Missouri Department of Higher Education

Building Missouri's future...by degrees

NEW PROGRAM PROPOSAL FORM / Form NP

Sponsoring Institution(s): Jefferson College

Program Title: Radiologic Technology

Degree/Certificate: Associate of Applied Science

Options: AAS Radiologic Technology

Delivery Site(s): Jefferson College, Hillsboro Campus

CIP Classification: 51.0911 (Please provide a CIP code)

Implementation Date: Fall 2013

Cooperative Partners: MO Health Wins Grant

Expected Date of First Graduation: Spring 2015

AUTHORIZATION:

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Name/Title of Institutional Officer	Signature	Date

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STUDENT ENROLLMENT PROJECTIONS / Form SE

1. Need:

i. Student Demand: Please see attached Form SE

Year	1	2	3	4	5
Full Time	15	30	30	30	30
Part Time	0	0	0	0	0
Total	15	30	30	30	30

ii. Enrollment is currently limited to 15 students per class due to available space and resources with the desire for lower instructor to student ratios for lecture and laboratory time. Enrollment will be capped in the future only at the request of the Joint Review Committee on Education in Radiologic Technology (JRCERT).

A. Market Demand:

Radiologic Technology - will see an increase of about 28% through 2020, faster than the average for all occupations according to the United State Department of Labor (Source: http://data.bls.gov/oep/nioem).

Demand will stem from an increasing aging population who will have more medical conditions, such as breaks and fractures caused by osteoporosis, which require imaging to diagnose and treat. Radiologic technologists will be needed to maintain and use the diagnostic equipment.

Although hospitals will remain the main employer of radiologic technologists, a number of new jobs will be in physicians' offices and in imaging centers. Employment in these healthcare settings is expected to increase because of the shift toward outpatient care whenever possible. Outpatient care is encouraged by third-party payers as a cost-saving measure and is made possible by technological advances, such as less expensive equipment, which allow for more procedures to be done outside of hospitals.

Job prospects will be best for those with multiple professional credentials, trained to perform a wide range of procedures.

(Source: http://www.bls.gov/ooh/healthcare/radiologic-technologists.htm#tab-6)

Because the Missouri Economic Research and Information Center (MERIC) reports the health care industry is one of few that will expand significantly in the next few years, Governor Jay Nixon launched the "Caring for Missourians" program in 2009 to train additional Missouri students to enter high-demand, critical-need health care fields. Governor Nixon announced "Caring for Missourians will help us train the next generation of medical professionals to meet the health care needs of tomorrow while also helping turn our economy around today." MERIC projects a 12.3% increase in the health care workforce statewide by 2016.

In his January 2011 State of the State address, Governor Nixon said, "We're fighting for every worker who needs a new skill to compete. We're fighting for every student who dreams of college and a career. And because we've been frugal, we have money to invest in the things that matter most to Missourians: jobs, education, health care, and law enforcement. To compete for twenty-first century jobs, we need a highly skilled and well-trained workforce. Our Training for Tomorrow and Caring for Missourians initiatives are preparing thousands more workers for the careers of tomorrow. We've invested millions in training workers to meet the growing demand in fields like computer technology, clean energy, automotive technology, and health care. Much of that training is taking place in our excellent community colleges, where the link between education and employment has always been strong. We've also invested $40 million in training more than 1,000 doctors, dentists, nurses, and other professionals through our Caring for Missourians initiative. With the booming demand for health care, they'll be ready to step into careers the minute they graduate."

In Summary, a radiologic technology program not only aligns with the mission of Jefferson College, but also Governor Nixon's vision for all of Missouri.

B. <u>Societal Need:</u>

Health care is an ever changing industry that must adjust to meet the needs of its ever-changing population. Medical and technological developments should permit an increased percentage of trauma victims and newborns with birth defects to survive, creating added demand for imaging services.

In 2011, the first members of the Baby Boomer generation turned 65 years old. It is estimated that by 2030, those over the age of 65 will represent 20% of the population. Due to improvements in the practice of medicine as well as technology, adults who reach the age of 65 are likely to live an additional 19 years. However, about 80% of those over the age of 65 have one chronic condition while 50% are living with two or more chronic conditions. Examples of chronic conditions include arthritis, high blood pressure, heart

disease, diabetes, and osteoporosis. Manifestations of these chronic conditions, including functional impairments such as decreased strength, balance, and mobility can lead to falls and further disability. These impairments lead to increased utilization of health care as evidenced by appointments with physicians and hospital stays, and other costs to society.

According to an article in 2007 in The Chronicle of Higher Education, this rapid aging of the population has caused the federal Bureau of Labor Statistics to project that 3.5 million more health care workers will be needed to meet the increasing demand. This number is in addition to replacements for the two million health care workers who will leave their positions.

C. Methodology Used to Determine Above Noted Demand and Need:

Research was conducted utilizing information, reports, and articles from sources including the United States Department of Labor, Missouri Economic Research and Information Center, the Office of Governor of Missouri, Missouri Hospital Association, Occupational Outlook Handbook, and regional healthcare facilities and employers.

2. Duplication and Collaboration:

Duplication of radiologic technology programs in the local area can be justified by two key points. The first point is that some of the area programs have long waiting list for entry into their radiologic technology programs. Demand for education in this field is high in our local area. The second point is because of the unique opportunity afforded to Jefferson College by the MoHealthWINS grant, industry standard as well as cutting edge equipment and technology will be available to all students accepted into the program. With this equipment and technology, students will be afforded a unique opportunity to broaden their knowledge base and discover a deeper understanding of the concepts needed to perform at a high level in the career field of radiologic technology.

Seventeen Radiography programs currently exist in Missouri. Some are hospital based and some operating in career and technical centers, community colleges and universities. In the greater St. Louis area, three programs exist. They include: Sanford-Brown College, Mercy Medical Center and St. Louis Community College. Mineral Area School of Radiologic Technology in Park Hills is also operating in Jefferson College's region.

Sanford Brown College is located in Fenton, 25 miles north of Jefferson College. This program accepts on average 15 students annually. Sanford Brown awards both associate and bachelor degrees in radiography.

St. Johns Mercy Medical Center is located in St. Louis, 36 miles north of Jefferson College. This program accepts 10 students annually. This is a certificate/diploma program that awards no college credit.

St. Louis Community College is located in St. Louis at Forest Park, 39 miles north of Jefferson College. This program accepts 40 students annually. An associate degree is earned upon completion of this program.

Mineral Area School of Radiologic Technology is located in Park Hills, 37 miles south of Jefferson College. This program accepts 16 students annually. An associate degree is earned upon completion of this program.

Jefferson College will offer a Radiologic Technology Program using a two year, integrated format in which some of the general education and technical courses can occur together throughout the two years. An associate degree will be awarded at completion of this program. This is similar to all existing programs in the market except for Mercy Medical Center. In conjunction with the MoHealthWINs grant, Jefferson College will have the opportunity to create a program unlike any other in the area. The state of the art radiology equipment, on site at Jefferson College's Hillsboro campus, will be utilized in the teaching process and will aid graduates' transition quickly into the ever changing field of radiography. This program will also lead to the creation of certificate degree offerings in multiple radiology modalities for registered radiologic technologists working today. Jefferson College plans to be the first to offer these certificates in the St. Louis area.

PROGRAM STRUCTURE / Form PS

A. Total credits required for graduation: 84.5-90.5

B. Residency requirements, if any: General requirement for an associate degree is a minimum of 62 semester hours of college credit; 24 hours must be completed at Jefferson College.

C. General education: Total credits: 24 – 30

Courses (specific courses OR distribution area and credits):
A&P I w/Lab ___ 4cr. US History I/US & MO Govt. and Constitution _____ 3cr.
A&P II w/Lab ___ 4cr. General Psychology/General Sociology _____ 3cr.
English Comp I _ 3cr. Intro. To College/Mastering the College Exp. _____ 1-3cr.
Inter. Algebra___ 3cr. Computer Literacy met by exam or course work ___ 0-4cr.
Medical Ethics__ 3cr.

D. Major requirements: Total credits: 60.5
See Attached _____cr. _____ ___cr. _____ ___cr.
_____ ___cr. _____ ___cr. _____ ___cr.
_____ ___cr. _____ ___cr. _____ ___cr.
_____ ___cr. _____ ___cr. _____ ___cr.
_____ ___cr. _____ ___cr. _____ ___cr.

E. Free elective credits: 0 (Sum of C, D, and E should equal A.)

F. Requirements for thesis, internship or other capstone experience: None

G. Any unique features such as interdepartmental cooperation: None

Major Requirements for AAS, RAD-TECH PROGRAM

Prerequisites	**CREDITS**
Radiologic Technology Prep Workshop (by invitation only – part of application process)	.5
	.5
First Semester	**Credits**
Term 1	
Introduction to Radiography	2
Radiographic Positioning I	3
Image Evaluation I	1
Term 2	
Patient Care Management	2
Radiographic Positioning II	3
Image Evaluation II	1
	12
Second Semester	**Credits**
Clinical Practicum I	3
Radiographic Exposures	3
Term 1	
Radiographic Positioning III	3
Term 2	
Radiographic Positioning IV	3
	12
Summer Semester	**Credits**
Clinical Practicum II	3
Clinical Practicum III	3
	6
Third Semester	**Credits**
Clinical Practicum IV	3
Term 1	
Cross-Sectional Anatomy	3
Radiographic Biology	3
Term 2	
Radiographic Physics	3
Radiographic Pharmacology	3
	15
Fourth Semester	
Clinical Practicum V	3
Term 1	
Radiographic Pathology	3
Image Intensification	3
Term 2	
Introduction to QA and Adv. Imaging Modalities	3
Radiography Curriculum Review and Prof. Dev.	3
	15
TOTAL	**60.5**
(Optional) Radiologic Technology Independent Study	1-3

Last Name First Name

Date of Birth

ASSOCIATE OF APPLIED SCIENCE
Degree Plan
RADIOLOGIC TECHNOLOGY

Effective 2012-2013

COURSE TITLES	COURSE NUMBERS	COMPLETED	ENROLLED	NEED
Anatomy and Physiology I (4)	BIO211	These courses must be completed with a "B" or better no more than 5 years prior to application into the program.		
Anatomy and Physiology II (4)	BIO212			
Intro. To College or Mastering The Col. Exp. (1-3)	COL101 or GUD136	All other pre-requisite & co-requiste courses must be completed with a "C" or better		
English Composition I (3)	ENG101			
Intermediate Algebra (3)	MTH128			
Computer Literacy	BIT138, CIS122, CIS125,			
- Met by exam or coursework (0-4)	CIS133, EDU205 or			
	PHY223			
US History I or US & MO Govt. and Constitutions (3)	HST103 or PSC102			
Medical Ethics (3)	PHL203			
General Psychology or General Sociology (3)	PSY101 or SOC101			
Radiologic Technology Prep Workshop (.5)	RADxxx			
Introduction to Radiography (2)	RADxxx			
Radiographic Positioning I (3)	RADxxx			
Image Evaluation I (1)	RADxxx			
Patient Care Management (2)	RADxxx			
Radiographic Positioning II (3)	RADxxx			
Image Evaluation II (1)	RADxxx			
Clinical Practicum I (3)	RADxxx			
Radiographic Exposures (3)	RADxxx			
Radiographic Positioning III (3)	RADxxx			
Radiographic Positioning IV (3)	RADxxx			
Clinical Practicum II (3)	RADxxx			
Clinical Practicum III (3)	RADxxx			
Clinical Practicum IV (3)	RADxxx			
Cross-Sectional Anatomy (3)	RADxxx			
Radiographic Biology (3)	RADxxx			
Radiographic Physics (3)	RADxxx			
Radiographic Pharmacology (3)	RADxxx			
Clinical Practicum V (3)	RADxxx			
Radiographic Pathology (3)	RADxxx			
Image Intensification & Equipment (3)	RADxxx			
Introduction to QA and Adv. Imaging Modalities (3)	RADxxx			
Radiographic Curriculum Review and Prof. Dev. (3)	RADxxx			
Radiologic Technology Independent Study (1-3)	RADxxx *(Optional)*			

Student Signature/Date

Advisor Signature/Date

Created April 2012

Total Credit Hours: 84.5 - 90.5

JEFFERSON COLLEGE AAS, RAD-TECH PROGRAM

Curriculum Sequence Fall 2013- Spring 2015

COURSE NUMBER	**Prerequisites**	**CREDITS**
COL 101 or GUD 136	Intro. To College or Mastering the College Exp.	1 or 3
BIO211	Anatomy and Physiology I	4
BIO212	Anatomy and Physiology II	4
ENG101	English Composition I	3
MTH128	Intermediate Algebra	3
Either BIT138, CIS122 CIS125, CIS133, EDU205 or PHY223 / Proficiency	Computer Literacy met by exam or coursework	0-4
	(Spring 2013)	
RADxxx	Radiologic Technology Prep Workshop (by invitation only – part of application process)	.5
		15.5 – 21.5
	First Semester (Fall 2013)	**Credits**
HST103 or PSC102	US History I or US & MO Govt. and Constitutions	3
	First 8 week session (Fall 2013)	
RADxxx	Introduction to Radiography	2
RADxxx	Radiographic Positioning I	3
RADxxx	Image Evaluation I	1
	Second 8 week session (Fall 2013)	
RADxxx	Patient Care Management	2
RADxxx	Radiographic Positioning II	3
RADxxx	Image Evaluation II	1
		15
	Second Semester (Spring 2014)	**Credits**
PHL203	Medical Ethics	3
RADxxx	Clinical Practicum I	3
RADxxx	Radiographic Exposures	3
	First 8 week session (Spring 2014)	
RADxxx	Radiographic Positioning III	3
	Second 8 week session (Spring 2014)	
RADxxx	Radiographic Positioning IV	3
		15
	Summer Semester (Summer 2014)	**Credits**
PSY101 or SOC101	General Psychology or General Sociology	3
RADxxx	Clinical Practicum II	3
RADxxx	Clinical Practicum III	3
		9
	Third Semester (Fall 2014)	**Credits**
RADxxx	Clinical Practicum IV	3
	First 8 week session (Fall 2014)	
RADxxx	Cross-Sectional Anatomy	3
RADxxx	Radiographic Biology	3
	Second 8 week session (Fall 2014)	
RADxxx	Radiographic Physics	3
RADxxx	Radiographic Pharmacology	3
		15

