MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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| **Module Information**  **معلومات المادة الدراسية** | | | | | | | |
| **Module Title** | Mathematics III | | | | **Module Delivery** | | |
| **Module Type** | Basic Learning Activity | | | | * **☒ Theory** * **☐ Lecture** * **☐ Lab** * **☒ Tutorial** * **☐ Practical** * **☐ Seminar** | | |
| **Module Code** | MATH212 | | | |
| **ECTS Credits** | 5 | | | |
| **SWL (hr/sem)** | 125 | | | |
| **Module Level** | | UGI | **Semester of Delivery** | | | | Two |
| **Administering Department** | | Type Dept. Code | **College** | Type College Code | | | |
| **Module Leader** | Azhar Malik | | **e-mail** | Azhar.m.alnaseri@uotechnology.edu.iq | | | |
| **Module Leader’s Acad. Title** | | Senior Lecturer | **Module Leader’s Qualification** | | | | M.Sc. |
| **Module Tutor** |  | | **e-mail** |  | | | |
| **Peer Reviewer Name** | |  | **e-mail** |  | | | |
| **Scientific Committee Approval Date** | | /5/2024 | **Version Number** | | | 1.0 | |

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| **Relation with other Modules**  **العلاقة مع المواد الدراسية الأخرى** | | | |
| **Prerequisite module** | MATH212 | **Semester** | One |
| **Co-requisites module** | None | **Semester** |  |

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| **Module Aims, Learning Outcomes and Indicative Contents**  **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية** | |
| **Module Objectives**  **أهداف المادة الدراسية** | 1. Helping the student to possess knowledge of engineering mathematics. 2. Possessing problem-solving skills. 3. Develop the ability to deduce, generalize, and use their own logic. 4. Ability to analyze and interpret data. |
| **Module Learning Outcomes**  **مخرجات التعلم للمادة الدراسية** | 1. Solving linear system equations through matrices by Gaussian and Cramer’s role methods. 2. Finding Inverse matrices by using Gaussian and cofactor. 3. Finding Eigen values and Eigen vectors. 4. Dealing with periodic function to write Fourier series. 5. Understanding even and odd functions. 6. Understanding the type, order and degree for the ordinary differential equations . and solve the 1st ODE. 7. Finding roots and solving (2nd ODE, higher ODE.) |
| **Indicative Contents**  **المحتويات الإرشادية** | **Part A – Matrices.**  Focuses on matrices, inverse matrices using Gaussian and cofactor method, solving linear system equations by using Gaussian and Cramer’s role methods and Find Eigen values and Eigen vectors. [10 hrs]  Revision problem tutorial sessions [5 hrs]  **Part B – Fourier Series.**  Using Fourier series for signal analysis, understanding odd and even Fourier series. [8 hrs]  Revision problem tutorial sessions [4 hrs]  **Part C – Ordinary Differential Equations.**  Solving ordinary differential equations (1st, 2nd, and higher ODE) and finding roots for higher D.E. [12 hrs]  Revision problem tutorial sessions [6 hrs] |

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| **Learning and Teaching Strategies**  **استراتيجيات التعلم والتعليم** | |
| **Strategies** | The primary approach for presenting this module will be encouraging students to participate in the activities, as well as enhancing and improving their critical thinking abilities. This will be accomplished through lectures, tutorials, debates, and assessing activities. |

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| **Student Workload (SWL)**  **الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا** | | | |
| **Structured SWL (h/sem)**  **الحمل الدراسي المنتظم للطالب خلال الفصل** | 48 | **Structured SWL (h/w)**  **الحمل الدراسي المنتظم للطالب أسبوعيا** | 3 |
| **Unstructured SWL (h/sem)**  **الحمل الدراسي غير المنتظم للطالب خلال الفصل** | 77 | **Unstructured SWL (h/w)**  **الحمل الدراسي غير المنتظم للطالب أسبوعيا** | 5 |
| **Total SWL (h/sem)**  **الحمل الدراسي الكلي للطالب خلال الفصل** | **125** | | |

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

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| **Delivery Plan (Weekly Syllabus)**  **المنهاج الاسبوعي النظري** | |
| **Week** | **Material Covered** |
| **Week 1** | Types of matrices, Matrix addition. |
| **Week 2** | Matrix multiplication and Determinants. |
| **Week 3** | Solving a system of linear equations by Gaussian method. and Gramer method. |
| **Week 4** | Solving a system of linear equations by Cramer’s role method. |
| **Week 5** | Finding inverse matrices by Gaussian method. |
| **Week 6** | Finding inverse matrices by cofactor method. |
| **Week 7** | Finding Eigen values and vectors. |
| **Week 8** | Definition of periodic function. |
| **Week 9** | Write Fourier series for periodic functions. |
| **Week 10** | Write odd and even Fourier series for periodic functions. |
| **Week 11** | The type, order and degree for the ordinary differential equations. |
| **Week 12** | Solve the 1st ODE (Separable, homo) |
| **Week 13** | Solve the 1st ODE (linear and exact) |
| **Week 14** | Solve the 2nd (homo and nonhomo). |
| **Week 15** | Solve the higher ODE (homo and nonhomo). |
| **Week 16** | **Preparatory week before the final Exam** |

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| **Delivery Plan (Weekly Tutorial)**  **المنهاج الاسبوعي للدرس التدريبي** | |
| **Week** | **Material Covered** |
|  | Each weak a questions sheet will be solved and discussed related to the material covered in the theoretical lecture. |

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| **Learning and Teaching Resources**  **مصادر التعلم والتدريس** | | |
|  | **Text** | **Available in the Library?** |
| **Required Texts** | Joel R. Hass, Christopher E. Heil, Maurice D. Weir, "Thomas' Calculus: Early Transcendentals", Pearson Education, 14th Edition, (January 1, 2017), ISBN-13 ‏ : ‎ 978-0134439020.  Advanced Mathematics for Engineering studies (أز رياض احمد عزت) | Yes |
| **Recommended Texts** | Anthony Croft, Robert Davison, "Mathematics for Engineers: A Modern Interactive Approach", Prentice Hall, 3rd edition, (January 1, 2008), ISBN-13 ‏ : ‎ 978-0132051569. | No |
| **Websites** | https://www.khanacademy.org/math/integral-calculus/ic-integration | |

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| **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 |
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| **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. | | | | |