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** | **Physics 2** |
| **Course Code** | **PHY 102** |
| **Year/Level** | **1st level** |
| **Specialization** | **Major** |
| **Authorization Date of Course Specification** |  |

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

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 1 | Apply knowledge of mathematics, science to study basics of electricity and magnetism, Quantum theory, Laser, Optics and propagation of light. |

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

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| **A1** | Define concepts and theories of mathematics and sciences necessary for engineering system analysis such as Coulomb's Law, Gauss's Law and Kirchhoff's rules. |
| **A5** | Recognize methodologies of solving engineering problems such as Einstein's quantum hypothesis, laws of reflection and refraction, interference and diffraction. |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| **No.** | **Intellectual Skills** |
| B2 | Think creatively to select the appropriate solutions for engineering problems such as Newton's Rings and design of optical fibers. |

**C. Professional Skills:**

|  |  |
| --- | --- |
| **No.** | **Professional Skills** |
| C5 | Use measuring instruments and laboratories equipment to design experiments and collect, analyze and interpret results such as Ohm's law, capacitance of capacitor, unknown resistance and inverse square law in a magnetism. |

**D. General Skills:**

|  |  |
| --- | --- |
| **No.** | **General Skills** |
| D9 | Refer to relevant literatures. |

**4. Course Contents:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Topics** | **Lectures** | **Tutorial** | **Practical** |
| 1 | Charge and substance- Electric field | 2 | 2 | 2 |
| 2 | Column’s law- Electric flux- Gauss law- electric volt | 6 | 6 | 6 |
| 3 | Condenser and insulation materials | 2 | 2 | 2 |
| 4 | Current, Resistance and Electric force – ohm’s law and simple circuits | 2 | 2 | 2 |
| 5 | Magnetic field- Babot and Savart laws – Magnetic flux and Gauss law- Faraday law - Magnetic impedance | 4 | 4 | 4 |
| 6 | Engineering light – light properties for spherical surfaces | 6 | 6 | 6 |
| 7 | Wave properties for light and Hygen’s principle - interference - polarization- and diffraction | 2 | 2 | 2 |
| 8 | Lenses and mirrors– Principle of Quantum theory- Laser – Optical – E Electric phenomenon | 4 | 4 | 4 |
| Total | | 28 | 28 | 28 |

**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 | **Web 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 - C5** |
| 2 | **Semester work** | **D9 - A5 - C5** |
| 3 | **Final term examination** | **A1 - A5 - B2** |
| 4 | **Practical exam** | **D9 - A5 - C5** |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **Weeks** |
| 1 | **Midterm examination** | **08th** |
| 2 | **Semester work** | **5th ,7th ,14th** |
| 3 | **Final term examination** | **15th** |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| **No.** | **evaluation method** | **Weights** |
| 1 | **Mid-term examination** | **10%** |
| 2 | **final examination** | **60%** |
| 3 | **Oral examination** | **0%** |
| 4 | **Practical examination** | **10%** |
| 5 | **Semester work** | **20%** |
| 6 | **Other types** | **0%** |
|  | **total** | **100%** |

**8. List of References:**

|  |  |
| --- | --- |
| **No.** | **Reference List** |
| 1 | Serwayjewett, " Physics for scientists and engineers", 2004 |
| 2 | Fitzgerald, ”Basic Electric Engineering”, McGraw – Hill, 1981 |
| 3 | William H. Roadstrum & Dan H. Wolaver“ Electrical  Engineering For All Engineers” , John Wiley & Sons, 1994 |

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

|  |  |  |
| --- | --- | --- |
| **No.** | **Facility** |  |
| 1 | **Lecture classroom** |  |
| 2 | **Presenter** |  |
| 3 | **White board** |  |
| 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 | charge and substance- electric field | 1 | **A1** |  | **C5** |  |
| 2 | column’s law- electric flux- Gauss law- electric volt | 1 |  |  | **C5** |  |
| 3 | condenser and insulation materials | 1 |  |  | **C5** |  |
| 4 | current , resistance and electric force – ohm’s law and simple circuits | 1 | **A1** |  | **C5** |  |
| 5 | magnetic field- Babot and Savart laws – magnetic flux and gauss law- Faraday law - Magnetic impedance | 1 |  |  | **C5** | **D9** |
| 6 | engineering light – light properties for spherical surfaces | 1 | **A5** | **B2** |  |  |
| 7 | wave properties for light and Hygen’s principle - interference - polarization- and diffraction | 1 |  | **B2** |  | **D9** |
| 8 | lenses and mirrors– principle of quantum theory- laser – optical – electric phenomenon | 1 | **A5** |  |  | **D9** |

**Course Coordinator: Dr. Amal Bahiry**

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

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