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| | Ministry of Higher Education and Scientific Research – Iraq<br><br>University of Warith Al-Anbiya<br>College of Engineering<br>Aircrafts Engineering Department | |

# MODULE DESCRIPTOR FORM
# نموذج وصف المادة الدراسية

## Module Information
معلومات المادة الدراسية

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|---|---|---|---|---|
| **Module Title** | Mathematics III | | **Module Delivery** | |
| **Module Type** | CORE | | | |
| **Module Code** | AIE231 | | | **Theory**<br>**Tutorial** |
| **ECTS Credits** | 5 | | | |
| **SWL (hr/sem)** | 125 | | | |
| **Module Level** | 2 | **Semester of Delivery** | 3 | |
| **Administering Department** | Aircrafts Engineering | **College** | College of Engineering | |
| **Module Leader** | Muhammad Abdel-Daem | **e-mail** | | |
| **Module Leader's Acad. Title** | Lect. | **Module Leader's Qualification** | Ms.c. | |
| **Module Tutor** | | **e-mail** | | |
| **Peer Reviewer Name** | | **e-mail** | | |
| **Review Committee Approval** | 26/09/2025 | **Version Number** | 2025 | |

## Relation with Other Modules
العلاقة مع المواد الدراسية الأخرى

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| **Prerequisite module** | ENG122 | **Semester** | 2 |

| Co-requisites module | None | Semester | |
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## Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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| **Module Aims**<br>أهداف المادة الدراسية | 1. To provide a course of high academic quality in Mathematics in a challenging and supportive learning environment that encourages students to reach their full potential, personally and academically.<br>2. To provide a course that is suitable both for students aiming to pursue research and for students going into other careers.<br>3. To provide an integrated system of teaching which can be tailored to the needs of individual students.<br>4. To develop in students the capacity for learning and clear logical thinking.<br>5. To continue to attract and select students of outstanding quality.<br>6. To provide an intellectually stimulating environment in which students have the opportunity to develop their skills and enthusiasm to their full potential. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | Knowledge and Understanding: This Course will develop learners' ability to:<br>1. Use mathematical models<br>2. Understand and use mathematical concepts in solving mathematical differential equations kinds.<br>3. Select and apply skills in dealing with geometric series, power series and Fourier series.<br>4. Use mathematical reasoning skills to interpret information, select a strategy to solve a problem, and communicate solutions.<br>Subject-specific skills: It is expected that learners will develop the following:<br>5. Skills for Learning, and drawn from the main skills areas listed below.<br>6. Skills for Life<br>7. and Skills for Work<br>These must be built into the Course where there are appropriate opportunities. |
| **Indicative Contents**<br>المحتويات الإرشادية | Indicative content includes the following.<br>**Ordinary Linear Differential Equations:**<br>1st order differential equations, Separable, Homogeneous, Exact, Linear, Bernoulli, 2nd Order Differential Equations, Homogeneous, Non-Homogeneous. [32 hrs]<br>**Sequences and Series:** |

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| | Sequence, Series, Geometric Series, Tests of Convergence, Definition, The General Term Test, The Integral Test, The Comparison Test, The Limit Comparison Test, The Ratio Test, The Root Test, Alternating Series, Power Series, Interval of Convergence, Taylor Series, Maclaurin Series, Applications. [24 hrs]<br>**Fourier Series:**<br>Periodic Function, Even and Odd Functions, Half Range Expansion Function. [9 hrs]<br>**Partial Differentiation**<br>Definition, Mechanism of Differentiation, Functions of Two Variables, Functions of Higher Variables. [6 hrs]<br>**General Applications.** [6 hrs] |
| **Learning and Teaching Strategies**<br>استراتيجيات التعلم والتعليم | |
| **Strategies** | All lectures reflect the higher values, purposes and principles. They offer flexibility, provide more time for learning, focus on skills and applying to learn, and scope for personalization and choice.<br>In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practices, enabling learners to achieve the highest standards they can.<br>This course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work. |

| **Student Workload (SWL)**<br>الحمل الدراسي للطالب | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 48 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 3 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 77 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 5.2 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 125 | | |

## Module Evaluation
تقييم المادة الدراسية

| | | Time/ Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 4 | 20% (20) | 3,5,9,11 | LO #1, 2, 3, and 4 |
| | Assignments | 2 | 10% (10) | 6, 12 | LO # 5 |
| | Projects / Lab. | - | - | - | - |
| | Report | 1 | 10% (10) | 8 | LO # 6 |
| Summative assessment | Midterm Exam | 2 hrs. | 10% (10) | 7 | LO # 1-4 |
| | Final Exam | 3 hrs. | 50% (50) | 16 | All |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

| Week | Material Covered |
|---|---|
| Week 1 | **Ordinary Linear Differential Equations**<br>1st order differential equations<br>Separable<br>Homogeneous |
| Week 2 | Exact<br>Linear<br>Bernoulli |
| Week 3 | 2nd Order Differential Equations<br>Homogeneous |
| Week 4 | Non-Homogeneous |
| Week 5 | Higher Order Differential Equations<br>Homogeneous |
| Week 6 | Non-Homogeneous<br>Applications |
| Week 7 | **Sequences and Series**<br>Sequence<br>Series<br>Geometric Series<br>Tests of Convergence |
| Week 8 | Definition<br>The General Term Test<br>The Integral Test<br>The Comparison Test |

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| **Week 9** | The Limit Comparison Test<br>The Ratio Test<br>The Root Test |
| **Week 10** | Alternating Series<br>Power Series<br>Interval of Convergence |
| **Week 11** | Taylor Series<br>Maclaurin Series<br>Applications |
| **Week 12** | **Fourier Series**<br>Periodic Function |
| **Week 13** | Even and Odd Functions<br>Half Range Expansion Function |
| **Week 14** | **Partial Differentiation**<br>Definition<br>Mechanism of Differentiation<br>Functions of Two Variables<br>Functions of Higher Variables |
| **Week 15** | **General Applications** |
| **Week 16** | **Final Exam** |

| **Delivery Plan (Weekly Lab. Syllabus)**<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Exp. 1: |
| **Week 2** | Exp. 2: |
| **Week 3** | Exp. 3: |
| **Week 4** | Exp. 4: |
| **Week 5** | Exp. 5: |
| **Week 6** | Exp. 6: |
| **Week 7** | Exp. 7: |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | 1. George B. Thomas, Jr., Maurice D. Weir and Joel Hass, Thomas' calculus, 12th edition, AddisonWesley, 2010.<br>2. Erwin Kreyszig,"Engineering mathematics", McGRAW-HILL ,9thedition, 2006. | Yes |
| **Recommended Texts** | | |
| **Websites** | | |

**APPENDIX:**

| GRADING SCHEME<br>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.

UNIVERSITY OF WARITH AL-ANBIYAA
COLLEGE OF ENGINEERING
جامعة وارث الانبياء
2017 أسست
كليـــة الهندســـــة