                                                                                                                                                                                                                                                                                            | Grade                   | التقدير             | Marks (%) | Definition                            |
| <b>Success Group (50 - 100)</b>                                                                                                                                                                                                                                                                                                                                                                  | <b>A</b> - Excellent    | امتياز              | 90 - 100  | Outstanding Performance               |
|                                                                                                                                                                                                                                                                                                                                                                                                  | <b>B</b> - Very Good    | جيد جدا             | 80 - 89   | Above average with some errors        |
|                                                                                                                                                                                                                                                                                                                                                                                                  | <b>C</b> - Good         | جيد                 | 70 - 79   | Sound work with notable errors        |
|                                                                                                                                                                                                                                                                                                                                                                                                  | <b>D</b> - Satisfactory | متوسط               | 60 - 69   | Fair but with major shortcomings      |
|                                                                                                                                                                                                                                                                                                                                                                                                  | <b>E</b> - Sufficient   | مقبول               | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group (0 – 49)</b>                                                                                                                                                                                                                                                                                                                                                                       | <b>FX</b> – Fail        | راسب (قيد المعالجة) | (45-49)   | More work required but credit awarded |
|                                                                                                                                                                                                                                                                                                                                                                                                  | <b>F</b> – Fail         | راسب                | (0-44)    | Considerable amount of work required  |
|                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                     |           |                                       |
| <p><b>Note:</b> Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.</p> |                         |                     |           |                                       |

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية