MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

NUET 120
Radiation Protection and Detection

Course Information

Division	**Applied Science and Engineering Technology**
Contact Hours	**60**
Theory	**45**
Lab Hours	**15**
Total Credits	**3.0**

Prerequisites: NUET 100

Course Description

This course presents the interaction of radiation with materials including biological systems. This course covers the basic atomic and nuclear structures including the physics of fission and radioactive decay, shielding and measurement of the various types of radiation. It also covers detection devices such as typical survey meters and personnel monitoring devices. The course will also discuss how exposure to radiation can be minimized and legal aspects of working with radioactive sources. Major radiation incidences and industrial operating experience will be discussed. Associated lab work will reinforce the principles of radiation detection.

This course is a required core course for students pursuing an AAS in Nuclear Engineering Technology

Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to:

A. Describe and apply the culture of safety, continuous improvement, and peer checking
B. Explain the requirement for documentation, formal procedures, and recordkeeping for nuclear related activities
C. Describe the main systems in a nuclear power plant, and how they are used in power generation
D. Identify typical power plant components and explain their function
E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
F. Identify and define problems in mathematics and scientific terms
G. Recognize assumptions and limits of analysis to the application of technology, including social and ethical implications
H. Recognize the need to engage in lifelong learning, and to perform research or conduct investigations to continuously upgrade knowledge and skills
I. Communicate effectively, and work as part of a team

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Course Outcomes

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

1. . **Identify the mechanics of how alpha, beta, gamma, and neutron radiation ionize matter and identify materials best suited for shielding these types of radiation**

   Applies To Program Outcome

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   C. Describe the main systems in a nuclear power plant, and how they are used in power generation
   F. Identify and define problems in mathematics and scientific terms
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2. **Apply the Chart of the Nuclides to determine to determine decay paths**.

   Applies To Program Outcome

   B. Explain the requirement for documentation, formal procedures, and recordkeeping for nuclear related activities
   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
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3. **Articulate the operating principles of the radiation detectors commonly used by Radiation Protection Technicians to perform surveys, count radioactive samples, and monitoring of personnel**.

   Applies To Program Outcome

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4. **Distinguish various sources of radiation and their contribution to the average total dose received by an individual in the United States**.
   Applies To Program Outcome

   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
   F. Identify and define problems in mathematics and scientific terms
   G. Recognize assumptions and limits of analysis to the application of technology, including social and ethical implications
   H. Recognize the need to engage in lifelong learning, and to perform research or conduct investigations to continuously upgrade knowledge and skills

5. **State terminology related to intake of radioactive material, identify practices related to intakes, and calculate or identify calculations for internal dose due to intakes**.
   Applies To Program Outcome

   A. Describe and apply the culture of safety, continuous improvement, and peer checking
   B. Explain the requirement for documentation, formal procedures, and recordkeeping for nuclear related activities
   C. Describe the main systems in a nuclear power plant, and how they are used in power generation
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   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
   I. Communicate effectively, and work as part of a team

6. **Describe the production methods of radioactive material, with the associated hazards and controls, so that the appropriate protective measures can be taken or prescribed.**
   Applies To Program Outcome

   C. Describe the main systems in a nuclear power plant, and how they are used in power generation
   D. Identify typical power plant components and explain their function
   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
   F. Identify and define problems in mathematics and scientific terms

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7. **Explain the philosophies and processes related to radioactive waste processing, transporting, and safeguarding**.
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   C. Describe the main systems in a nuclear power plant, and how they are used in power generation
   D. Identify typical power plant components and explain their function
   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
   F. Identify and define problems in mathematics and scientific terms
   G. Recognize assumptions and limits of analysis to the application of technology, including social and ethical implications
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8. **Break down various methods and procedures for decontamination and decontamination surveys for plant areas, equipment, and tools**.
   Applies To Program Outcome

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   C. Describe the main systems in a nuclear power plant, and how they are used in power generation
   D. Identify typical power plant components and explain their function
   E. Describe different sources of radiation, their effects on organic matter, methods of detection, and shielding
   F. Identify and define problems in mathematics and scientific terms
   G. Recognize assumptions and limits of analysis to the application of technology, including social and ethical implications
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9. Characterize terminology and methods to minimize exposure to personnel and calculate related functions.

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10. Interpret the foundation and role of radiation protection standards and be able to select the appropriate regulation of the federal standards.

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11. Explain the NRC Regulatory Oversight Process (ROP).

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Date Updated: Oct 9, 2019
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