JEFFERSON COLLEGE AAS, RAD-TECH PROGRAM

Curriculum Sequence Fall 2013- Spring 2015

COURSE NUMBER	**Fourth Semester (Spring 2015)**	
RADxxx	Clinical Practicum V	3
	First 8 week session (Spring 2015)	
RADxxx	Radiographic Pathology	3
RADxxx	Image Intensification & Equipment	3
	Second 8 week session (Spring 2015)	
RADxxx	Introduction to QA and Adv. Imaging Modalities	3
RADxxx	Radiography Curriculum Review and Prof. Dev.	3
		15
	TOTAL	**84.5 – 90.5**
RADxxx	*(Optional)* Radiologic Technology Independent Study	1-3

Radiologic Technology Course Descriptions

General Education Course Descriptions

COL101 Introduction to College: Strategies for Success 1
Pre-/corequisite: Reading proficiency
Introduction to College: Strategies for Success introduces students to college life. This course emphasizes orientation to college, behavioral expectations of college students, required skills for academic success, Jefferson College resources, and essential college/workplace issues such as time management, decision making, and goal setting. (F,S,Su,O)

Or

GUD136 Mastering the College Experience 3
Pre-/corequisite: Reading proficiency
Mastering the College Experience is a course based on research on the learning and thinking skills of effective learners. This course emphasizes the development of effective academic skills including the structure of learning, problem solving, critical reading, and utilizing campus and community resources. Students will also assess their current academic skills and identify changes appropriate for academic success. This course fulfills the First Year Experience requirement. (F,S,O)

BIO211 Anatomy and Physiology I 4
Prerequisites: High school biology and chemistry or equivalent (BIO101 and CHM101), with a grade of "C" or better within the previous five years of registration date, and reading proficiency.
Anatomy and Physiology I examines the structure and function of cells, tissues, organs, and organ systems. Although all organ systems are introduced, special emphasis is given to the integumentary, skeletal, muscular, nervous, and endocrine systems. Laboratory time is required. Students cannot apply both BIO120 and BIO211 toward graduation. (F,S)

BIO212 Anatomy and Physiology II 4
Prerequisites: BIO211 with a grade of "C" or better or special permission of the Dean and reading proficiency; BIO120 will not fulfill the prerequisite for BIO212
Anatomy and Physiology II is a continuation of BIO211 with emphasis on cardiovascular, lymphatic, respiratory, digestive, excretory, and reproductive systems. Laboratory time is required. (F,S,Su)

ENG101 English Composition I 3
Prerequisites: COMPASS writing skills score of 70 or higher within the past two years, ACT English score of 18 or higher within the past two years, ENG099 with a grade of "C" or better, or ENG034 with a grade of "C" or better and reading proficiency

English Composition I offers the student the opportunity to learn to write competent expository essays and to do preliminary research. Students will review grammar and mechanics, but the emphasis is on the writing process. English Composition I is required for all degrees. Non-native speakers of English who do not qualify for ENG101, based on the required test scores, must take ENG031, English as a Second Language I; ENG032, English as a Second Language II; ENG033, English as a Second Language III; and/or ENG034, English as a Second Language IV. (F,S,Su,O)

HST103 U.S. History I to Reconstruction 3
Prerequisite: Reading proficiency
U.S. History I shows the development of the United States from Columbian contact through post-Civil War reconstruction. This course is designed to help students understand and function in their society. (F,S,O)

Or

PSC102 U.S. and Missouri Governments and Constitutions 3
Prerequisite: Reading proficiency
U.S. and Missouri Governments and Constitutions examines the U.S. and Missouri Constitutions including their impact on federal, state, and local government structure and power. Focus is on citizen and group efforts to influence government policies. This course fulfills the Missouri and U.S. Constitutions requirements. (F,S,Su,O)

MTH128 Intermediate Algebra 3
Prerequisites: COMPASS algebra score of at least 42 within the past two years, ACT math score of 18 or higher within the past two years, or MTH002 with a grade of "C" or better and reading proficiency
Intermediate Algebra continues the development of the algebraic skills introduced in Beginning Algebra. This course counts as an elective toward the Associate of Arts degree. (F,S,Su,O)

PHL203 Medical Ethics 3
Prerequisite: Reading proficiency
Medical Ethics is a study of contemporary issues in health care ethics. Students will become familiar with major theories of ethics and justice. They will learn about health care code of ethics, classic cases in the recent history of medical ethics, and ongoing disputes about topics such as abortion, euthanasia, resource allocation, patient rights, research on human subjects, and reproductive technologies. (F,S,O)

PSY101 General Psychology 3
Prerequisite: Reading proficiency
General Psychology deals with the scientific study of behavior and mental processes found in humans and animals. (F,S,Su,O)

Or

SOC101 General Sociology 3
Prerequisite: Reading proficiency
General Sociology deals with the scientific study of group behavior. (F,S,Su,O)

Either:

BIT138 Word Processing Applications I 3
Pre-/corequisite: Reading proficiency Corequisite: BIT100 or instructor approval Word Processing Applications I introduces entry-level word processing skills used in the creation of many types of personal, educational, and business documents. Introductory coverage includes creating and editing memos, letters, and reports and adding and modifying visual elements to enhance written communications. This course fulfills the computer literacy graduation requirement for degree-seeking students. (F,O)

Or

CIS122 Basic Computer Skills 1
Prerequisite: Reading proficiency
Basic Computer Skills is designed to provide the student with fundamental computer skills and essential word processing capabilities. This course fulfills the computer literacy graduation requirement for degree-seeking students. (F,S,Su)

Or

CIS125 Introduction to Information Systems 3
Prerequisite: Reading proficiency
Introduction to Information Systems introduces students to hardware, software, and terminology related to various computers. Additionally, there is the study of various data communications, networks, multimedia, artificial intelligence, operating environments, and future computer uses. This course also gives practical laboratory experiences using Windows and Microsoft Office Professional (an integrated software package for word processing, spreadsheet, database, and presentation). Students may need to work in the computer laboratory outside of class in order to complete the assignments. Introduction to Information Systems fulfills the computer literacy graduation requirement for degree-seeking students. (F,S,O)

Or

CIS133 Microcomputer Software Applications 3
Pre-/corequisite: Reading proficiency

Microcomputer Software Applications gives practical experiences using widely utilized microcomputer software application programs: word processing (Word), spreadsheet (Excel), database (Access), and presentation(PowerPoint). Students will also learn basic Windows functions and briefly explore the Internet. Students may need to work in the computer laboratory outside of class in order to complete the assignments. This course fulfills the computer literacy graduation requirement for degree seeking students. (F,S,Su,O)

Or

EDU205 Technology for Teachers 3
Prerequisites: ENG101 with a grade of "C" or better and reading proficiency; EDU105 recommended
Technology for Teachers teaches students how to integrate instructional technology into P-12 classrooms. Students will study a variety of software programs, presentation technology, and telecommunication tools. The focus will also be on social, ethical, legal, and human issues surrounding the use of technology. (F,S,Su,O)

Or

PHY223 General Physics I 4
Prerequisites: PHY118 and reading proficiency Pre-/corequisite: MTH180
General Physics I, which is calculus-based, is the second course in the physics sequence for all physics, chemistry, mathematics, and pre-engineering majors and is a rigorous study of topics in kinematics, dynamics, fluid mechanics, and thermodynamics. Laboratory time is required. This course is required for the Associate of Science degree. General Physics I fulfills the computer literacy graduation requirement for degree-seeking students. (F)

RAD TECH Core Curriculum Course Descriptions: Year 1

RADxxx Radiologic Technology Prep Workshop .5
Prerequisites: Requires application to the Radiologic Technology Program and is by invitation only; all other Radiologic Technology classes require admission to the program, Reading Proficiency
All students who meet minimum eligibility requirements upon application to the Radiologic Technology Program will be invited to the workshop. If invited, the applicant must attend the workshop to be considered for the Radiologic Technology Program. The workshop will inform potential students of all aspects of the Radiologic Technology Program and review program requirements. All applicants in attendance will complete an interview, type an essay in our computer lab, and complete a critical thinking exam. (S)

RADxxx Introduction to Radiography 2
Prerequisites: Admission to Program, Reading Proficiency

This course shall provide the student with an overview of Radiologic Technology and its role in health care delivery. Students will be oriented to the academic and administrative structure of the program, radiographer role and responsibility, and to the profession as a whole. Basic principles of radiation safety and protective measures will be introduced including regulatory agencies. (F)

RADxxx Radiographic Positioning I 3
Prerequisites: Admission to Program, Reading Proficiency
This course consists of lecture and practicum in routine radiographic procedures for the chest, abdomen and extremity studies using relevant structural relationships, landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine positioning and techniques of the region, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (F)

RADxxx Image Evaluation I 1
Prerequisites: Admission to Program, Reading Proficiency
This course shall provide the student with the knowledge and skills necessary to perform radiologic procedures for the chest, abdomen and extremity studies. An introduction to chest, abdomen, upper extremity, lower extremity, hip & pelvis and relevant mobile / trauma procedures for adult and pediatric patients is reinforced. Utilization of anatomical landmarks, body planes and line, and film size are reinforced. The student will practice radiation protection standards and evaluate radiographic image quality in simulated clinical conditions. Students will use their knowledge of anatomy, positioning and exposure factors to critique radiographs and determine if radiographs are of proper diagnostic quality. (F)

RADxxx Patient Care Management 2
Prerequisites: Admission to Program, Reading Proficiency
This course focuses on technological and assessment skills and concepts required to build a foundation for holistic care of patients. The student gains a beginning understanding of the nurse's responsibilities as a member of the interdisciplinary health care team so to apply that understanding to the diagnostic imaging environment. Instruction will introduce the basic concepts of cultural and legal aspects of patient care, vital signs, medical asepsis and infection control, hygiene, body mechanics and mobility, safety, documentation, evaluation of physical needs and surgical asepsis. (F)

RADxxx Radiographic Positioning II 3
Prerequisites: Admission to Program, Reading Proficiency
This course consists of lecture and practicum in routine radiographic procedures for the thorax and spine as well as contrast studies using relevant structural relationships, landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine positioning and techniques of the region, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. This

course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (F)

RADxxx Image Evaluation II 1
Prerequisites: Admission to Program, Reading Proficiency
This course shall provide the student with the knowledge and skills necessary to perform radiologic procedures for the thorax and spine as well as contrast studies. An introduction to thorax, spine, contrast studies, relevant mobile / trauma procedures for adult and pediatric patients are reinforced. Utilization of anatomical landmarks, body planes and line, and film size are reinforced. The student will practice radiation protection standards and evaluate radiographic image quality in simulated clinical conditions. Students will use their knowledge of anatomy, positioning and exposure factors to critique radiographs and determine if radiographs are of proper diagnostic quality. (F)

RADxxx Clinical Practicum I 3
Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II
This clinical practicum is the first course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (S)

RADxxx Radiographic Exposures 3
Prerequisites: Admission to Program, Reading Proficiency
This course introduces the student to the fundamental principles of radiographic exposure: radiation production, equipment function, collimation and filtration of the beam, control of secondary radiation, and automatic processing technique. In addition the application of anatomical and pathological conditions affecting image quality will be addressed. (S)

RADxxx Radiographic Positioning III 3
Prerequisites: Admission to Program, Reading Proficiency
This course consists of lecture and practicum in routine and trauma radiographic procedures for skull, facial bone and sinus studies using relevant structural relationships, anatomical landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine and non-routine positioning and techniques of the region, body planes and lines, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. The student will evaluate radiographic image quality in simulated

clinical conditions. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (S)

RADxxx Radiographic Positioning IV 3
Prerequisites: Admission to Program, Reading Proficiency
This course consists of lecture and practicum in advanced imaging techniques and approaches for imaging adult, pediatric and geriatric trauma/emergency radiography, routine pediatric studies, angiographic and interventional procedures, digital imaging and computer tomography as well as mobile and operating room equipment and procedures using relevant structural relationships, anatomical landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine and non-routine positioning and techniques of the region, body planes and lines, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. The student will evaluate radiographic image quality in simulated clinical conditions. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (S)

RADxxx Clinical Practicum II 3
Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV
This clinical practicum is the second course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (Su)

RADxxx Clinical Practicum III 3
Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV
This clinical practicum is the third course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (Su)

RAD TECH Core Curriculum Course Descriptions: Year 2

RADxxx Clinical Practicum IV 3
Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV
This clinical practicum is the fourth course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (F)

RADxxx Cross-Sectional Anatomy 3
Prerequisites: Admission to Program, Reading Proficiency
This course will introduce application techniques, image formation, computer anatomy and picture archiving of digital imaging. Processing and computer tomography concepts are presented. Fundamental study of the human anatomy including bones, organs, vessels and tissues in cross-section will be conducted. Specific procedures imaged for the head, brain, neck, thorax, abdomen and pelvis will be addressed. A general review of scanning protocol, patient preparation and evaluation of radiographic image quality will be discussed. Knowledge of cross-sectional anatomy will lead to a greater understanding of modalities such as CT, MRI and Ultrasound. (F)

RADxxx Radiographic Biology 3
Prerequisites: Admission to Program, Reading Proficiency
This course will provide an overview of the principles of the interaction of radiation on the human body. Radiation effects on molecules, organisms, and factors affecting biological response, and acute and chronic effects of radiation are discussed. This course will also review radiation protection measures. (F)

RADxxx Radiographic Physics 3
Prerequisites: Admission to Program, Reading Proficiency
This course provides the student with the principles of x-ray generation and use, including the mathematical, electrical, chemical, and physical concepts necessary for x-ray production and beam characteristics. An introduction to the x-ray equipment, instrumentation and control, and the unit of measure is provided. An analysis of production and measurement of radiation, interaction with matter and film, the study of x-ray tubes, rating charts, and x-ray circuits will be presented. (F)

RADxxx Radiographic Pharmacology 3
Prerequisites: Admission to Program, Reading Proficiency
This course covers the fundamentals of pharmacology including drug absorption, metabolism, and excretion responses for selected drugs and contrast media used in radiology and radiographic procedures. The desired effects, mechanism of actions and adverse effects of contrast media on the human body are discussed. An introduction to venipuncture is included. (F)

RADxxx Clinical Practicum V 3
Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV
This clinical practicum is the fourth course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (S)

RADxxx Radiographic Pathology 3
Prerequisites: Admission to Program, Reading Proficiency
This course is an introduction to the basic nature and cause of disease, radiographic manifestation of disease processes and acute injury, and their related radiographic significance. (S)

RADxxx Image Intensification & Equipment 3
Prerequisites: Admission to Program, Reading Proficiency
This course provides the student with the knowledge of x-ray equipment routinely utilized to produce diagnostic images. An overview of various recording media and image intensification units used in radiology will be discussed. (S)

RADxxx Introduction to Quality Assurance and Advanced Imaging Modalities 3
Prerequisites: Admission to Program, Reading Proficiency
This course provides the student with the principles of a Quality Management program including theory, tools, procedures and assessment of images. Quality Control measures pertaining to processors, equipment, fluoroscopy and ancillary equipment are discussed. Quality Management of digital radiographic imaging equipment is discussed. Advanced imaging modalities including computed tomography, digital radiography, ultrasound, magnetic resonance imaging, mammography, special procedures, nuclear medicine, and radiation therapy will also be discussed. (S)

RADxxx Radiography Curriculum Review and Professional Development 3
Prerequisites: Admission to Program, Reading Proficiency
This course provides the student with a general review of all previous coursework through multiple examinations on concepts in radiation protection, patient care management, radiographic procedures, image production and equipment operation, so as to prepare the student for the national registry exam. This course also discusses matters involving current trends in imaging, career options, the importance of critical thinking skills and continuing education to the profession, and professionalism of registered Radiologic Technologists. (S)

RAD TECH (Optional) Independent Study Curriculum Course Descriptions:

RADxxx Radiologic Technology Independent Study 1-3
Prerequisites: Admission to Program, Reading Proficiency
This independent study course is designed to give the student the opportunity to study and be tested on specific areas of radiologic technology that they may be interested in. This self-paced course is designed to assist the radiologic technology student to obtain a deeper education in the selected area of the radiologic sciences including, but not limited to, CT, MRI, nuclear medicine, radiation therapy and ultrasound career paths. Students have the opportunity to repeat this course as many times as they would like. (F,S,Su)

Missouri Department of Higher Education

Building Missouri's future…by degrees

PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS / Form PG

Institution Name: Jefferson College
Program Name: Radiologic Technology
Date: July 2012
(Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below. Quantification of performance goals should be included wherever possible.)

Student Preparation

- Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.

  Applicants will be required to meet Jefferson College Admissions Procedure: Submit a Jefferson College application for admissions form with application fee, submit official high school transcripts or high school equivalency certificate (GED), and submit official college transcripts from all colleges attended. For all college courses completed as dual credit, transcripts must be requested from each college awarding credit (as well as the high school transcripts). Take a placement Test: ACT, or COMPASS. All developmental courses must be taken and passed with a "C" or higher, based upon assessment test scores. Applicants will have an overall GPA of 2.75 or higher. The following prerequisite courses must be passed with a "B" or higher: Anatomy and Physiology I with lab, Anatomy and Physiology II with lab. The following prerequisite courses must be passed with a "C" or higher: Introduction to College or Mastering the College Experience, English Composition I, Intermediate Algebra, and Computer Literacy met by exam or coursework. Three general education courses must be completed with a "C" or higher to meet AAS requirements. A Radiologic Technology application packet must be completed and submitted by all applicants. The application packet will include but is not limited to: application form, observation time required and paperwork completed, and references. All applicants with complete application packets who meet minimum requirements will be invited to a workshop which will include academic/critical thinking assessment as well as oral and written requirements. If selected for the program, students must complete drug testing, background checks, and provide documentation of immunizations.

- Characteristics of a specific population to be served, if applicable.

  In conjunction with the guidelines of the MoHealthWINs grant, the first two years of the Radiologic Technology program will serve Trade Adjustment Assistance (TAA), unemployed, underemployed and

low-skilled students. After the first two years, the program will serve any and all Jefferson College students.

Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.

A full-time program director is required. The program director must: 1.) Hold, at a minimum, a master's degree, 2.) Be proficient in curriculum design, program administration, evaluation, instruction, and academic advising, 3.) Document three years clinical experience in the professional discipline, 4.) Document two years of experience as an instructor in a JRCERT-accredited program, 5.) Hold American Registry of Radiologic Technologists current registration in radiography or equivalent (i.e., unrestricted state license for the state in which the program is located).

A full-time clinical coordinator is required to: 1.) Hold, at a minimum, a baccalaureate degree, 2.) Be proficient in curriculum development, supervision, instruction, evaluation, and academic advising, 3.) Document two years clinical experience in the professional discipline, 4.) Document a minimum of one year of experience as an instructor in a JRCERT-accredited program, 5.) Hold American Registry of Radiologic Technologists current registration in radiography or equivalent (i.e., unrestricted state license for the state in which the program is located).

Any full-time didactic program faculty are required to: 1.) Hold, at a minimum, a baccalaureate degree, 2.) Be qualified to teach the subject, 3.) Be knowledgeable of course development, instruction, evaluation, and academic advising, 4.) Document two years clinical experience in the professional discipline, 5.) Hold American Registry of Radiologic Technologists current registration in radiography or equivalent (i.e., unrestricted state license for the state in which the program is located).

Any part-time didactic program faculty are required to: 1.) Hold academic and/or professional credentials appropriate to the subject content area taught and 2.) Be knowledgeable of course development, instruction, evaluation, and academic advising.

Any clinical instructor(s) are required to: 1.)Be proficient in supervision, instruction, and evaluation, 2.) Document two years clinical experience in the professional discipline, 3.) Hold American Registry of Radiologic Technologists current registration in radiography or equivalent (i.e., unrestricted state license for the state in which the clinical education setting is located).

Any clinical staff are required to: 1.) Hold American Registry of Radiologic Technologists current registration in radiography or equivalent (i.e., unrestricted state license for the state in which the clinical education setting is located).

Faculty teaching loads and release time must be consistent with those of comparable faculty in other health science (allied health) programs in the same institution.

Additionally, a full-time equivalent clinical coordinator is required if the program has more than five (5) active clinical education settings or more than thirty (30) students enrolled in the clinical component. The clinical coordinator position may be shared by no more than four (4) appointees. If a clinical coordinator is required, the program director may not be identified as the clinical coordinator. The clinical coordinator may not be identified as the program director.

The program director and clinical coordinator may perform clinical instruction; however, they may not be identified as clinical instructors.

A minimum of one clinical instructor must be designated at each recognized clinical education setting. The same clinical instructor may be identified at more than one site as long as a ratio of one full-time equivalent clinical instructor for every ten (10) students is maintained.

- Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.
  Full time faculty will teach greater than 50% of the credit hours

- Expectations for professional activities, special student contact, teaching/learning innovation.

  Students and instructors will attend a professional development conference annually. The number of students assigned to the clinical education setting must not exceed the number of clinical staff assigned to the radiography department. The student to radiography clinical staff ratio must be 1:1. However, it is acceptable that more than one student may be temporarily assigned to one technologist during uncommonly performed procedures. Students will have sufficient access to clinical education settings that provide a wide range of procedures for competency achievement including mobile, surgical, and trauma examinations. Clinical education settings may include hospitals, clinics, specialty/imaging centers, orthopedic centers, and other facilities.

Enrollment Projections

- Student FTE majoring in program by the end of five years.

  30 full time students enrolled each year, 15 first year and fifteen second year students, (after the first year).

- Percent of full time and part time enrollment by the end of five years.

  Part time enrollment will not be an option for this degree.

Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.

  Fifteen graduates each year.

- Special skills specific to the program.

  Radiologic technologists are the medical personnel who perform diagnostic imaging examinations. They are educated in anatomy, patient positioning, examination techniques, equipment protocols, radiation safety, radiation protection and basic patient care. Radiologic technologists who perform imaging examinations are responsible for accurately positioning patients and ensuring that a quality diagnostic image is produced. They work closely with radiologists, the physicians who interpret medical images to either diagnose or rule out disease or injury. For the images to be interpreted correctly by the radiologist, the imaging examination must be performed properly by a radiologic technologist.

- Proportion of students who will achieve licensing, certification, or registration.

  Five-year average credentialing examination pass rate of not less than 75 percent at first attempt.

- Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.

  Five-year average credentialing examination pass rate of not less than 75 percent at first attempt. The American Registry of Radiologic Technologists (ARRT) national certification exam is the industry standard.

- Placement rates in related fields, in other fields, unemployed.

  Five-year average job placement rate of not less than 75 percent within six months of graduation. Job placement rate is defined as the number of graduates employed in the radiologic sciences compared to the number of graduates actively seeking employment in the radiologic sciences.

- Transfer rates, continuous study.

  Documentation of annual program completion rates must be presented to the JRCERT accrediting body. No specific percentage of completion is required for accreditation. Transfer rates are included in the JRCERT completion rate formula.

  JRCERT definition of program completion rate: Program completion rate is calculated by dividing the number of students who complete the program within a cohort by the number who enrolled in the cohort initially and subsequently (for example, transfer students or re-admits). Students who leave or do not graduate on time for any reason, such as medical leave, personal choice, or course failure, are considered as not completing the program with the original cohort.

$$PCR = \frac{\text{\# of graduates in the cohort}}{\text{\# of students initially enrolled in cohort + \# of transfer students or re-admits}}$$

Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. If there are no plans to seek specialized accreditation, please provide reasons.

  Application for accreditation from the Joint Review Committee on Education in Radiologic Technology (JRCERT) will be filed when the first students are accepted into the program.

Alumni and Employer Survey

- Expected satisfaction rates for alumni, including timing and method of surveys

  Graduate surveys will have a 50% return rate with a composite score of three or greater on a five point rating scale.

- Expected satisfaction rates for employers, including timing and method of surveys

  Employer surveys will have a 50% return rate with a composite score of three or greater on a five point rating scale.

Institutional Characteristics / Form IC

Jefferson College is well equipped to support the proposed Radiologic Technology Program because in the latest assessment of the mission "to meet the needs of the community", they recognize the need for increased healthcare workers due to changes in our healthcare system as well as changes in the age and general health of the population. Missouri's economy is shifting away from manufacturing and moving toward service industries; therefore, Jefferson College wants to provide educational programs to members of the community who are interested in a career in radiologic technology. In doing so, they were able to acquire funding for renovation of existing space for large and small classrooms, laboratory space, offices, necessary equipment, and personnel to address this documented need.

Jefferson College has four campus locations in which students could complete some of the general education course requirements. In addition to the Hillsboro campus where the radiologic technology courses will occur, there are campuses in Arnold, Imperial, and Cedar Hill.

There is a multitude of student services and support available at Jefferson College to ensure student success. The Advising and Retention Center assists in long-term academic decision making and works together with the Career Development Center in career exploration and preparation for entry into the workforce. Academic Support Services offers peer and profession tutoring for students in need of academic assistance. There are also writing labs available, including one online, and a math lab for assistance in these specific subjects. The learning Center offers courses which will help students develop essential skills necessary for college success. Students with disabilities can utilize available support services including the Assistive Technology Center.

The campus library offers study rooms, a large collection of books, magazines, DVD's, videos, CDs, and databases as well as access to books from throughout the state of Missouri through the MOBIUS system.

Project SUCCESS helps students develop academic skills and achieve set educational goals. This federally funded TRIO program provides free services including academic assistance, personal support, career and transfer counseling, financial guidance, and cultural enrichment. Students with low income, and/or documented disability, and/or first generation college students are eligible for this program.

The Jefferson College Child Development Center enrolls children age two to twelve from students, faculty, staff and the community. The center is accredited by the state of Missouri and provides developmentally appropriate activities for children in a safe environment.

Jefferson College and the Cultural Council offer a variety of concerts, drama, exhibits, festivals, film, and guest lectures in the evenings and on the weekend for the students and the community to enjoy.

Jefferson College offers intercollegiate athletic programs in women's basketball, softball, and volleyball as well as men's baseball and soccer.

The Office of Student Activities offers leadership opportunities for students to become involved both in and off of campus, including options for community service.

Student housing is available in the form of 52 fully furnished apartments (two and four bedroom units), including a full service kitchen, on-site laundry facilities, and connections for telephone, cable, and internet.

