Wharton County Junior College

Administrative Master Syllabus

Course Information

Course Title	Radiographic Imaging Equipment
Course Prefix, Num. and Title	RADR 2309
Division	Allied Health
Department	Radiologic Technology
Course Type	WECM Course
	Equipment and physics of x-ray production. Includes basic circuits. Also examines the relationship of conventional and digital equipment components to the imaging process.
Pre-Requisites	RADR 2205 and 1267 with a "C" or better
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	3:2:4
Equated Pay Hours	4
Lab/Other Hours Breakdown: Lab Hours	4
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Department Head:	Sharla Walker	09/27/2023
Division Chair:	CJDerkowski Carol Derkowski Digitally signed by Carol Derkowski Date: 2023.11.20 15:18:14 -06'00'	11/15/2023
VPI:		

Wharton County Junior College

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

I. X-Ray Circuit
- a. Electricity
- b. Electrical Safety
- c. Transformers
- d. Components and functions
- e. Rectification
- f. Generator Types

II. Radiographic Equipment
- a. Fixed Units
- b. Mobile Units
- c. Automatic Exposure Control

III. Diagnostic X-ray Tubes
- a. Construction
- b. Extending Tube Life

IV. Fluoroscopy
- a. Image Intensified
- b. Pulsed
- c. Flat Panel
- d. Mobile
- e. Image Quality
- f. Viewing Systems
- g. Image Recording Systems
- h. Operation and Manipulation

V. Radiation Production and Characteristics
- a. Structure of the atom
- b. Nature of Radiation
- c. X-ray Production
- d. Target Interactions
- e. Common terms(source of electrons; Acceleration of electrons;ect)
- f. Conditions necessary for x-ray production
- g. Factors that affect x-ray emission spectrum
- h. Interactions of Photons with Matter

VII. Digital Imaging Acquisition and Display
- a. Image Acquisition
  1. Detectors
  2. Evaluation of detector characteristics
  3. Dynamic range
  4. Raw data extraction
  5. Exposure indicators and deviation index
- b. Initial Processing

1. Preprocessing
2. Image Analysis
3. Rescaling
4. VOI
5. LUT
6. Noise reduction
7. Smoothing
8. Edge enhancement
9. Equalization

c. Post Processing
d. Image Acquisition Errors
e. Image Display
f. Data Management
g. AI

VII. Digital Image Appearance Characteristics
a. Brightness
b. Noise
c. Contrast (Grayscale)
d. SNR
e. CNR
f. Spatial resolution
g. Contrast resolution
h. Exposure indicator appropriateness

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Differentiate between conventional and digital equipment.

2. Explain the physics of x-ray production.

3. Describe x-ray circuits.

4. Relate conventional and digital equipment components to the imaging process.

Methods of Assessment:

1. Unit 5 Digital Exam

2. Unit 7 exam over x-ray production

3. Unit Exam- Ohm's Law

4. A written assignment comparing and contrasting conventional and digital imaging components and how they relate to the imaging process

Required text(s), optional text(s) and/or materials to be supplied by the student:

Bushong, Stewart C., Radiologic Science for Technologists,The C. V. Mosby Company, latest edition

Wharton County Junior College

Orth, Denise., Essentials of Radiologic Science, Wolters Kluwer, latest edition

Mason, Starla., Essentials of Radiologic Science, Wolters Kluwer, latest edition

Suggested Course Maximum:

18

List any specific or physical requirements beyond a typical classroom required to teach the course.

LCD projector, computer access, radiographic imaging tables and DR equipmentin our radiology lab.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Grading Scale:
A 92-100 B 83-91 C 75-82 74.9 F

Grading Formula:
Each unit will end with a written exam. These exams will be averaged together and count as 75% of the final grade. There will also be a comprehensive final exam that will count as 25% of the final grade.
**Students must make a 75 or higher on the course final in order to pass the course.

Curriculum Checklist:

☐**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐**Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms

- ☐Critical Thinking
- ☐Communication
- ☐Empirical & Quantitative Skills
- ☐Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☒**WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist