El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Radiation Therapy Technology**
COURSE RUBRIC AND NUMBER	**RADT 2317**
COURSE TITLE	**Radiologic Physics I**
COURSE CREDIT HOURS	**3 3 : 1** **Credits Lec Lab**

I. Catalog Description

Provides concepts of radiation physics. Includes topics on classical and atomic physics, basic electrical principles, the interaction of radiation with matter, and nuclear physics. A grade of a "C" or better is required to take the next course**. (3:1). Lab fee.**

II. Course Objectives

Upon satisfactory completion of this course, the student will be able to:

A. Unit I. Units of Measurement and General Principles
1. Define the fundamental units of the English, metric, and Systeme International d'Unites (SI) systems.
2. Calculate various unit conversions.
3. Explain the use of different radiation units.
4. Demonstrate applications of the general principles that relate to inertia, work, energy, and momentum.
5. Identify the four major forces of nature.

B. Unit II. Structure of the Atom
1. Describe Bohr's theory of atomic structure.
2. Compare the characteristics and functions of a proton, neutron, and electron.
3. Discuss the energy levels of the atom.
4. Define the terms relating to atomic nomenclature.
5. Compare covalent bonding and ionic bonding.
6. Describe the process of ionization.

C. Unit III. Structure of Matter
1. Differentiate between the characteristics of a mixture, substance, and element.
2. Classify the characteristics of an element using the periodic table.
3. Compare the characteristics of a molecule and a compound.

D. Unit IV. Nature of Radiation and Electromagnetic Radiation
1. Describe the nature of light.
2. Describe the different types of radiation.
3. Define Half-life.
4. Explain the relationship between wavelength, frequency, and velocity.

5. Differentiate between the radiations of the electromagnetic (EM) spectrum.
6. Explain the relationship of energy and frequency to Plank's Constant.

E. Unit V. Electrostatics and Electrodynamics
1. Distinguish between electrical charge and electrical field.
2. Describe the methods of electrification
3. Explain the Laws of Electrostatics and their application.
4. Define potential difference, current, resistance, circuit, and electric power.
5. Compare the characteristics of direct and alternating currents.
6. Identify the components on a schematic resistance circuit diagram.
7. Apply Ohm's Law to resolve direct current problems.
8. Apply power formulas to determine power consumed.
9. Compare electrical measuring devices.
10. Discuss electrical measuring devices.

F. Unit VI. Magnetism and Electromagnetism
1. Describe the properties and laws of magnetism.
2. Relate the electronic spin of an element to its potential magnetic properties.
3. Describe the principle of magnetic induction.
4. Discuss the interaction between electric and magnetic fields.
5. Compare types of electromagnetic induction.
6. Compare types and functions of generators, motors, transformers, and rectification systems.
7. Compare single-phase, three-phase, high frequency, and falling load generators in terms of radiation production and efficiency.

G. Unit VII. Rectification and X-ray Circuits
1. Explain the purpose of rectification.
2. Compare solid state and vacuum tube rectification.
3. Identify parts of a complete x-ray circuit.
4. Discuss application and components of automatic exposure devices.

H. Unit VIII. Production and Characteristics of Radiation
1. State the principles of x-ray production.
2. Compare the production of bremsstrahlung with the production ofcharacteristic radiations.
3. Compare various photon interactions in terms of description of interaction,relation to atomic number, and applications.
4. Define photodisintegration.
5. Discuss relationships of wavelength and frequency to beam characteristics.
6. Define units of radiation measurement and give an example of their application.

I. Unit IX. Diagnostic X-ray Circuits
1. Describe the characteristics and functions of a cathode and a rotating anode.
2. Describe the construction and function of the tube housing.
3. Identify the parts of an x-ray tube.
4. Calculate the maximum allowable exposure factors for various radiographic procedures using a tube-rating chart.
5. Determine heat units and cooling characteristics of the x-ray tube housing.
6. Propose methods to extend tube life.

III. THECB Learning Outcomes (WECM)

1. Apply basic principles of electricity to radiography equipment.
2. Describe various interactions of radiation with matter.
3. Describe the theories and laws associated with matter and energy.
4. Identify the characteristics and nature of radiation.

IV. Evaluation

A. Methods:
1. Homework and quizzes
2. Unit examinations
3. Comprehensive final examination

B. Grading Scale:
93 - 100 = A
85 - 92 = B
75 - 84 = C
74 and below = F

V. Disability Statement (American with/Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.