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Clinical Practicum I

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Clinical Practicum I

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II

B. Credit hour award: 3

C. Description: This clinical practicum is the first course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the technological factors affecting radiographic image quality and patient assessment skills	Competency Check off
Demonstrate the principles of radiation safety and protection practices utilized in radiographic procedures	Competency Check off
Manipulate/demonstrate the effective operation of x-ray equipment for radiologic examinations	Competency Check off Clinical Instructor (CI) monthly evaluation Clinical Coordinator (CC) end of semester evaluation
Demonstrate student initiative in regards to personal effort, use of time, interest in clinical education, judgment, quantity of work and radiographic quality	CI monthly evaluation CC end of semester evaluation
Demonstrate medical knowledge in	Competency Check off

regards to basic & clinical science, interest in learning and positioning skills	CI monthly evaluation CC end of semester evaluation Written exam
Demonstrate interpersonal & communication skills in regards to interaction with others, and self-image	CI monthly evaluation CC end of semester evaluation
Demonstrate patient care in regards to tact & courtesy, communication, and concern and interactions	CI monthly evaluation CC end of semester evaluation
Demonstrate professionalism in regards to listening skills, attendance, appearance, attitude & cooperation, reaction to criticism and use & care of equipment	CI monthly evaluation CC end of semester evaluation
Demonstrate critical thinking skills	Written assignment Competency Check off CI monthly evaluation CC end of semester evaluation

III. OUTLINE OF TOPICS/ COMPETENCIES: *By completion of the fifth clinical practicum, all radiology students will have completed all competency requirements as defined by the American Registry of Radiologic Technologists (ARRT).*

A. Chest Routine
   a. Chest AP (Wheelchair or Stretcher)
   b. Ribs
   c. Chest Lateral Decubitus
   d. Sternum
   e. Upper Airway (Soft-Tissue Neck)

B. Upper Extremity
   a. Thumb or Finger
   b. Hand
   c. Wrist
   d. Forearm
   e. Elbow
   f. Humerus
   g. Shoulder
   h. Trauma: Shoulder (Scapular Y, Transthoracic or Axillary)*
   i. Clavicle
   j. Scapula
   k. AC Joints
   l. Trauma: Upper Extremity (Nonshoulder)*

C. Lower Extremity
   a. Toes
   b. Foot

c. Ankle
d. Knee
e. Tibia-Fibula
f. Femur
g. Trauma: Lower Extremity*
h. Patella
i. Calcaneus (Os Calcis)

D. Head – Candidates must select at least one elective procedure from this section.
    a. Skull
    b. Paranasal Sinuses
    c. Facial Bones
    d. Orbits
    e. Zygomatic Arches
    f. Nasal Bones
    g. Mandible
E. Spine and Pelvis
    a. Cervical Spine
    b. Trauma: Cervical Spine (Cross Table Lateral)*
    c. Thoracic Spine
    d. Lumbar Spine
    e. Pelvis
    f. Hip
    g. Cross Table Lateral Hip
    h. Sacrum and/or Coccyx
    i. Scoliosis Series
    j. Sacroiliac Joints
F. Abdomen
    a. Abdomen Supine (KUB)
    b. Abdomen Upright
    c. Abdomen Decubitus
    d. Intravenous Urography
G. Fluoroscopy Studies – Candidates must select Upper GI or Barium Enema plus one other elective procedure from this section.
    a. Upper GI Series (Single or Double Contrast)
    b. Barium Enema (Single or Double Contrast)
    c. Small Bowel Series
    d. Esophagus
    e. Cystography/Cystourethrography
    f. Endoscopic Retrograde Cholangiopancreatography (ERCP)
    g. Myelography
    h. Arthrography
H. Surgical Studies
    a. C-Arm Procedure (Orthopedic)
    b. C-Arm Procedure (Non Orthopedic)
I. Mobile Studies

a. Chest
b. Abdomen
c. Orthopedic

J. Pediatrics (age 6 or younger)
a. Chest Routine
b. Upper Extremity
c. Lower Extremity
d. Abdomen
e. Mobile Study

K. Digital Systems
a. Digital Radiography
b. Digital Fluoroscopy

* Trauma is considered a serious injury or shock to the body. Modifications may include variations in positioning, minimal movement of the body part, etc.

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods which include but are not limited to student observation and performance of radiologic exams, critical thinking projects, interactive learning with clinical staff, and application of any new information taught within the classroom. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.

B. Martensen, K. (2011). Radiographic Image Analysis "Workbook". (3rd ed.) St. Louis, MO: Elsevier Saunders.

C. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7^{th} ed). St. Louis, MO: Mosby.

D. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.

E. Jefferson College Clinical Competency Book

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)

B. Course homepage available through Blackboard
C. Technique book, radiation badge, name tag, lead markers, pen, uniform, white lab coat, white sneakers, white socks, clinical competency book.

VII. SUPPLEMENTAL REFERENCES

A. Clinical Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

ASSIGNMENTS: For each clinical rotation, the clinical instructor and the clinical coordinator will evaluate each student on awareness of the environment, communication skills, quality assurance, quality of service, work behaviors and professional ethics. Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days. For orientation and specialty rotations, the student will complete the appropriate clinical objectives, have the objective form signed by the supervising technologist and turn it in to the clinical coordinator within 1 week of completion of the rotation. For each day the orientation or specialty objectives are late, the grade for those objectives will be reduced by 20%. If specialty objectives are over 5 days late, the student will not receive credit for that assignment. All specialty objectives must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

To complete the semester requirements, one Critical Thinking exercise will be completed each semester. For each day a Critical Thinking exercise is late, the grade for that exercise will be reduced by 20%. If the exercise is over 5 days late, the student will not receive credit for that assignment. All Critical Thinking exercises must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

Each student is required to complete a set number of competencies (listed below) during each semester. Until course requirements are met the final grade will be an incomplete. Failure to complete the minimum number of competencies two consecutive semesters may be grounds for dismissal from the program. Students completing all competencies for the current semester may begin work on competencies for the following semester. **Any registered technologist** may evaluate step 4 or 5 of the Five Steps to Clinical Competency. The **clinical instructor** for the site or a Jefferson College

Radiologic Technology faculty member must evaluate or over sign step 5. It is each student's responsibility to know who the clinical instructor(s) is/are at each clinical site.

Semester	Mandatory	Elective	Total
1st Semester (Spring)	5	0	5
2nd Semester (1st month summer)	7	1	8
3rd Semester (2nd month Summer)	7	1	8
4th Semester (Fall)	8	6	14
5th Semester (Spring)	5	8	13
Totals	32	16	48

As this course is a portion of the Five Steps to Clinical Competency, a minimum mastery of 85% is required to successfully complete the course. All competency exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. Until course requirements are met the final grade will be an incomplete.

Clinical grades will be based on a percentage of total possible points.
Clinical grades will be based on a weighted scale listed below:

- Rotation evaluations twenty percent 20%
- Critical thinking assignments ten percent 10%
- Clinical coordinator semester evaluation thirty percent 30%
- Clinical competencies forty percent 40%

TOTAL 100%

- Each clinical absence/tardy will reduce grade by 1%

Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days.

Example # 1	Pts received	Pts possible	% on assignment	Portion of grade		
End of month evaluations	375	400	93.75%	20%	18.75 %	(93.75% x 20%)
Critical thinking assignments	191	200	95.50%	10%	9.55%	(95.5% x 10%)
Clinical Coordinator semester evaluation	91	100	91.00%	30%	27.30 %	(91.0% x 30%)
Clinical Competencies	988	1000	98.80%	40%	39.52 %	(98.8% x 40%)
Absent 2.5 hours (-1%)					95.12 % -1.00%	
					94.12	B

Example # 2

End of month evaluations	350	400	87.50%	20%	17.50 %	(87.5% x 20%)
Critical thinking assignments	162	200	81.00%	10%	8.10%	(81% x 10%)
Clinical Coordinator semester evaluation	85	100	85.00%	30%	25.5%	(85% x 30%)
Clinical Competencies	987	1000	98.70%	40%	39.48 %	(98.7% x 40%)
Absent four days (-4%)					90.58 % -4.00%	
					86.58	C

Example # 3

End of month evaluations	393	400	98.25%	20%	19.65 %	(98.25% x 20%)
Critical thinking assignments	159	200	79.50%	10%	7.95%	(79.5% x 10%)
Clinical Coordinator semester evaluation	96	100	96.00%	30%	28.8%	(96.0% x 30%)
Clinical Competencies	985	1000	98.50%	40%	39.4%	(98.5% x 40%)
Absent No days (+1/2%)					95.8% +.5%	
					96.3%	A

All of the above examples use the same amount of points to make them easier to understand. Each semester will have a different total number for competencies and end of month evaluations depending on the number of months in the semester.

EXAMS – Exams will be given on the dates given in this syllabus. If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence.

GRADES – Grades in this course are based on the Jefferson College Radiologic Technology Program's grading scale.

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Clinical Practicum II

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Clinical Practicum II

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV

B. Credit hour award: 3

C. Description: This clinical practicum is the second course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (Su)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the technological factors affecting radiographic image quality and patient assessment skills	Competency Check off
Demonstrate the principles of radiation safety and protection practices utilized in radiographic procedures	Competency Check off
Manipulate/demonstrate the effective operation of x-ray equipment for radiologic examinations	Competency Check off Clinical Instructor (CI) monthly evaluation Clinical Coordinator (CC) end of semester evaluation
Demonstrate student initiative in regards to personal effort, use of time, interest in clinical education, judgment, quantity of work and radiographic quality	CI monthly evaluation CC end of semester evaluation

Demonstrate medical knowledge in regards to basic & clinical science, interest in learning and positioning skills	Competency Check off CI monthly evaluation CC end of semester evaluation Written exam
Demonstrate interpersonal & communication skills in regards to interaction with others, and self-image	CI monthly evaluation CC end of semester evaluation
Demonstrate patient care in regards to tact & courtesy, communication, and concern and interactions	CI monthly evaluation CC end of semester evaluation
Demonstrate professionalism in regards to listening skills, attendance, appearance, attitude & cooperation, reaction to criticism and use & care of equipment	CI monthly evaluation CC end of semester evaluation
Demonstrate critical thinking skills	Written assignment Competency Check off CI monthly evaluation CC end of semester evaluation

III. OUTLINE OF TOPICS/ COMPETENCIES: *By completion of the fifth clinical practicum, all radiology students will have completed all competency requirements as defined by the American Registry of Radiologic Technologists (ARRT).*

A. Chest Routine
   a. Chest AP (Wheelchair or Stretcher)
   b. Ribs
   c. Chest Lateral Decubitus
   d. Sternum
   e. Upper Airway (Soft-Tissue Neck)

B. Upper Extremity
   a. Thumb or Finger
   b. Hand
   c. Wrist
   d. Forearm
   e. Elbow
   f. Humerus
   g. Shoulder
   h. Trauma: Shoulder (Scapular Y, Transthoracic or Axillary)*
   i. Clavicle
   j. Scapula
   k. AC Joints
   l. Trauma: Upper Extremity (Nonshoulder)*

C. Lower Extremity
   a. Toes

b. Foot
c. Ankle
d. Knee
e. Tibia-Fibula
f. Femur
g. Trauma: Lower Extremity*
h. Patella
i. Calcaneus (Os Calcis)

D. Head – Candidates must select at least one elective procedure from this section.
    a. Skull
    b. Paranasal Sinuses
    c. Facial Bones
    d. Orbits
    e. Zygomatic Arches
    f. Nasal Bones
    g. Mandible
E. Spine and Pelvis
    a. Cervical Spine
    b. Trauma: Cervical Spine (Cross Table Lateral)*
    c. Thoracic Spine
    d. Lumbar Spine
    e. Pelvis
    f. Hip
    g. Cross Table Lateral Hip
    h. Sacrum and/or Coccyx
    i. Scoliosis Series
    j. Sacroiliac Joints
F. Abdomen
    a. Abdomen Supine (KUB)
    b. Abdomen Upright
    c. Abdomen Decubitus
    d. Intravenous Urography
G. Fluoroscopy Studies – Candidates must select Upper GI or Barium Enema plus one other elective procedure from this section.
    a. Upper GI Series (Single or Double Contrast)
    b. Barium Enema (Single or Double Contrast)
    c. Small Bowel Series
    d. Esophagus
    e. Cystography/Cystourethrography
    f. ERCP
    g. Myelography
    h. Arthrography
H. Surgical Studies
    a. C-Arm Procedure (Orthopedic)
    b. C-Arm Procedure (Non Orthopedic)

I. Mobile Studies
    a. Chest
    b. Abdomen
    c. Orthopedic
J. Pediatrics (age 6 or younger)
    a. Chest Routine
    b. Upper Extremity
    c. Lower Extremity
    d. Abdomen
    e. Mobile Study
K. Digital Systems
    a. Digital Radiography
    b. Digital Fluoroscopy

* Trauma is considered a serious injury or shock to the body. Modifications may include variations in positioning, minimal movement of the body part, etc.

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods which include but are not limited to student observation and performance of radiologic exams, critical thinking projects, interactive learning with clinical staff, and application of any new information taught within the classroom. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.
B. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.
C. Martensen, K. (2011). Radiographic Image Analysis "Workbook". (3rd ed.) St. Louis, MO: Elsevier Saunders.
D. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7^{th} ed). St. Louis, MO: Mosby.
E. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.
F. Jefferson College Clinical Competency Book

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Technique book, radiation badge, name tag, lead markers, pen, uniform, white lab coat, white sneakers, white socks, clinical competency book.

