1. **Basic Information:**

|  |  |
| --- | --- |
| **Program Title** | All programs |
| **Department Offering the Program** | Basic Science and Engineering |
| **Department Responsible for the Course** | Basic Science and Engineering |
| **Course Title** | Mathematics 2 |
| **Course Code** | MTH102 |
| **Year/Level** | Level: 1 |
| **Specialization** | Major |
| **Authorization Date of Course Specification** | - |

|  |  |  |  |
| --- | --- | --- | --- |
| **Teaching hours** | **Lectures** | **Tutorial** | **Practical** |
| 2 | 2 | - |

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 1 | Apply knowledge of mathematics, concepts of main topics of calculus and analytic geometry basics to solve fundamental engineering problems. |

1. **Intended Learning Outcomes (ILO’S):**
2. **Knowledge and understanding:**

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| A1 | Define concepts and theories of integration techniques and analytical geometry in the plane and space that necessary for engineering system analysis |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| **No.** | **Intellectual Skills** |
| B1 | Select appropriate mathematical methods for system modelling and analysis |

1. **Professional Skills:**

|  |  |
| --- | --- |
| **No.** | **Professional Skills** |
| C1 | Apply knowledge of mathematics, to solve engineering problems. |
| C7 | Apply numerical integration methods to engineering problems. |

1. **General Skills:**

|  |  |
| --- | --- |
| **No.** | **General Skills** |
| D2 | Work in stressful environment and within constraints. |

**4. Course Contents:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Topic** | **Lecture** | **Tutorial** | **Practical** |
| Basic concepts- equations of second degree and double equation for two straight linesmovement and rotation of axes | **4** | **4** | **-** |
| * Circle– conical sectors | **6** | **6** | **-** |
| * Analytical geometry in space * Cartesian coordinates * Cylindrical-spherical -plane in space | **2** | **2** | **-** |
| * Equations of surfaces in second order – rotation and movement of axes in space. | **2** | **2** | **-** |
| * Indefinite integration (basic functions – theories) – method of integration | **6** | **6** | **-** |
| * Definite integration (definition – properties -theories) * Applications of definite integration (plain areas – circular volumes – plain technical length) | **4** | **4** | **-** |
| * Areas – Circular surfaces | **2** | **2** | **-** |
| * Numerical integration. | **2** | **2** | **-** |
| **Total** | **28** | **28** | **0** |

**5. Teaching and learning methods:**

|  |  |
| --- | --- |
| **No.** | **Teaching Methods** |
| 1 | Lectures |
| 2 | Discussion sessions |
| 3 | Information collection from different sources |
| 4 | Research assignment |

**6. Teaching and learning methods for disable students:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Teaching Methods** | **Reason** |
| 1 | Presentation of the course in digital material | Better access any time |
| 2 | Wed communication with students | Better communication with certain cases |
| 3 | Asking small groups to do assignments; each composed of low ,medium and high performance students | Knowledge and skills transfer among different levels of students |

7**. Student evaluation:**

**7.1 Student evaluation method**:

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **ILO’s** |
| 1 | Midterm examination | A1 ,B1 |
| 2 | Semester work | C1, C7,D2 |
| 3 | Final term examination | A1,B1, C1, C7 |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **Weeks** |
| 1 | Midterm examination | 8th |
| 2 | Semester work | 7th - 9th |
| 3 | Final term examination | 15th |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| **No.** | **evaluation method** | **Weights** |
| 1 | Midterm examination | 20% |
| 2 | Semester work | 20% |
| 3 | Final term examination | 60% |

**8. List of References:**

|  |  |
| --- | --- |
| **No.** | **Reference List** |
| 1 | Swokowski, E , Olinick ,M and Pence, D., Calculus, PWS Publishing Company - Boston, 1994. |
| 2 | Mary Attenborough, Engineering Mathematics, McGraw - HILL Book Company Europe, 1994. |
| 3 | Anthony croft,Robert Davison, Engineering Mathematics A modern Foundation for Electrical ,Electronic & Control Engineering, Addison |

**9. Facilities required for teaching and learning:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Facility** | | | |
| 1 | Lecture classroom | 3 | White board |
| 2 | Seminar | 4 | Data Show system |

**10. Matrix of knowledge and skills of the course:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Topic** | **Aims** | **Knowledge and understanding** | **Intellectual Skills** | **Professional Skills** | **General Skills** |
| 1 | **Analytical geometry**  -Equations of second degree and double equation for two straight lines  -Movement and rotation of axes  -Groups of unified axes circles  -Conical sectors (properties of conical sectors - parabola – ellipse – hyperbola)  -Analytical geometry in space  -Cartesian coordinates -Cylindrical-Spherical – plane in space  -Equations of surfaces in second order  -Rotation and movement of axes in space. | 1 | A1 | B1 | C1, C7 | D2 |
| 2 | **Integration**  -Indefinite integration (basic functions – theories)  -Method of integration (direct – indirect)  -Definite integration (definition – properties -theories)  -Applications of definite integration (plain areas – circular volumes – plain technical length)  -Areas – Circular surfaces  -Numerical integration. | 1 | A1 | B1 | C1, C7 | D2 |

**Course Coordinator: Dr. Ibrahim El-shamy**

**Head of Department: Prof. Dr. Mohammed Saad Elkady**

**Date of Approval:**