MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Standard Course

Physics 252 – Engineering Physics II

Course Information

Division	**Science/Mathematics**
Contact Hours	**7**
Theory	**4**
Lab Hours	**3**
Total Credits	**5**

Prerequisites

PHY 251. MATH 251 and MATH 273 are highly recommended.

Course Description

This course is a continuation of PHY 251 and is designed to satisfy the requirements of engineering and physics majors. Topics include temperature and heat, electricity and magnetism, electromagnetic waves, optics and quantum, atomic, and nuclear physics. This course requires laboratory work.

Course Outcomes

In order to evidence success in this course, students will be able to:

1. Understand and describe the differences between induction and conduction.
2. Use Coulomb's Law to determine the force between electrically charged objects.
3. Diagram and calculate electric forces and electric fields.
4. Describe electric flux and how it varies with respect to angle, area, and surface vectors.
5. Use Gauss's law to determine electric fields or charges contained within.
6. Define electric potential and compare and contrast it to electric energy.
7. Use calculus to determine the electric field due to continuous charge distributions.
8. Given a practical problem with capacitors, determine their equivalency in both parallel and series circuits.
9. After simplifying capacitor circuits, determine the net charge and energy contained in the circuit.
10. Define electric current and be able to calculate its value using Ohm's Law.
11. Determine electrical power in a circuit.
12. Find equivalent resistive series and parallel circuits.
13. Determine the power dissipated in simple DC circuits.
14. Use Kirchhoff's Rules in complex DC circuits.
15. Diagram and calculate the RC time constant, charge, and current in an RC circuit.
16. Understand and describe the earth's magnetic field and why it is essential to life on earth.
17. Diagram the cyclotron and calculate the kinetic energy of a particle within the cyclotron.
18. Calculate magnetic moments and apply them to torque problems in electrical circuits.
19. Use the Biot-Savart Law to determine the magnetic field from a known charge distribution.
20. Use Ampere's law to determine magnetic fields.
21. Describe the factors necessary to create and modify emf and magnetic flux.
22. Use Faraday's Law of induction to determine the induced emf in a coil.
23. Calculate the "back emf" in a electrical circuit.
24. Summarize Maxwell's Predictions and summarize Hertz's confirmation of electromagnetic waves.
25. Use the Doppler effect for electromagnetic waves.

MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Standard Course

Physics 252 – Engineering Physics II

27. Use the Poynting vector to determine the intensity of an electromagnetic wave.
28. Define reflection, refraction, diffraction, and dispersion.
29. Create images using ray tracing for mirrors and lenses using the ray model of geometric optics.
30. Explain how Huygens's Principle is used for light reflection and refraction.
31. To diagram images formed by mirrors and lenses.
32. Use the len's formula to determine the magnification and position of reflected and refracted light waves.
33. Use Young's Double-slit experiment to calculate the wavelength of light.
34. Calculate the thickness of thin films due to interference.
35. Identify the different methods of polarizing light.
36. Explain the different types of eye conditions and the appropriate corrections.
37. Diagram reflecting and refracting telescopes.
38. Use Rayleigh's criterion to determine image resolution.
39. Explain blackbody radiation and Planck's hypothesis.
40. Understand the photoelectric effect and how it helped in understanding quantum physics.
41. Describe De Broglie's hypothesis and how it helped in understanding the motion of electrons around the nucleus.
42. Use the Uncertainty Principle to determine the minimum uncertainty in position and momentum.
43. List and give the formula for the chronological support for explaining quantum physics.
44. Determine wavelengths of light when emitted from an atom using the Bohr Model.
45. Know the names and the criteria for the emission of light from a hydrogen atom.
46. Use the exclusion principle to configure electron shells.
47. List and explain the four quantum numbers.
48. Calculate the approximate size of atoms and their binding energy.
49. Determine the half-life of radioactive nuclei.
50. Model the decay process of radioactive nuclei.
51. Compare and contract nuclear fission and fusion.
52. Diagram a brief history of the Universe from the Big Bang to the present.

Date Updated: 9/2018
By: RDS