**COURSE SPECIFICATION**

1. **Course Data**

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| **Course Title** | Engineering Mathematics (4) Code: EMP 202 |
| **Academic year / Semester** | 2014 / 2015, Second semester |
| **Program on which the course is given** | Energy and Sustainable Energy |
| **Major or Minor element of program** | Major |
| **Prerequisites** | EMP 201 |
| **Credit hours** | 3 |
| **Contact hours per week** | Lecture: 2 Hours Tutorials: 2 Hours |

1. **Course Aims**

* To provide the students essential information and fundamentals of Differential Equation and Numerical Analysis and their applications in engineering.
* To apply mathematical techniques for modeling, solving and analyzing real problems.

1. **Intended Learning Outcome (ILOs)**

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| --- | --- |
| **a- Knowledge and understanding** | a1- Identify theories and fundamentals of mathematics.  a2- Define mathematical methods for solving problems.  a3- Outline mathematical techniques for modeling real  problems. |
| **b- Intellectual Skills** | b1- Analyze mathematical problems and categorize them.  b2- Solve practical problems using mathematical methods.  b3- Make mathematical models to real problems in the light  of available data and information. |
| **c- Professional and Practical Skills** | c1- Apply mathematical logic and techniques for solving  real life problems  c2- Diagnose solutions to real life problems.  c3- Prepare professional reports via mathematical logic. |
| **d- General and Transferable Skills** | d1- Communicate effectively using different means.  d2- Use information technology for obtaining information.  d3- Work in a group and lead a team.  d4- Manage time effectively and conduct self learning . |

1. **Contents**

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| Topic | No. of Lectures |
| **First order ordinary Differential Equations**, Separable equations, Exact equations. | 1 |
| Homogenous equations, Linear equations, Orthogonal trajectories. | 1 |
| Higher order equations, D-Operator method, Variation of parameters method | 2 |
| System of differential equations | 1 |
| Laplace Transformations | 1 |
| Inverse Laplace Transformations | 1 |
| Solving differential equations by Laplace transformations | 1 |
| Numerical analysis, Curve fitting, Interpolation. | 1 |
| Numerical integration and differentiation | 1 |
| Numerical methods for solving differential equations | 1 |
| Introduction to statistics and probability | 2 |
| Software applications: Excel-SPSS | 1 |

1. **Teaching and Learning Methods for Students with Special Needs**

White board, Prepared notes, Data Show.

1. **Learning and Teaching Activities**

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| **Tools** | **Intended Learning Outcomes Achieved** |
| Interactive Lectures | ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3. |
| Tutorials | ILOs: b1, b2, b3, c1, c2, c3. |
| Assignments and Homework | ILOs: d1, d2, d3, d4. |

1. **Student Assessment**

* **Assessment Strategy**

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| **Tools** | **Intended Learning Outcomes Achieved** |
| Quizzes | ILOs: a1, a2, b1, b2, c1, c2. |
| Written Exams | ILOs: a1, a2, a3, b1, b2, b3, c1, c2, c3. |
| Assignments and Homework | ILOs: d1, d2, d3, d4. |

* **Assessment Details**

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| --- | --- | --- | --- | --- |
| Methods of Assessment | Grading Mode | Weighting % | Minimum  Pass Mark | Outline Details |
| Quizzes | 5 | 5 % |  | Weeks: 4, 10 |
| Assignments | 5 | 5 % |  | Weeks: 3, 5, 11, 13 |
| Mid-Term Exam | 50 | 50 % |  | Weeks: 7, 8: 1 hour |
| Final Exam | 40 | 40 % |  | Week 15: 2 hours |

1. **List of References**

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| 1. Course Notes | * Lectures In Mathematic, Differential Calculus, Mohamed H. Eid, Benha Univeristy, 2011. * Numerical Analysis, Fathi Abdsallam, 2013. |
| 1. Required Books (text books) | * Advanced Engineering Mathematics, E. Kreyszig, John Wiley and Sons, Inc., New York, 2006. |
| 1. Recommended Books | * Numerical Methods For Engineers and Scientists, 2nd Edition, Joe, D. Hoffman, Marcel Dekker, Inc., New York, 2001. * Advanced Calculus With Applications In Statistics, 2nd Edition, A.I. Khuri, John Wiley and Sons, Inc., New Jersey, 2003. |
| 1. Periodicals, web sites**,…** | www.intmath.com  www.dekker.com |

Course Instructor: Dr. Mohamed Husien Eid Date: 10 / 2 / 2015

Head of Department: