



Nursing and Health Professions
1400 Tanyard Road, Sewell, NJ 08080
856-468-5000

NMT 107: Radiation Physics

Syllabus

Lecture Hours/Clinical Lab/Credits: 2/0/2

Catalog Description

Prerequisite: Acceptance into the program, Grade of "C" or higher in CHM 111, PHY 103, BIO 105 and BIO 106

Pre or Co-requisites: Grade of "C" or higher in ALH 107 and NMT 106

This course focuses on nuclear physics including the study of electromagnetic waves, the basis of radioactivity, converting units and terminology related to radioactivity.

Textbook and Course Materials

It is the responsibility of the student to confirm with the bookstore and/or their instructor the textbook, handbook, and any other materials required for their specific course and section.

Click here to see current textbook prices at rcgc.bncollege.com.

Evaluation Assessment

Online Proctoring

All courses offered at RCSJ, whether they are web-enhanced, hybrid, or fully online, may include assessments that make use of Online Proctoring. To find out more about Online Proctoring, and to learn about the minimum technical requirements, visit rcsj.edu/elearning/online-proctoring.

Grading Distribution

Grading to be determined by individual instructors.

Individual instructors may include the following assessment(s):

- Exams
- Quizzes
- Terms Identification
- Essays
- Presentations
- Group Discussions
- Attendance and Participation

Grading

The grading scale for each course and section will be determined by the instructor and distributed the first day of class.

Rowan College of South Jersey Core Competencies

(Based on the NJCCC General Education Foundation - August 15, 2007; Revised 2011; Adopted 2014)

This comprehensive list reflects the core competencies that are essential for all RCSJ graduates; however, each program varies regarding competencies required for a specific degree. Critical thinking is embedded in all courses, while teamwork and personal skills are embedded in many courses.

1. **Written and Oral Communication:** Students will communicate effectively in both speech and writing.
2. **Quantitative Knowledge and Skills:** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems
3. **Scientific Knowledge and Reasoning:** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.
4. **Technological Competency:** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals
5. **Society and Human Behavior:** Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.
6. **Humanistic Perspective:** Students will analyze works in the fields of art, history, music, or theater; literature; philosophy and/or religious studies; and/or will gain competence in the use of a foreign language
7. **Historical Perspective:** Students will understand historical events and movements in World, Western, non-Western or American societies and assess their subsequent significance.
8. **Global and Cultural Awareness:** Students will understand the importance of a global perspective and culturally diverse peoples.
9. **Ethical Reasoning and Action:** Students will understand ethical issues and situations.
10. **Information Literacy:** Students will address an information need by locating, evaluating, and effectively using information.

NMT 107 Core Competencies

This course focuses on one of RCSJ's Core Competencies:

- Quantitative Knowledge and Skills

Student Learning Outcomes: Radiation Physics

Successful completion of NMT 107 will help students:	RCSJ Core Competencies	Evaluation / Assessment (Additional means of evaluation may be included by individual instructors)
Apply knowledge of nuclear terminology and units of decay to convert between various units, and calculate activity using nuclear decay factors.	Quantitative Knowledge and Skills	Exams 2
Integrate knowledge of the structure of atoms and the basis of radioactivity to determine characteristics of nuclear decay and emissions and properties of electromagnetic radiation.		Exams 1
Apply knowledge on the origin of radionuclides to determine characteristics of daughter products.		Exams 3

It is the responsibility of the student to review the RCSJ Information and Policies, as well as the Online Syllabus at: rcsj.edu/syllabi.

Topical Outline

- I. Anatomy of an atom
 - A. Atoms and Molecules, AMU
 - B. Components of Atom: Electrons, Protons and Neutrons
 - C. Atomic Structure – Quantum Numbers
 - D. Neutron/Proton Relationships
 - E. Mass/Energy Relationships
 - F. Mass Defect
 - G. Nuclear Short Hand
 - H. Radionuclide Charts
 - I. Isotopes, Isobars, Isotones, Isomers
 - J. Electromagnetic Radiation

- II. Basic Emissions – Alpha, Beta, Gamma
 - A. Review Characteristic of Alpha Radiation
 - B. Beta-bremsstrahlung
 - C. Decay Schemes
 - D. Begin Beta Decay
 - E. Basic Emissions – Alpha, Beta, Gamma
 - F. Review Characteristic of Alpha Radiation
 - G. Beta-bremsstrahlung
 - H. Decay Schemes
 - I. Gamma Emissions – Compton, Photoelectric, Pair Production, Auger Electrons
 - J. Internal Conversion
 - K. Production of X rays

- III. Converting Units
 - A. Definition of Units: Curie, Milli, Uci, Dps, Bq
 - B. Half-life Physical, Biological and Effective
 - C. Review Metric Conversions

- D. Begin converting Disintegrations and Curie
- E. Definition of Units: Curie, Milli, Uci, Dps, Bq
- F. Half-life Physical, Biological and Effective
- G. Review Metric Conversions
 1. Converting between SI Units: Bq & Curies
 2. Converting time to Military time
 3. Calculations- using decay factors Pre and Post

IV. Dose Calculations

- A. Universal Decay Formula
- B. Specific Concentration
- C. Dose Volume Calculations
- D. Begin Converting Disintegrations and Curie

V. Origin of Nuclides

- A. Fission/Fusion Neutron Activation/ Neutron Capture

VI. Personnel Monitoring Devices

- A. Decontamination Procedures

Resources

Academic Support Center: The Academic Support Center (ACS), located in Room 603 above the College Store, offers FREE tutoring, student success workshops, structured study groups, and academic coaching for RCSJ students seeking assistance in most subjects. The phone number is 856-681-6250. For more information about all the services provided, please visit the Academic Support Center's webpage: rcsj.edu/asc.

