

LABETTE COMMUNITY COLLEGE BRIEF SYLLABUS

SPECIAL NOTE:

This brief syllabus is not intended to be a legal contract. A full syllabus will be distributed to students at the first class session.

TEXT AND SUPPLEMENTARY MATERIALS USED IN THE COURSE (if any):

Please check with the LCC bookstore <http://www.labette.edu/bookstore> for the required texts for this class.

<u>COURSE NUMBER:</u>	RADI 217
<u>COURSE TITLE:</u>	RADIATION PROTECTION I
<u>CREDIT HOUR:</u>	2
<u>DEPARTMENT:</u>	Radiography
<u>DIVISION:</u>	Health Science
<u>PREREQUISITE:</u>	RADI 125 Principles of Radiation Physics & Equipment Operation
<u>REVISION DATE:</u>	2012

COURSE DESCRIPTION:

The study of the biological effects of radiation and patient protection. Also included are radiation monitoring and occupational exposure and protection.

COURSE OUTCOMES & COMPETENCIES:

Students who successfully complete this course will without references and with 86% accuracy be able to:

1. Understand the interactions of radiation and matter, the reasons for an effective radiation safety program, and the units of exposure involved.
 - Define biological effects.
 - Define ALARA.
 - Discuss equivalent dose and biological damage.
 - Discuss the probability of photon interaction with matter.
 - Describe the 5 types of interactions between radiation and matter.
 - Define short term somatic effects.
 - Define long term somatic effects.
 - Define dose equivalent.

- Define effective dose.
- Describe the unit of exposure.
- Describe the unit of absorbed dose.
- Describe dose equivalent.
- Describe linear energy transfer.

2. Understand radiation monitoring procedures.

- List the personnel monitoring devices currently available.
- Compare the accuracy of the personnel monitoring devices.
- Describe the information found on a personnel monitoring report.
- Describe the radiation survey instruments for area monitoring.

3. Understand cell biology and explain the effects of radiation on cells.

- Discuss cell structure.
- Differentiate between mitosis and meiosis.
- Differentiate between high and low LET and their effects on cells.
- Describe relative biologic effectiveness.
- Differentiate between direct and indirect molecular effects of irradiation.
- Compare cell radiosensitivity.
- Explain the various radiation dose-response relationship curves.
- Compare somatic and genetic damage factors.
- Explain LD 50/30.
- List the genetic effects of radiation.
- Describe non-stochastic effects.
- Describe stochastic effects.

4. Understand the importance of dose limits for exposure to ionizing radiation.

- State the basis of effective dose limiting systems.
- List the organizations that are responsible for Radiation Protection Standards.
- Discuss the U.S. regulatory agencies.
- Describe a radiation safety program.
- State the objectives of radiation protection.
- Describe the current NCRP regulations regarding occupational doses.

5. Explain patient radiation protection procedures.

- Describe the beam limiting devices used in diagnostic radiology.
- Describe the effects of filtration on patient protection.
- Describe the various protective shielding devices used for patient protection.
- Discuss digital imaging and its effects on patient exposure.
- Describe fluoroscopic procedures and ways that can be used to decrease patient exposure.
- Describe the precautions taken with the pregnant patient.
- Describe the precautions take with the pediatric patient.

6. Understand the management of imaging personnel radiation dose.

- List the methods that can be used to decrease occupational dose.
- Describe the various protective structural shields.
- Describe the protective measures taken during fluoroscopy to reduce exposure to the personnel.
- Describe the protective measure taken during mobile and C-arm procedures to reduce exposure to the personnel.
- Describe the effects of distance on personnel exposure.
- List the radiation absorbent barrier design considerations.

7. Explain the special precautions that must be used when dealing with radioisotopes.

- Define an isotope.
- Discuss the radioisotopes used in radiation therapy.
- Discuss the radioisotopes used in nuclear medicine.
- Discuss PET and CT and radiation protection procedures.
- Discuss radiation emergencies and the use of radiation as a terrorist weapon.
- Review the dose-effect relation after acute whole-body radiation exposure.