VII. SUPPLEMENTAL REFERENCES

A. Clinical Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

ASSIGNMENTS: For each clinical rotation, the clinical instructor and the clinical coordinator will evaluate each student on awareness of the environment, communication skills, quality assurance, quality of service, work behaviors and professional ethics. Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days. For orientation and specialty rotations, the student will complete the appropriate clinical objectives, have the objective form signed by the supervising technologist and turn it in to the clinical coordinator within 1 week of completion of the rotation. For each day the orientation or specialty objectives are late, the grade for those objectives will be reduced by 20%. If specialty objectives are over 5 days late, the student will not receive credit for that assignment. All specialty objectives must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

To complete the semester requirements, one Critical Thinking exercise will be completed each semester. For each day a Critical Thinking exercise is late, the grade for that exercise will be reduced by 20%. If the exercise is over 5 days late, the student will not receive credit for that assignment. All Critical Thinking exercises must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

Each student is required to complete a set number of competencies (listed below) during each semester. Until course requirements are met the final grade will be an incomplete. Failure to complete the minimum number of competencies two consecutive semesters may be grounds for dismissal from the program. Students completing all competencies for the current semester may begin work on competencies for the following semester. **Any registered**

technologist may evaluate step 4 or 5 of the Five Steps to Clinical Competency. The **clinical instructor** for the site or a Jefferson College Radiologic Technology faculty member must evaluate or over sign step 5. It is each student's responsibility to know who the clinical instructor(s) is/are at each clinical site.

Semester	Mandatory	Elective	Total
1st Semester (Spring)	5	0	5
2nd Semester (1st month summer)	7	1	8
3rd Semester (2nd month Summer)	7	1	8
4th Semester (Fall)	8	6	14
5th Semester (Spring)	5	8	13
Totals	32	16	48

As this course is a portion of the Five Steps to Clinical Competency, a minimum mastery of 85% is required to successfully complete the course. All competency exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. Until course requirements are met the final grade will be an incomplete.

Clinical grades will be based on a percentage of total possible points. Clinical grades will be based on a weighted scale listed below:

- Rotation evaluations twenty percent 20%
- Critical thinking assignments ten percent 10%
- Clinical coordinator semester evaluation thirty percent 30%
- Clinical competencies forty percent 40%

TOTAL 100%

- Each clinical absence/tardy will reduce grade by 1%

Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days.

Example # 1	Pts received	Pts possible	% on assignment	Portion of grade		
End of month evaluations	375	400	93.75%	20%	18.75 %	(93.75% x 20%)
Critical thinking assignments	191	200	95.50%	10%	9.55%	(95.5% x 10%)
Clinical Coordinator semester evaluation	91	100	91.00%	30%	27.30 %	(91.0% x 30%)
Clinical Competencies	988	1000	98.80%	40%	39.52 %	(98.8% x 40%)
Absent 2.5 hours (-1%)					95.12 % -1.00%	

					94.12	B

Example # 2

End of month evaluations	350	400	87.50%	20%	17.50 %	(87.5% x 20%)
Critical thinking assignments	162	200	81.00%	10%	8.10%	(81% x 10%)
Clinical Coordinator semester evaluation	85	100	85.00%	30%	25.5%	(85% x 30%)
Clinical Competencies	987	1000	98.70%	40%	39.48 %	(98.7% x 40%)
Absent four days (-4%)					90.58 % -4.00%	
					86.58	C

Example # 3

End of month evaluations	393	400	98.25%	20%	19.65 %	(98.25% x 20%)
Critical thinking assignments	159	200	79.50%	10%	7.95%	(79.5% x 10%)
Clinical Coordinator semester evaluation	96	100	96.00%	30%	28.8%	(96.0% x 30%)
Clinical Competencies	985	1000	98.50%	40%	39.4%	(98.5% x 40%)
Absent No days (+1/2%)					95.8% +.5%	
					96.3%	A

All of the above examples use the same amount of points to make them easier to understand. Each semester will have a different total number for competencies and end of month evaluations depending on the number of months in the semester.

EXAMS – Exams will be given on the dates given in this syllabus. If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence.

GRADES – Grades in this course are based on the Jefferson College Radiologic Technology Program's grading scale.

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Clinical Practicum III

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Clinical Practicum III

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV

B. Credit hour award: 3

C. Description: This clinical practicum is the third course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (Su)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the technological factors affecting radiographic image quality and patient assessment skills	Competency Check off
Demonstrate the principles of radiation safety and protection practices utilized in radiographic procedures	Competency Check off
Manipulate/demonstrate the effective operation of x-ray equipment for radiologic examinations	Competency Check off Clinical Instructor (CI) monthly evaluation Clinical Coordinator (CC) end of semester evaluation
Demonstrate student initiative in regards to personal effort, use of time, interest in clinical education, judgment, quantity of work and radiographic quality	CI monthly evaluation CC end of semester evaluation

Demonstrate medical knowledge in regards to basic & clinical science, interest in learning and positioning skills	Competency Check off CI monthly evaluation CC end of semester evaluation Written exam
Demonstrate interpersonal & communication skills in regards to interaction with others, and self-image	CI monthly evaluation CC end of semester evaluation
Demonstrate patient care in regards to tact & courtesy, communication, and concern and interactions	CI monthly evaluation CC end of semester evaluation
Demonstrate professionalism in regards to listening skills, attendance, appearance, attitude & cooperation, reaction to criticism and use & care of equipment	CI monthly evaluation CC end of semester evaluation
Demonstrate critical thinking skills	Written assignment Competency Check off CI monthly evaluation CC end of semester evaluation

III. OUTLINE OF TOPICS/ COMPETENCIES: *By completion of the fifth clinical practicum, all radiology students will have completed all competency requirements as defined by the American Registry of Radiologic Technologists (ARRT).*

A. Chest Routine
   a. Chest AP (Wheelchair or Stretcher)
   b. Ribs
   c. Chest Lateral Decubitus
   d. Sternum
   e. Upper Airway (Soft-Tissue Neck)

B. Upper Extremity
   a. Thumb or Finger
   b. Hand
   c. Wrist
   d. Forearm
   e. Elbow
   f. Humerus
   g. Shoulder
   h. Trauma: Shoulder (Scapular Y, Transthoracic or Axillary)*
   i. Clavicle
   j. Scapula
   k. Acromio-Clavicular (AC) Joints
   l. Trauma: Upper Extremity (Nonshoulder)*

C. Lower Extremity
   a. Toes

b. Foot
c. Ankle
d. Knee
e. Tibia-Fibula
f. Femur
g. Trauma: Lower Extremity*
h. Patella
i. Calcaneus (Os Calcis)

D. Head – Candidates must select at least one elective procedure from this section.
    a. Skull
    b. Paranasal Sinuses
    c. Facial Bones
    d. Orbits
    e. Zygomatic Arches
    f. Nasal Bones
    g. Mandible
E. Spine and Pelvis
    a. Cervical Spine
    b. Trauma: Cervical Spine (Cross Table Lateral)*
    c. Thoracic Spine
    d. Lumbar Spine
    e. Pelvis
    f. Hip
    g. Cross Table Lateral Hip
    h. Sacrum and/or Coccyx
    i. Scoliosis Series
    j. Sacroiliac Joints
F. Abdomen
    a. Abdomen Supine (KUB)
    b. Abdomen Upright
    c. Abdomen Decubitus
    d. Intravenous Urography
G. Fluoroscopy Studies – Candidates must select Upper GI or Barium Enema plus one other elective procedure from this section.
    a. Upper GI Series (Single or Double Contrast)
    b. Barium Enema (Single or Double Contrast)
    c. Small Bowel Series
    d. Esophagus
    e. Cystography/Cystourethrography
    f. ERCP
    g. Myelography
    h. Arthrography
H. Surgical Studies
    a. C-Arm Procedure (Orthopedic)
    b. C-Arm Procedure (Non Orthopedic)

I. Mobile Studies
    a. Chest
    b. Abdomen
    c. Orthopedic
J. Pediatrics (age 6 or younger)
    a. Chest Routine
    b. Upper Extremity
    c. Lower Extremity
    d. Abdomen
    e. Mobile Study
K. Digital Systems
    a. Digital Radiography
    b. Digital Fluoroscopy

* Trauma is considered a serious injury or shock to the body. Modifications may include variations in positioning, minimal movement of the body part, etc.

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods which include but are not limited to student observation and performance of radiologic exams, critical thinking projects, interactive learning with clinical staff, and application of any new information taught within the classroom. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.
B. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.
C. Martensen, K. (2011). Radiographic Image Analysis "Workbook". (3rd ed.) St. Louis, MO: Elsevier Saunders.
D. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7^{th} ed). St. Louis, MO: Mosby.
E. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.
F. Jefferson College Clinical Competency Book

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Technique book, radiation badge, name tag, lead markers, pen, uniform, white lab coat, white sneakers, white socks, clinical competency book.

VII. SUPPLEMENTAL REFERENCES

A. Clinical Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

ASSIGNMENTS: For each clinical rotation, the clinical instructor and the clinical coordinator will evaluate each student on awareness of the environment, communication skills, quality assurance, quality of service, work behaviors and professional ethics. Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days. For orientation and specialty rotations, the student will complete the appropriate clinical objectives, have the objective form signed by the supervising technologist and turn it in to the clinical coordinator within 1 week of completion of the rotation. For each day the orientation or specialty objectives are late, the grade for those objectives will be reduced by 20%. If specialty objectives are over 5 days late, the student will not receive credit for that assignment. All specialty objectives must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

To complete the semester requirements, one Critical Thinking exercise will be completed each semester. For each day a Critical Thinking exercise is late, the grade for that exercise will be reduced by 20%. If the exercise is over 5 days late, the student will not receive credit for that assignment. All Critical Thinking exercises must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

Each student is required to complete a set number of competencies (listed below) during each semester. Until course requirements are met the final grade will be an incomplete. Failure to complete the minimum number of competencies two consecutive semesters may be grounds for dismissal from the program. Students completing all competencies for the current semester may begin work on competencies for the following semester. **Any registered**

technologist may evaluate step 4 or 5 of the Five Steps to Clinical Competency. The **clinical instructor** for the site or a Jefferson College Radiologic Technology faculty member must evaluate or over sign step 5. It is each student's responsibility to know who the clinical instructor(s) is/are at each clinical site.

Semester	Mandatory	Elective	Total
1st Semester (Spring)	5	0	5
2nd Semester (1st month summer)	7	1	8
3rd Semester (2nd month Summer)	7	1	8
4th Semester (Fall)	8	6	14
5th Semester (Spring)	5	8	13
Totals	32	16	48

As this course is a portion of the Five Steps to Clinical Competency, a minimum mastery of 85% is required to successfully complete the course. All competency exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. Until course requirements are met the final grade will be an incomplete.

Clinical grades will be based on a percentage of total possible points. Clinical grades will be based on a weighted scale listed below:

- Rotation evaluations twenty percent 20%
- Critical thinking assignments ten percent 10%
- Clinical coordinator semester evaluation thirty percent 30%
- Clinical competencies forty percent 40%

TOTAL 100%

- Each clinical absence/tardy will reduce grade by 1%

Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days.

Example # 1	Pts received	Pts possible	% on assignment	Portion of grade		
End of month evaluations	375	400	93.75%	20%	18.75 %	(93.75% x 20%)
Critical thinking assignments	191	200	95.50%	10%	9.55%	(95.5% x 10%)
Clinical Coordinator semester evaluation	91	100	91.00%	30%	27.30 %	(91.0% x 30%)
Clinical Competencies	988	1000	98.80%	40%	39.52 %	(98.8% x 40%)
Absent 2.5 hours (-1%)					95.12 % -1.00%	

					94.12	B

Example # 2

End of month evaluations	350	400	87.50%	20%	17.50 %	(87.5% x 20%)
Critical thinking assignments	162	200	81.00%	10%	8.10%	(81% x 10%)
Clinical Coordinator semester evaluation	85	100	85.00%	30%	25.5%	(85% x 30%)
Clinical Competencies	987	1000	98.70%	40%	39.48 %	(98.7% x 40%)
Absent four days (-4%)					90.58 % -4.00%	
					86.58	C

Example # 3

End of month evaluations	393	400	98.25%	20%	19.65 %	(98.25% x 20%)
Critical thinking assignments	159	200	79.50%	10%	7.95%	(79.5% x 10%)
Clinical Coordinator semester evaluation	96	100	96.00%	30%	28.8%	(96.0% x 30%)
Clinical Competencies	985	1000	98.50%	40%	39.4%	(98.5% x 40%)
Absent No days (+1/2%)					95.8% +.5%	
					96.3%	A

All of the above examples use the same amount of points to make them easier to understand. Each semester will have a different total number for competencies and end of month evaluations depending on the number of months in the semester.

EXAMS – Exams will be given on the dates given in this syllabus. If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence.

GRADES – Grades in this course are based on the Jefferson College Radiologic Technology Program's grading scale.

