MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Module Information**  معلومات المادة الدراسية | | | | | | | |
| **Module Title** | Integral Mathematics | | | | **Module Delivery** | | |
| **Module Type** | Supportive | | | | **☒ Theory**   * **Lecture** * **Lab**   **☒ Tutorial**   * **Practical** * **Seminar** | | |
| **Module Code** | MIE12205 | | | |
| **ECTS Credits** | **5** | | | |
| **SWL (hr/sem)** | **125** | | | |
| **Module Level** | | 1 | **Semester of Delivery** | | | | 2 |
| **Administering Department** | | MIE | **College** | MUC | | | |
| **Module Leader** | Emad Abbas | | **e-mail** |  | | | |
| **Module Leader’s Acad. Title** | | Professor | **Module Leader’s Qualification** | | | | PHD |
| **Module Tutor** |  | | **e-mail** |  | | | |
| **Peer Reviewer Name** | | Dr. Noor Kadhim Meftin | **e-mail** | noor.kadhim@muc.edu.iq | | | |
| **Scientific Committee Approval Date** | | 17/06/2023 | **Version Number** | | | 1.0 | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Relation with other Modules**  العالقة مع المواد الدراسية األخرى | | | |
| **Prerequisite module** | Differential Mathematics | **Semester** | 1 |
| **Co-requisites module** | None | **Semester** |  |

|  |  |
| --- | --- |
| **Module Aims, Learning Outcomes and Indicative Contents**  أهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية | |
| **Module Objectives**  أهداف المادة الدراسية | 1. To develop problem solving skills and understanding of Integral calculus through a broad range of Integration techniques. 2. To understand theory and methods of integrations and apply it on various types of functions. 3. This is the basic subject for all engineering fields 4. Demonstrate basic knowledge and understanding of a core of linear algebra and applied mathematics. 5. Introduce student to integration of trigonometric functions and their inverses. |
| **Module Learning Outcomes**  مخرجات التعلم للمادة الدراسية | 1. learn the basic ideas, tools and techniques of integration and will use them to solve problems from real-life applications. 2. Understand the definite and indefinite integrals and their applications in life. 3. Learn approximation techniques for integration. 4. Recognize how to apply integration methods to find area and volumes 5. Learn how to find the length of a plane curve for a given function. 6. Discuss Matrices, Inverse of matrix and solution of homogeneous matrices. 7. List the various applications of Eigenvalues, Eigenvectors and Matrix diagonalization in Signals and systems. |
| **Indicative Contents**  المحتويات الارشادية | Indicative content includes the following.  Theory of Integration,Basics of Definite and indefinite Integration, Integration of trigonometric and inverse functions, Integration of the exponential functions, and Integration of logarithmic functions. [21 hrs] |

|  |  |
| --- | --- |
|  | Integration of Hyperbolic and inverse hyperbolic functions, methods of integration, numerical integration, applications of the definite integrals, and area of surface. [15 hrs]  Volume of revolution, length of plane curve, and matrices with their Inverses. [15 hrs]  Matrix Diagonalization, solution of homogeneous matrices, eigenvalues, and eigenvectors. [15 hrs]  Revision problem classes [6 hrs] |

|  |  |
| --- | --- |
| **Learning and Teaching Strategies**  استراجيات التعلم والتعليم | |
| **Strategies** | The major approach used to offer this module will be to promote student engagement in the exercises while also enhancing and broadening their critical thinking abilities. Classes and interactive lessons will be used to achieve this. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Workload (SWL)**  الحمل الدراسي للطالب محسوب لـ **٥١** اسبوعا | | | |
| **Structured SWL (h/sem)**  الحمل الدراسي المنتظم للطالب خلال الفصل | 78 | **Structured SWL (h/w)**  الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**  الحمل الدراسي غير المنتظم للطالب خلال الفصل | 47 | **Unstructured SWL (h/w)**  الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.5 |
| **Total SWL (h/sem)**  الحمل الدراسي الكلي للطالب خلال الفصل | **125** | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Module Evaluation**  تقييم المادة الدراسية | | | | | |
|  | | **Time/Number** | **Weight (Marks)** | **Week Due** | **Relevant Learning**  **Outcome** |
| **Formative** | **Quizzes** | 2 | 10% (10) | 5 and 10 | LO #1, #2 and #3 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **assessment** | **Assignments** | 2 | 10% (10) | 2 and 12 | LO #4, #5 , #6and #7 |
| **Tutorial** | 1 | 10% (10) | Continuous | All |
| **Summative**  **assessment** | **Midterm Exam** | 2hr | 20% (20) | 7 | LO #1 - #3 |
| **Final Exam** | 3hr | 50% (50) | 16 | All |
| **Total assessment** | | | 100% (100 Marks) |  |  |

|  |  |
| --- | --- |
| **Delivery Plan (Weekly Syllabus)**  المنهاج الأسبوعي النظري | |
|  | **Material Covered** |
| **Week 1** | Introduction – Theory of Integration. |
| **Week 2** | Methods of integration and Basics of Definite and indefinite Integration. |
| **Week 3** | Integration of trigonometric and inverse functions. |
| **Week 4** | Integration of the exponential functions. |
| **Week 5** | Integration of logarithmic functions. |
| **Week 6** | Integration of Hyperbolic and inverse hyperbolic functions. |
| **Week 7** | Mid-term Exam + numerical integration and applications of the definite integrals. |
| **Week 8** | Area of surface. |
| **Week 9** | Volume of revolution. |
| **Week 10** | Length of plane curve. |
| **Week 11** | Matrices and Inverse of matrix. |
| **Week 12** | Matrix Diagonalization |
| **Week 13** | Solution of homogeneous systems |
| **Week 14** | Eigenvalues. |
| **Week 15** | Eigenvectors |
| **Week 16** | **Preparatory week before the final Exam** |

|  |  |  |
| --- | --- | --- |
| **Learning and Teaching Resources**  مصادر التعلم والتدريس | | |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | Notes on Calculus II Integral Calculus Miguel A. Lerma | No |
| **Recommended**  **Texts** | Thomas ‘ Calculus (pdf)  Fouteenth edition | No |

|  |  |  |
| --- | --- | --- |
|  | Based on the original work by GEORGE B. THOMAS, JR. |  |
| **Websites** | <https://sites.math.northwestern.edu/~mlerma/courses/math214-2-02f/notes/c2-all.pdf>  <http://dl.konkur.in/post/Book/Paye/Thomas-Calculus-14th-Edition-%5Bkonkur.in%5D.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 | 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. | | | | |