Affirmative Action Statement

The Board of Trustees is committed to providing a work and academic environment that maintains and promotes affirmative action and equal opportunity for all employees and students without discrimination on the basis of certain enumerated and protected categories. These categories are race, creed (religion), color, national origin, nationality, ancestry, age, sex (including pregnancy and sexual harassment), marital status, domestic partnership or civil union status, affectional or sexual orientation, gender identity or expression, atypical hereditary cellular or blood trait, genetic information, liability for military service, or mental or physical disability, including AIDS and HIV related illnesses.

For questions concerning discrimination, contact Almarie J. Jones, Special Assistant to the President, Diversity and Equity/Title IX and Compliance, 856-415-2154 or ajones@rcsj.edu or (Cumberland) Nathaniel Alridge, Jr., JD, Director, Diversity and Equity/Title IX and Judicial Affairs, 856-691-8600, ext. 1414 or nalridge@rcsj.edu. For disability issues or any barriers in the learning or physical environment related to a document condition/disability please contact: Gloucester campus – Carol Weinhardt, Director, Department of Special Services, ADA/504 Officer at 856-415-2247 or cweinhar@rcsj.edu; or Cumberland Campus – Meredith Vicente, Senior Director, Department of Special Services/Project Assist at 856-200-4688 or mvicent1@rcsj.edu.

Department of Special Services

The Department of Special Services is committed to providing support services and ensuring equal access to eligible students with documented conditions/disabilities as outlined by the Americans with Disabilities Act (ADA) and the Americans with Disabilities Act with Amendments Act (ADAAA).

(Gloucester Campus Location and Contact)

Location: Instructional Center, room 425A.

Primary Contact: Director, Carol Weinhardt, (email) cweinhar@rcsj.edu; or (phone) 856-415-2247.

(Cumberland Campus Location and Contact)

Location: Center for Academic & Student Success (CASS)

Primary Contact: Senior Director, Meredith Vicente, (email) mvicent1@rcsj.edu; or (phone) 856-200-4688.

Reporting Allegations of Sexual Assault and Resource Referrals (08/2021) Gloucester Campus

There are multiple safe places for students to report allegations of sexual assault, both on and off campus. Reports of sexual assault can be made to any of the following offices listed in the chart below.

All students are encouraged to report alleged crimes on campus. Crimes that pose a threat to the campus community must be reported to **9-1-1**, Security, the Sheriff's Office or the Deptford Township Police Department. All employees, including Security staff, must report incidents of discrimination, harassment or sexual misconduct to the Title IX Officer.

Service	Resource	Phone Number/Location/Website
Non-Confidential Reporting Local Law Enforcement	Gloucester County Sheriff's Office	856-681-2200
	Deptford Township Police Dept.	856-845-2220
	Gloucester Co. Prosecutor's Office	856-384-5500
	Sexual Assault Response Team	856-384-5555
Non-Confidential Reporting 9-1-1 and Campus Security	9-1-1 Gloucester County Emergency Management Dispatch Campus Security Blue Light Emergency Phones <u>or</u> ext. 4444 from any campus desk phone	9-1-1 or push RED button on Campus Blue Light Emergency Phones 856-681-6287
Non-Confidential On-Campus Reporting Support Services	Almarie J. Jones Special Assistant to the President Diversity and Equity/Title IX and Compliance John F. Ryder Director, Student and Veteran Affairs	856-415-2154 College Center, Room 116 <i>ajones@rcsj.edu</i> 856-468-5000, ext. 6456 College Center, room 202 <i>jryder@rcsj.edu</i>
Confidential On-Campus Counseling and Support Services	Lois Y. Lawson-Briddell, Ph.D. MSW, LSW, Director Counseling & Wellness Services Center	856-464-5236 <i>llawsonb@rcsj.edu</i> College Center, Room 206
	William Leonard, Ph.D. Intervention Teams Consultant	856-415-2119 <i>wleonard@rcsj.edu</i> College Center, STEM Office C-168
	Crystal Noboa, LSW, MSW Director, The Center for People in Transition (PIT)	856-415-2264 <i>cnoboa@rcsj.edu</i> Career & Technical Education Center, Room 809, 1492 Tanyard Road
	Diane Mussoline, EdS, LMFT Executive Director of Behavioral Services	856-494-5665 <i>dmussoli@rcsj.edu</i> Rowan University Center, Room 200A
Confidential Off-Campus Full-Service Support	Center for Family Services/ Services Empowering Rights of Victims (SERV)	1-866-295-7378 Camden and Gloucester counties www.centerffs.org/serv
Hospitals with Sexual Assault Nurse Examiners	Inspira Medical Center Jefferson Washington Township Hospital	700 Mullica Hill Road, Mullica Hill, NJ 08062 856-508-1000 435 Hurffville-Crosskeys Rd., Turnersville, NJ 856-582-2500