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Clinical Practicum IV

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Clinical Practicum IV

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV

B. Credit hour award: 3

C. Description: This clinical practicum is the fourth course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the technological factors affecting radiographic image quality and patient assessment skills	Competency Check off
Demonstrate the principles of radiation safety and protection practices utilized in radiographic procedures	Competency Check off
Manipulate/demonstrate the effective operation of x-ray equipment for radiologic examinations	Competency Check off CI monthly evaluation CC end of semester evaluation
Demonstrate student initiative in regards to personal effort, use of time, interest in clinical education, judgment, quantity of work and radiographic quality	CI monthly evaluation CC end of semester evaluation
Demonstrate medical knowledge in regards to basic & clinical science,	Competency Check off CI monthly evaluation

interest in learning and positioning skills	CC end of semester evaluation
Demonstrate interpersonal & communication skills in regards to interaction with others, and self-image	CI monthly evaluation CC end of semester evaluation
Demonstrate patient care in regards to tact & courtesy, communication, and concern and interactions	CI monthly evaluation CC end of semester evaluation
Demonstrate professionalism in regards to listening skills, attendance, appearance, attitude & cooperation, reaction to criticism and use & care of equipment	CI monthly evaluation CC end of semester evaluation
Demonstrate critical thinking skills	Written assignment Competency Check off CI monthly evaluation CC end of semester evaluation

III. OUTLINE OF TOPICS/ COMPETENCIES: *By completion of the fifth clinical practicum, all radiology students will have completed all competency requirements as defined by the American Registry of Radiologic Technologists (ARRT).*

A. Chest Routine
   1. Chest AP (Wheelchair or Stretcher)
   2. Ribs
   3. Chest Lateral Decubitus
   4. Sternum
   5. Upper Airway (Soft-Tissue Neck)

B. Upper Extremity
   1. Thumb or Finger
   2. Hand
   3. Wrist
   4. Forearm
   5. Elbow
   6. Humerus
   7. Shoulder
   8. Trauma: Shoulder (Scapular Y, Transthoracic or Axillary)*
   9. Clavicle
   10. Scapula
   11. AC Joints
   12. Trauma: Upper Extremity (Nonshoulder)*

C. Lower Extremity
   1. Toes
   2. Foot
   3. Ankle

4. Knee
5. Tibia-Fibula
6. Femur
7. Trauma: Lower Extremity*
8. Patella
9. Calcaneus (Os Calcis)

D. Head – Candidates must select at least one elective procedure from this section.
    1. Skull
    2. Paranasal Sinuses
    3. Facial Bones
    4. Orbits
    5. Zygomatic Arches
    6. Nasal Bones
    7. Mandible

E. Spine and Pelvis
    1. Cervical Spine
    2. Trauma: Cervical Spine (Cross Table Lateral)*
    3. Thoracic Spine
    4. Lumbar Spine
    5. Pelvis
    6. Hip
    7. Cross Table Lateral Hip
    8. Sacrum and/or Coccyx
    9. Scoliosis Series
    10. Sacroiliac Joints

F. Abdomen
    1. Abdomen Supine (KUB)
    2. Abdomen Upright
    3. Abdomen Decubitus
    4. Intravenous Urography

G. Fluoroscopy Studies – Candidates must select Upper GI or Barium Enema plus one other elective procedure from this section.
    1. Upper GI Series (Single or Double Contrast)
    2. Barium Enema (Single or Double Contrast)
    3. Small Bowel Series
    4. Esophagus
    5. Cystography/Cystourethrography
    6. ERCP
    7. Myelography
    8. Arthrography

H. Surgical Studies
    1. C-Arm Procedure (Orthopedic)
    2. C-Arm Procedure (Non Orthopedic)

I. Mobile Studies
    1. Chest

2. Abdomen
3. Orthopedic

J. Pediatrics (age 6 or younger)
1. Chest Routine
2. Upper Extremity
3. Lower Extremity
4. Abdomen
5. Mobile Study

K. Digital Systems
1. Digital Radiography
2. Digital Fluoroscopy

* Trauma is considered a serious injury or shock to the body. Modifications may include variations in positioning, minimal movement of the body part, etc.

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods which include but are not limited to student observation and performance of radiologic exams, critical thinking projects, interactive learning with clinical staff, and application of any new information taught within the classroom. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.

B. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.

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D. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7^{th} ed). St. Louis, MO: Mosby.

E. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.

F. Jefferson College Clinical Competency Book

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)

B. Course homepage available through Blackboard
C. Technique book, radiation badge, name tag, lead markers, pen, uniform, white lab coat, white sneakers, white socks, clinical competency book.

VII. SUPPLEMENTAL REFERENCES

A. Clinical Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

ASSIGNMENTS: For each clinical rotation, the clinical instructor and the clinical coordinator will evaluate each student on awareness of the environment, communication skills, quality assurance, quality of service, work behaviors and professional ethics. Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days. For orientation and specialty rotations, the student will complete the appropriate clinical objectives, have the objective form signed by the supervising technologist and turn it in to the clinical coordinator within 1 week of completion of the rotation. For each day the orientation or specialty objectives are late, the grade for those objectives will be reduced by 20%. If specialty objectives are over 5 days late, the student will not receive credit for that assignment. All specialty objectives must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

To complete the semester requirements, one Critical Thinking exercise will be completed each semester. For each day a Critical Thinking exercise is late, the grade for that exercise will be reduced by 20%. If the exercise is over 5 days late, the student will not receive credit for that assignment. All Critical Thinking exercises must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

Each student is required to complete a set number of competencies (listed below) during each semester. Until course requirements are met the final grade will be an incomplete. Failure to complete the minimum number of competencies two consecutive semesters may be grounds for dismissal from the program. Students completing all competencies for the current semester may begin work on competencies for the following semester. **Any registered technologist** may evaluate step 4 or 5 of the Five Steps to Clinical Competency. The **clinical instructor** for the site or a Jefferson College

Radiologic Technology faculty member must evaluate or over sign step 5. It is each student's responsibility to know who the clinical instructor(s) is/are at each clinical site.

Semester	Mandatory	Elective	Total
1st Semester (Spring)	5	0	5
2nd Semester (1st month summer)	7	1	8
3rd Semester (2nd month Summer)	7	1	8
4th Semester (Fall)	8	6	14
5th Semester (Spring)	5	8	13
Totals	32	16	48

As this course is a portion of the Five Steps to Clinical Competency, a minimum mastery of 85% is required to successfully complete the course. All competency exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. Until course requirements are met the final grade will be an incomplete.

Clinical grades will be based on a percentage of total possible points.
Clinical grades will be based on a weighted scale listed below:

- Rotation evaluations twenty percent 20%
- Critical thinking assignments ten percent 10%
- Clinical coordinator semester evaluation thirty percent 30%
- Clinical competencies forty percent 40%

TOTAL 100%

- Each clinical absence/tardy will reduce grade by 1%

Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days.

Example # 1	Pts received	Pts possible	% on assignment	Portion of grade		
End of month evaluations	375	400	93.75%	20%	18.75 %	(93.75% x 20%)
Critical thinking assignments	191	200	95.50%	10%	9.55%	(95.5% x 10%)
Clinical Coordinator semester evaluation	91	100	91.00%	30%	27.30 %	(91.0% x 30%)
Clinical Competencies	988	1000	98.80%	40%	39.52 %	(98.8% x 40%)
Absent 2.5 hours (-1%)					95.12 % -1.00%	
					94.12	B

Example # 2

End of month evaluations	350	400	87.50%	20%	17.50 %	(87.5% x 20%)
Critical thinking assignments	162	200	81.00%	10%	8.10%	(81% x 10%)
Clinical Coordinator semester evaluation	85	100	85.00%	30%	25.5%	(85% x 30%)
Clinical Competencies	987	1000	98.70%	40%	39.48 %	(98.7% x 40%)
Absent four days (-4%)					90.58 % -4.00%	
					86.58	C

Example # 3

End of month evaluations	393	400	98.25%	20%	19.65 %	(98.25% x 20%)
Critical thinking assignments	159	200	79.50%	10%	7.95%	(79.5% x 10%)
Clinical Coordinator semester evaluation	96	100	96.00%	30%	28.8%	(96.0% x 30%)
Clinical Competencies	985	1000	98.50%	40%	39.4%	(98.5% x 40%)
Absent No days (+1/2%)					95.8% +.5%	
					96.3%	A

All of the above examples use the same amount of points to make them easier to understand. Each semester will have a different total number for competencies and end of month evaluations depending on the number of months in the semester.

EXAMS – Exams will be given on the dates given in this syllabus. If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence.

GRADES – Grades in this course are based on the Jefferson College Radiologic Technology Program's grading scale.

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Clinical Practicum V

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Clinical Practicum V

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency, RADXXX Radiographic Positioning I, RADXXX Radiographic Positioning II, RADXXX Radiographic Positioning III, RADXXX Radiographic Positioning IV

B. Credit hour award: 3

C. Description: This clinical practicum is the fifth course in a series of five clinical education courses designed for development, application, analysis, integration, synthesis and evaluation of clinical competencies that have been taught previously in positioning courses. Supervised clinical rotations will be performed in basic and advanced areas of radiologic technology at assigned clinical sites. Radiology students will complete between 1200 and 1300 clinical contact hours over the course of the program to ensure clinical competence. The clinical credit hours have been equally assigned to the five program clinical courses. Over the life of the program, this equates to approximately 80 contact hours per one college credit hour. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the technological factors affecting radiographic image quality and patient assessment skills	Competency Check off
Demonstrate the principles of radiation safety and protection practices utilized in radiographic procedures	Competency Check off
Manipulate/demonstrate the effective operation of x-ray equipment for radiologic examinations	Competency Check off CI monthly evaluation CC end of semester evaluation
Demonstrate student initiative in regards to personal effort, use of time, interest in clinical education, judgment, quantity of work and radiographic quality	CI monthly evaluation CC end of semester evaluation
Demonstrate medical knowledge in regards to basic & clinical science,	Competency Check off CI monthly evaluation

interest in learning and positioning skills	CC end of semester evaluation
Demonstrate interpersonal & communication skills in regards to interaction with others, and self-image	CI monthly evaluation CC end of semester evaluation
Demonstrate patient care in regards to tact & courtesy, communication, and concern and interactions	CI monthly evaluation CC end of semester evaluation
Demonstrate professionalism in regards to listening skills, attendance, appearance, attitude & cooperation, reaction to criticism and use & care of equipment	CI monthly evaluation CC end of semester evaluation
Demonstrate critical thinking skills	Written assignment Competency Check off CI monthly evaluation CC end of semester evaluation

III. OUTLINE OF TOPICS/ COMPETENCIES: *By completion of the fifth clinical practicum, all radiology students will have completed all competency requirements as defined by the American Registry of Radiologic Technologists (ARRT).*

A. Chest Routine
   a. Chest AP (Wheelchair or Stretcher)
   b. Ribs
   c. Chest Lateral Decubitus
   d. Sternum
   e. Upper Airway (Soft-Tissue Neck)

B. Upper Extremity
   a. Thumb or Finger
   b. Hand
   c. Wrist
   d. Forearm
   e. Elbow
   f. Humerus
   g. Shoulder
   h. Trauma: Shoulder (Scapular Y, Transthoracic or Axillary)*
   i. Clavicle
   j. Scapula
   k. AC Joints
   l. Trauma: Upper Extremity (Nonshoulder)*

C. Lower Extremity
   a. Toes
   b. Foot
   c. Ankle

    d. Knee
    e. Tibia-Fibula
    f. Femur
    g. Trauma: Lower Extremity*
    h. Patella
    i. Calcaneus (Os Calcis)

D. Head – Candidates must select at least one elective procedure from this section.
    a. Skull
    b. Paranasal Sinuses
    c. Facial Bones
    d. Orbits
    e. Zygomatic Arches
    f. Nasal Bones
    g. Mandible

E. Spine and Pelvis
    a. Cervical Spine
    b. Trauma: Cervical Spine (Cross Table Lateral)*
    c. Thoracic Spine
    d. Lumbar Spine
    e. Pelvis
    f. Hip
    g. Cross Table Lateral Hip
    h. Sacrum and/or Coccyx
    i. Scoliosis Series
    j. Sacroiliac Joints

F. Abdomen
    a. Abdomen Supine (KUB)
    b. Abdomen Upright
    c. Abdomen Decubitus
    d. Intravenous Urography

G. Fluoroscopy Studies – Candidates must select Upper GI or Barium Enema plus one other elective procedure from this section.
    a. Upper GI Series (Single or Double Contrast)
    b. Barium Enema (Single or Double Contrast)
    c. Small Bowel Series
    d. Esophagus
    e. Cystography/Cystourethrography
    f. ERCP
    g. Myelography
    h. Arthrography

H. Surgical Studies
    a. C-Arm Procedure (Orthopedic)
    b. C-Arm Procedure (Non Orthopedic)

I. Mobile Studies
    a. Chest

b. Abdomen
c. Orthopedic

J. Pediatrics (age 6 or younger)
   a. Chest Routine
   b. Upper Extremity
   c. Lower Extremity
   d. Abdomen
   e. Mobile Study

K. Digital Systems
   a. Digital Radiography
   b. Digital Fluoroscopy

* Trauma is considered a serious injury or shock to the body. Modifications may include variations in positioning, minimal movement of the body part, etc.

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods which include but are not limited to student observation and performance of radiologic exams, critical thinking projects, interactive learning with clinical staff, and application of any new information taught within the classroom. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

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F. Jefferson College Clinical Competency Book

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B. Course homepage available through Blackboard
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VII. SUPPLEMENTAL REFERENCES

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B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
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VIII. METHOD OF EVALUATION (basis for determining course grade)

ASSIGNMENTS: For each clinical rotation, the clinical instructor and the clinical coordinator will evaluate each student on awareness of the environment, communication skills, quality assurance, quality of service, work behaviors and professional ethics. Failure to turn in monthly evaluations will result in a 5% reduction in grade for each day late and a zero for that month if late more than three days. For orientation and specialty rotations, the student will complete the appropriate clinical objectives, have the objective form signed by the supervising technologist and turn it in to the clinical coordinator within 1 week of completion of the rotation. For each day the orientation or specialty objectives are late, the grade for those objectives will be reduced by 20%. If specialty objectives are over 5 days late, the student will not receive credit for that assignment. All specialty objectives must be completed in order to complete course requirements. Until course requirements are met the final grade will be an incomplete.

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Absent 2.5 hours (-1%)					95.12 % -1.00%	
					94.12	B

Example # 2

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Absent four days (-4%)					90.58 % -4.00%	
					86.58	C

Example # 3

End of month evaluations	393	400	98.25%	20%	19.65 %	(98.25% x 20%)
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Absent No days (+1/2%)					95.8% +.5%	
					96.3%	A

All of the above examples use the same amount of points to make them easier to understand. Each semester will have a different total number for competencies and end of month evaluations depending on the number of months in the semester.

EXAMS – Exams will be given on the dates given in this syllabus. If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence.

