1. **Basic Information:**

|  |  |
| --- | --- |
| **Program Title** | Civil engineering |
| **Department Offering the Program** | Civil engineering |
| **Department Responsible for the Course** | Basic Science and Engineering |
| **Course Title** | Mathematics 4 |
| **Course Code** | MTH 202 |
| **Year/Level** | Level: 2 |
| **Specialization** | Major |
| **Authorization Date of Course Specification** | - |

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

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 1 | Apply knowledge of concepts of complex analysis, Fourier analysis, partial differential equations and special functions to solve and analysis engineering systems. |

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

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| A1 | Define concepts and theories of complex analysis, Fourier analysis, partial differential equations and special functions that necessary for engineering systems analysis |

1. **Intellectual Skills:**

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

1. **Professional Skills:**

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

1. **General Skills:**

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

**4. Course Contents:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Topics** | **Lecture** | **Tutorial** | **Practical** |
| 1 | Special functions – Fourier series | **4** | **4** | **-** |
| 2 | periodic functions and Euler's laws | **2** | **2** | **-** |
| 3 | Fourier's integrations | **4** | **4** | **-** |
| 4 | solutions of the differential equations by series | **2** | **2** | **-** |
| 5 | solving the partial differential equations  using variables separation | **2** | **2** | **-** |
| 6 | Functions with complex variables | **2** | **2** | **-** |
| 7 | complex quantities algebra | **2** | **2** | **-** |
| 8 | multiple values functions | **2** | **2** | **-** |
| 9 | the analytical functions and Koshi's theorem | **2** | **2** | **-** |
| 10 | the complex series and Taylor and Lorant series | **2** | **2** | **-** |
| 11 | the zeros, unique points and the rest | **2** | **2** | **-** |
| 12 | the infinite series | **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,D2 |
| 3 | Final term examination | A1, B1 , C1 |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **Weeks** |
| 1 | Midterm examination | 8th |
| 2 | Semester work | 2nd -7th -14th |
| 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 | Peter V.O.Neil, Advanced Engineering Mathematics, Chirrs Carson Publishing, UK, 2007. |
| 2 | Swokowski, E , Olinick ,M and Pence, D., Calculus, PWS Publishing Company - Boston, 1994. |
| 3 | Mary Attenborough, Engineering Mathematics, McGraw - HILL Book Company Europe, 1994. |
| 4 | Anthony croft,Robert Davison, Engineering Mathematics A modern Foundation for Electrical ,Electronic & Control Engineering, Addison - Wesley - Publishing Company, 1992. |

**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 | Special functions Fourier series | 1 | A1 | B1 | C1 | D2 |
| 2 | periodic functions and Euler's laws | 1 | A1 | B1 | C1 | D2 |
| 3 | Fourier's integrations | 1 | A1 | B1 | C1 | D2 |
| 4 | solutions of the differential equations by series | 1 | A1 | B1 | C1 | D2 |
| 5 | solving the partial differential equations using variables separation | 1 | A1 | B1 | C1 | D2 |
| 6 | Functions with complex variables | 1 | A1 | B1 | C1 | D2 |
| 7 | complex quantities algebra | 1 | A1 | B1 | C1 | D2 |
| 8 | multiple values functions | 1 | A1 | B1 | C1 | D2 |
| 9 | the analytical functions and Koshi's theorem | 1 | A1 | B1 | C1 | D2 |
| 10 | the complex series and Taylor and Lorant series | 1 | A1 | B1 | C1 | D2 |
| 11 | the zeros, unique points and the rest | 1 | A1 | B1 | C1 | D2 |
| 12 | the infinite series | 1 | A1 | B1 | C1 | D2 |

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

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

**Date of Approval:**