GRADES – Grades in this course are based on the Jefferson College Radiologic Technology Program's grading scale.

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Cross-Sectional Anatomy

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Cross-Sectional Anatomy

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course will introduce application techniques, image formation, computer anatomy and picture archiving of digital imaging. Processing and computer tomography concepts are presented. Fundamental study of the human anatomy including bones, organs, vessels and tissues in cross-section will be conducted. Specific procedures imaged for the head, brain, neck, thorax, abdomen and pelvis will be addressed. A general review of scanning protocol, patient preparation and evaluation of radiographic image quality will be discussed. Knowledge of cross-sectional anatomy will lead to a greater understanding of modalities such as CT, MRI and Ultrasound. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Compare anatomy, in cross-section, from text and CT images	Written Assignments Class Discussion/Activity Written Examinations Oral Presentations
Assess patient preparation and protocols for CT imaging	Class Discussion/Activity Written Examinations Written Assignments
Evaluate radiographic image quality and relevant pathology	Class Discussion/Activity Written Examinations Written Assignments Oral Presentations

III. OUTLINE OF TOPICS

A. Introduction to Sectional Anatomy
   1. Define Anatomy, Cross-Sectional Anatomy and Relationship Anatomy
   2. Review associated Terminology
   3. Review Planes of the Body
   4. Discuss different modalities and applications
   5. Identify Value for the Technologist
   6. Application Techniques

7. Image Formation
8. Computer Anatomy
9. PACS Processing
10. Computer Tomography Concepts

B. Cranium and Facial Bones
    1. Anatomy
        i. Occipital Bone
        ii. Temporal Bone
        iii. Facial Bone
        iv. Sinuses
        v. Orbit
        vi. Muscles
    2. Cross-Sectional Anatomy and Protocols
    3. Pathology

C. Brain
    1. Anatomy
        i. Meninges
        ii. Ventricular System
        iii. Vascular System
        iv. Cranial Nerves
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology

D. Spine
    1. Anatomy
        i. Vertebral
        ii. Spinal Cord
        iii. Plexuses
        iv. Cranial Nerves
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology

E. Neck
    1. Anatomy
        i. Organs
        ii. Muscles
        iii. Vascular Structures
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology

F. Thorax
    1. Anatomy
        i. Lungs
        ii. Bronchi
        iii. Mediastinum
        iv. Azygos Venous System
        v. Breast
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology

G. Abdomen
    1. Anatomy
        i. Peritoneal Space
        ii. Retroperitoneal Space
        iii. Liver
        iv. Portal System
        v. Billiay System
        vi. Spleen
        vii. Adrenals
        viii. Pancreas
        ix. Kidneys
        x. Intestines
        xi. Vasculature
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology
H. Pelvis
    1. Anatomy
        i. Pelvic Bone
        ii. Pelvic Muscles
        iii. Pelvic Viscera
        iv. Pelvic Vasculature
        v. Lymph Nodes
    2. Cross-Sectional Anatomy and Protocols and Patient Prep.
    3. Pathology
I. Comprehensive Film Review

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Applegate, E. (2010). The Sectional Anatomy Learning System: Concepts and Applications, (3rd ed). St. Louis, MO: Saunders.
B. Seeram, E. (2001). Computed Tomography: Physical Principles, Clinical Applications, & Quality Control. (2^{nd} ed.). Philadelphia, PA: Saunders.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)

B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Image Evaluation I

1 Credit Hour

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Image Evaluation I

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 1

C. Description: This course shall provide the student with the knowledge and skills necessary to perform radiologic procedures for the chest, abdomen and extremity studies. An introduction to chest, abdomen, upper extremity, lower extremity, hip & pelvis and relevant mobile/trauma procedures for adult and pediatric patients is reinforced. Utilization of anatomical landmarks, body planes and line, and film size are reinforced. The student will practice radiation protection standards and evaluate radiographic image quality in simulated clinical conditions. Students will use their knowledge of anatomy, positioning and exposure factors to critique radiographs and determine if radiographs are of proper diagnostic quality. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate radiographic image quality and relevant pathology	Class Discussion/Activity Written Examinations Written Assignments Oral presentation
Manipulate equipment apparatus for clinical procedures and patient types	Class Discussion/Activity Written Examinations Written Assignments Oral presentation
Demonstrate application skills involved in radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Oral presentation

III. OUTLINE OF TOPICS

A. Guidelines for Image Analysis
    1. Terminology
    2. Displaying images
        i. Antero-Posterior (AP) and Postero-Anterior (PA)
            1. Projections and Oblique Positions of the Torso, Vertebrae and cranium

2. Lateral Positions of the Torso, Vertebrae and Cranium
3. Extremities

3. Image Analysis Form
   i. Marking
   ii. Required anatomy
   iii. Relationship between anatomical structures
   iv. Maximum collimation
   v. Radiation Protection
   vi. Bony cortical Outlines
   vii. Unwanted distortion
   viii. Correct film orientation
   ix. Density & Penetration
   x. Contrast
   xi. Artifacts
   xii. Anatomical Centering
   xiii. Pt. positioning, CR placement, angulations
   xiv. Acceptable / Unacceptable

B. Chest Film Evaluation
   1. Postero-Anterior (PA) Projection
      i. Positioning Considerations
         1. Patient Position
         2. Part Placement
         3. Film Selection/Placement
         4. Beam Limitation/Shielding
         5. Beam Alignment/Angulations
         6. Patient Instructions
         7. Special Considerations

      ii. Radiographic Critique Considerations
         1. Contrast Density
         2. Recorded Detail
         3. Distortion
         4. Shielding and Proper ID of Patient
   2. Lateral Film Evaluation
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   3. Lateral Decubitus Projection
      i. Positioning Considerations
      ii. Radiographic Critique Considerations

C. Abdomen Film Evaluation
   1. Supine Abdomen/Kidney, Ureters, Bladder (KUB) projection
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   2. Upright Abdomen/KUB Projection
      i. Positioning Considerations
      ii. Radiographic Critique Considerations

3. Decubitus Abdomen Projection
    i. Positioning Considerations
    ii. Radiographic Critique Considerations

D. Mobile Chest and Abdomen Film Evaluation
1. Mobile Units
    i. General Electric
    ii. Siemens
    iii. Battery Powered Units
    iv. Capacitor Discharged Units
2. Technical Considerations
    i. Cassettes
        1. Film-Screen Cassettes
        2. Digital Cassettes
    ii. Film
    iii. Grids
3. Patient Care Management
4. Mobile Chest/Abdomen Exams
    i. Portable AP Upright Chest
        1. Positioning Considerations
        2. Radiographic Critique Considerations
    ii. Portable Lateral Chest
        1. Positioning Considerations
        2. Radiographic Critique Considerations
    iii. Portable Decubitus Chest
        1. Positioning Considerations
        2. Radiographic Critique Considerations
    iv. Portable Abdomen
        1. Positioning Considerations
        2. Radiographic Critique Considerations
    v. Portable Decubitus Abdomen
        1. Positioning Considerations
        2. Radiographic Critique Considerations

E. Upper Extremity Film Evaluation
1. Fingers (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
2. Hand (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
3. Wrist (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
4. Forearm (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations

5. Elbow (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
6. Humerus (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
7. Shoulder Girdle (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
8. Clavicle (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
9. Scapula (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
10. AC Joints (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations

F. Lower Extremity Film Evaluation
1. Toes (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
2. Foot (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
3. Ankle (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
4. Calcaneous (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
5. Tibia-Fibula (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
6. Knee (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
7. Femur (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
8. Hip (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations
9. Pelvis (All Projections)
    i. Positioning Considerations
    ii. Radiographic Critique Considerations

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.
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C. Martensen, K. (2011). Radiographic Image Analysis "Workbook". (3rd ed.) St. Louis, MO: Elsevier Saunders.
D. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7^{th} ed). St. Louis, MO: Mosby.
E. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers and highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
    1. Textbooks
    2. Periodicals
    3. Films On Demand Videos
C. Internet Resources
    1. On-line references
    2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, oral presentations and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

EXAMS & PRESENTATIONS – Exams will be given on the dates published in the class schedule. Student presentations will be performed on dates published in syllabus. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam/presentation is not taken/performed at the scheduled time and arrangements for a make-up exam/presentation have not been made prior to the designated exam/presentation time, the grade for that exam/presentation will be zero. **No make-up exam/presentation will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take/perform the exam/presentation at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and

assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 10%
C. Homework: 5%
D. Written and Oral Communication Assignments: 70%
E. Attendance/Participation: 10%
F. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Image Evaluation II

1 Credit Hour

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Image Evaluation II

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 1

C. Description: This course shall provide the student with the knowledge and skills necessary to perform radiologic procedures for the thorax and spine as well as contrast studies. An introduction to thorax, spine, contrast studies, relevant mobile / trauma procedures for adult and pediatric patients are reinforced. Utilization of anatomical landmarks, body planes and line, and film size are reinforced. The student will practice radiation protection standards and evaluate radiographic image quality in simulated clinical conditions. Students will use their knowledge of anatomy, positioning and exposure factors to critique radiographs and determine if radiographs are of proper diagnostic quality. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate radiographic image quality and relevant pathology	Class Discussion/Activity Written Examinations Written Assignments Oral presentation
Manipulate equipment apparatus for clinical procedures and patient types	Class Discussion/Activity Written Examinations Written Assignments Oral presentation
Demonstrate application skills involved in radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Oral presentation

III. OUTLINE OF TOPICS

A. Vertebral Column
    1. Cervical (All Projections)
        i. Positioning Considerations
            1. Patient Position
            2. Part Placement
            3. Film Selection/Placement
            4. Beam Limitation/Shielding

5. Beam Alignment/Angulations
6. Patient Instructions
7. Special Considerations

ii. Radiographic Critique Considerations

1. Contrast Density
2. Recorded Detail
3. Distortion
4. Shielding and Proper ID of Patient

2. Thoracic (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
3. Lumbar (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
4. SI Joints (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
5. Sacrum/Coccyx (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
6. Scoliosis (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
7. Sternum (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
8. SC Joints (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations
9. Ribs (All Projections)
   i. Positioning Considerations
   ii. Radiographic Critique Considerations

B. Gastrointestinal Tract Film Evaluation
   1. Esophagus (Barium Swallow (BAS))
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   2. UGI
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   3. SMB
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   4. Single contrast/full Column BE
      i. Positioning Considerations
      ii. Radiographic Critique Considerations
   5. Double Contrast/Air Contrast BE

i. Positioning Considerations
ii. Radiographic Critique Considerations

C. Genitourinary Film Evaluation
1. IVU
i. Positioning Considerations
ii. Radiographic Critique Considerations
2. Cystography/Cystogram
i. Positioning Considerations
ii. Radiographic Critique Considerations
3. Retrograde Urography (RUG)
i. Positioning Considerations
ii. Radiographic Critique Considerations
4. Hysterosalpingography (HSG)
i. Positioning Considerations
ii. Radiographic Critique Considerations

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

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E. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6^{th} ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)

B. Course homepage available through Blackboard

C. Binder, paper, pens, pencils with erasers and highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, oral presentations and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

EXAMS & PRESENTATIONS – Exams will be given on the dates published in the class schedule. Student presentations will be performed on dates published in syllabus. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

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QUIZZES – will be given on the dates published in the class schedule. If a quiz

is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 10%
C. Homework: 5%
D. Written and Oral Communication Assignments: 70%
E. Attendance/Participation: 10%
F. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Image Intensification & Equipment

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Image Intensification & Equipment

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course provides the student with the knowledge of x-ray equipment routinely utilized to produce diagnostic images. An overview of various recording media and image intensification units used in radiology will be discussed. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Evaluate the components and function of an image intensification unit	Written Assignments Class Discussion/Activity Written Examinations
Compare the use of video recorders, film cameras and automatic film changers	Class Discussion/Activity Written Examinations Written Assignments
Appraise the design specifications for installation of radiographic equipment	Class Discussion/Activity Written Examinations Written Assignments
Apply radiation protection standards to instillation of radiographic equipment	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Image Intensified Fluoroscopy
   1. Definition – Image Intensified Fluoroscopy vs. Conventional (obsolete) Non-Intensified Fluoroscopy
   2. History
      i. Thomas Edison
      ii. Edward Chamberlain
         1. Review of anatomy and physiology of human eye
   3. Components of Image Intensification Tube
      i. Input Phosphor
      ii. Photocathode
      iii. Output Phosphor
      iv. Electrostatic Focusing Lens

4. Brightness Gain
    i. Flux Gain
    ii. Minification Gain
    iii. Conversion Factor
5. Multifield Image Intensification
    i. Dual Field, Trifield tubes
    ii. Magnification Factor
    iii. Patient Dose
    iv. Contrast Resolution
    v. Spatial Resolution

B. Image Intensified Fluoroscopy, (cont.)
1. Television Camera Tube
    i. Vidicon or Plumbicon
    ii. Electron Gun
    iii. Electrosatic Grids
    iv. Target Assembly
        1. Face Plate or Window
        2. Signal Plate
        3. Target Plate
    v. Coupling
        1. Fiber Optic
        2. Lens Coupling
2. Television Picture
    i. Cathode Ray Tube Design
    ii. Modulation
    iii. Raster Pattern
    iv. Field Interlace – Frame
    v. Vertical Resolution
    vi. Horizontal Resolution – Bandwidth, Bandpass
3. Image Qualities
    i. Brightness
        1. Automatic Brightness Control
        2. Automatic Gain Control
        3. Contrast
        4. Noise
        5. Lag
        6. Resolution
        7. Vignetting
        8. Magnification – Electronics vs. Large OID

C. Image Intensified Fluoroscopy, (cont.)
1. Recording the Image
    i. Radiographic Cassette
    ii. Photospot Camera
    iii. Cine
    iv. Video recording
    v. DF

2. Radiation Safety
    i. Fluoro Exposure Time
    ii. Dose Rate – Tube mA
    iii. Exposure Switch
    iv. Collimation
    v. Filtration
    vi. Minimum Source-to-skin Distance
    vii. Shielding – Primary Barrier, Curtain, Gloves, Aprons

D. Radiographic Equipment Installation
1. Radiographic Tube Construction
    i. Cathode Assembly
    ii. Anode
    iii. Envelope
    iv. Housing
2. Factors Governing Tube Life
    i. Filament Factors
    ii. Anode Factors
    iii. Tube Charts
        1. Tube Rating Charts
        2. Cooling Curves
        3. Heat Units
3. Operators Console
    i. Autotransformer
    ii. kVp and mAs Adjustments
    iii. Exposure Timers
    iv. Automatic Exposure Control
4. Three Phase Generators
5. High Frequency Generators
6. Mobile X-ray Equipment
    i. Battery Powered
    ii. Capacitor Discharged Units
        1. Wave-Tail Cutoff
        2. Grid Controlled Triodes
    iii. AC Powered

E. Digital Imaging and PACS
1. Analog vs. Digital Imaging
    i. Analog vs. Digital
    ii. Digital Fluoroscopy
    iii. Scanned Projection Radiography
    iv. Computed Radiography
2. Image Characteristics
    i. Image Matrix
    ii. Pixel
    iii. Field of View
    iv. Gray Scale Range
    v. Window Width and Window Level

3. Digital Radiography
    i. SPR
    ii. CR
    iii. DR
    iv. DF
    v. Film Digitizers
4. PACS
    i. Display
    ii. Network
    iii. Storage

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

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B. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.
C. Selman, Joseph C. (2000). The Fundamentals of Imaging Physics and Radiobiology (9th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
    1. Textbooks
    2. Periodicals
    3. Films On Demand Videos
C. Internet Resources
    1. On-line references
    2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently

without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Introduction to Quality Assurance and Advanced Imaging Modalities

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Introduction to Quality Assurance and Advanced Imaging Modalities

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course provides the student with the principles of a Quality Management program including theory, tools, procedures and assessment of images. Quality Control measures pertaining to processors, equipment, fluoroscopy and ancillary equipment are discussed. Quality Management of digital radiographic imaging equipment is discussed. Advanced imaging modalities including computed tomography, digital radiography, ultrasound, magnetic resonance imaging, mammography, special procedures, nuclear medicine, and radiation therapy will also be discussed. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Compare and contrast Quality Improvement, Quality Assurance and Quality Control	Class Discussion/Activity Written Assignments Written Examinations
Identify Quality Control tools and testing and explain the purpose of each quality control test	Class Discussion/Activity Written Examinations Written Assignments
Discuss the instrumentation and application of special imaging modalities	Class Discussion/Activity Written Examinations Written Assignments Oral Communication Assignment

III. OUTLINE OF TOPICS

A. Quality Management (QM)
   1. Introduction to quality management
      i. Terminology
      ii. Identify need for QM
      iii. Impact of government regulations and JCAHO
      iv. Difference between Quality Assurance (QA), Quality Control (QC) and QM
      v. 5 steps of a process
   2. Quality management tools and procedures

i. Terminology
ii. Four components of a QM program
iii. 7 types of graphs
iv. Basic administrative responsibilities of a QM program
v. Components of risk management program
vi. Radiation safety protocols

3. Outcome assessment of radiographic images
   i. Terminology
   ii. Importance of repeat analysis
   iii. Determine the causal repeat rate
   iv. Determine the total repeat rate
   v. Identify artifacts
   vi. Corrective action for artifacts
   vii. Difference between accuracy, sensitivity and specificity

B. Quality Management
   1. Film darkrooms
      i. Terminology
      ii. Function and characteristics of darkroom
      iii. Proper safelight
      iv. Safelight evaluation
      v. White light leakage
      vi. Proper film and chemical storage
      vii. View box illuminator
      viii. View box QC
   2. Film processing
      i. Terminology
      ii. Differences in manual and automatic film processing
      iii. Function of developer, fixer and wash
      iv. Six main systems of automatic film processor
      v. Function of each system
   3. Processor quality control
      i. Terminology
      ii. Importance of processor QC
      iii. Main components of processor QC
      iv. QC for daylight systems
   4. Quality control of radiographic equipment
      i. Terminology
      ii. Difference between single, three-phase and high frequency generators
      iii. Recognize voltage wave form
      iv. 3 main parts of QC program for radiographic equipment
      v. List and describe the performance tests
   5. Radiographic ancillary equipment
      i. Terminology
      ii. QC testing for Automatic Exposure Control (AEC)
      iii. Grid uniformity and alignment

6. Quality control of fluoroscopic equipment
    i. Terminology
    ii. List and describe the performance tests for fluoroscopic equipment

C. Digital Radiographic Imaging Systems
1. Conversion of Analog Film Image to Digital Format
    i. Laser Scanning Digitizer
2. Computerized Radiography (CR)
    i. Advantages of Computerized Radiography versus Conventional Radiography
    ii. Disadvantages of Computerized Radiography versus Conventional Radiography
3. Digital Radiography (DR)
    i. Indirect-Conversion DR Systems
    ii. Direct-Conversion DR Systems
    iii. Comparison of CR with DR Systems
4. Quality Control of Digital Radiographic Imaging Systems
5. Digital Fluoroscopy (DF)
    i. Image Intensifier Tube DF Systems
    ii. Flat-Panel DF Systems
6. Digital Subtraction Angiography
7. Quality Control of Digital Fluoroscopy Units
8. Dry Laser Printers
9. Pressure Injectors

D. Advanced Imaging Modalities
1. Cardiac Catheterization
    i. Basic Principles
    ii. Applications
2. Computed Tomography (CT) & Tomography
    i. Basic Principles
    ii. Applications
3. Bone Densitometry
    i. Basic Principles
    ii. Applications
4. Nuclear Medicine
    i. Basic Principles
    ii. Applications
5. Positron Emission Tomography (PET)
    i. Basic Principles
    ii. Applications
6. Contrast Arthrography
    i. Basic Principles
    ii. Applications
7. Magnetic Resonance Imaging (MRI)
    i. Basic Principles
    ii. Applications
8. Mammography

i. Basic Principles
ii. Applications

9. Diagnostic Ultrasound
    i. Basic Principles
    ii. Applications
10. Radiation Oncology
    i. Basic Principles
    ii. Applications
11. Medical Dosimetry
    i. Basic Principles
    ii. Applications
12. Computed Radiography (CR) / Digital Radiography (DR)
    i. Basic Principles
    ii. Applications

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Papp, J. (2011). Quality Management in the Imaging Sciences. (4th ed.) St. Louis, MO: Mosby.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
    1. Textbooks
    2. Periodicals
    3. Films On Demand Videos
C. Internet Resources
    1. On-line references
    2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently

without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Introduction to Radiography

2 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career and Technical Education

RADxxx Introduction to Radiography

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 2

C. Description: This course shall provide the student with an overview of Radiologic Technology and its role in health care delivery. Students will be oriented to the academic and administrative structure of the program, radiographer role and responsibility, and to the profession as a whole. Basic principles of radiation safety and protective measures will be introduced including regulatory agencies. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Distinguish various accrediting and credentialing agencies used and their function	Written Assignments Class Discussion/Activity Written Examinations
Integrate historical perspectives of x-ray discovery with related customer service skills in radiography today	Class Discussion/Activity Written Examinations Written Assignments
Adjust prefixes, roots, suffixes of medical terminology used in radiology	Class Discussion/Activity Written Examinations
Create a safe environment of radiation exposure for patient, personnel, and self	Class Discussion/Activity Written Examinations Written Assignments
Define traits of becoming a better student while applying critical reading and thinking skills	Class Discussion/Activity Written Examinations Written Assignments
Discuss professional ethics and medical law	Class Discussion/Activity Written Examinations Written Assignments Oral Communication Assignment
Explain the primary professional associations associated with the radiology profession	Class Discussion/Activity Written Examinations Written Assignments
Develop an understanding of how to apply classroom knowledge in the clinical setting	Class Discussion/Activity Written Examinations Written Assignments

Discuss the radiographer's role in image production and evaluation	Written Assignments Classroom Discussion/Activity
Explain organization and operation of the radiology department	Written Assignments Written Examinations Classroom Discussion/Activity
Recognize Human and cultural diversity and what it means to the care provider	Classroom Discussion/Activity Written Assignments Written Examinations
Recognize the importance of health information management	Classroom Discussion/Activity Written Assignments Written Examinations

III. OUTLINE OF TOPICS

A. Accreditation and Credentialing
    1. Accreditation Body
        i. Definition
        ii. Purpose of agency
        iii. History
        iv. Type of program
        v. Organization process
    2. Credentialing Body
        i. Definition
        ii. Purpose of agency
        iii. Organization process
    3. Professional Organization and Development
        i. Purpose
        ii. Radiology Managers/supervisors
        iii. Educators
        iv. Radiologic technologists/radiologists
B. Role of the Radiologic Technologist/Radiographer
    1. Duties and Responsibilities
    2. Ethics and Law in the Radiologic Sciences
        i. Legal terms, principles, doctrines and law specific to the radiologic sciences
        ii. Institutional and professional liability protection typically available to the radiographer
        iii. Consent forms use relative to specific radiographic procedures
    3. Quality Customer Service
        i. Definition
        ii. Types of customer
        iii. Human and cultural diversity and what it means to the care provider.
        iv. Benefit of high quality service

v. Conflict resolution
1. Effective listening
2. Empathy

4. Importance of health information management.
5. Becoming a Better Student
i. Hierarchy of human needs
ii. Physiological needs
iii. Psychological needs
iv. Primal reaction to stress
v. Stress and Conflict
1. Definition
2. Causes
3. Managing and resolving

6. Dynamics of Learning
i. Memorization
1. Types
2. Listening/reading skill improvement
3. Retrieval process
4. Remembering/forgetting

7. Critical Thinking Skills
i. Definition
ii. Qualities of a thinker
iii. Developmental skills

8. Radiology: A Historical Perspective
i. Wilhelm Conrad Roentgen
ii. Discovery of x-rays
iii. Advancements of the Roentgen Rays

C. Practicing the Profession
1. Radiography Education – From Classroom to Clinic
i. Patient as the customer
ii. Basic Curriculum
iii. Clinical Setting/evaluation

2. Language of Medicine (abbreviations, prefixes, root, suffixes)
3. Imaging Equipment
i. X-ray tube
ii. Film-screen system
iii. Fluoroscopy
iv. Specialized imaging equipment

4. Organization and Operation of the Radiology Department
i. Policies and procedures
ii. Personal monitoring
iii. Safety standards
1. Departmental
2. Electrical
3. Infection Control
4. Quality Assurance

D. Basic Radiation Safety and Protective Measures
    1. Purpose
        i. Patient
        ii. Personnel
    2. Radiation Sources
        i. Natural background
            1. Radon
            2. Cosmic
            3. Terrestrial
            4. Internal
        ii. Man Made
            1. Medical x-rays
            2. Nuclear medicine
    3. Radiation Detection and Measurement
        i. Roentgen-Coulomb/kg
        ii. Rad-Gray
        iii. Rem-Sievert
        iv. Curie-Bacquerel
    4. Radiation Dose-Limiting Standards
        i. Dose equivalent
        ii. Absorbed dose equivalent
        iii. Qualifying Factors
    5. Principles
        i. Patient and personnel safety
            1. Pregnancy
                a. Prior to fertilization
                b. In utero
            2. Beam limiting
                a. Filtration
                b. Collimation
            3. Time
            4. Distance
            5. Shielding
                a. Lead aprons
                b. Fluoroscopy screens
        ii. Personnel monitoring
            1. Devices
            2. Reports
    6. Agencies and Regulations
        i. Nuclear Regulatory Commission (NRC)
        ii. National Council of Radiation Protection Report #91

IV. METHOD(S) OF INSTRUCTION

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are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

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B. Gurley, L. and Callaway, W. (2002). Introduction to Radiologic Technology, (5th Edition). St. Louis, MO: Mosby.

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Positioning I

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Positioning I

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course consists of lecture and practicum in routine radiographic procedures for the chest, abdomen and extremity studies using relevant structural relationships, landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine positioning and techniques of the region, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Identify the major anatomical structures and positioning terms related to the chest, abdomen, upper & lower extremities, and hip & pelvis	Written Assignments Class Discussion/Activity Written Examinations Competency Testing
Compare traditional and non-traditional projections used for chest, abdomen, upper & lower extremities, and hip & pelvis procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Determine film size, exposure factors, central ray direction and/or angulation for radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate an understanding of pre-examination patient criteria practices for chest, abdomen, upper & lower extremities, and hip & pelvis procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate radiation safety protection practices utilized in radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing

Demonstrate Knowledge of basic positioning terms, body movements and joint classifications	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Identify the anatomical structures visible on radiographs of the chest, abdomen, upper & lower extremities, and hip & pelvis	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Preliminary Steps in Radiography
   1. Ethics
      i. American Society of Radiologic Technologists (ASRT)
   2. Image Receptors (IR)
   3. Radiographic Quality Factors
      i. Density
      ii. Contrast
      iii. Recorded Detail
      iv. Distortion
   4. Image Display
   5. Basic Patient Care
   6. Care of Examination Room
   7. Infection Control
   8. Motion
      i. Involuntary
      ii. Voluntary
   9. Image Identification (ID)
   10. IR Replacement
   11. Central Ray Direction
   12. Source to Image Distance (SID)
   13. Basic Radiation Protection
   14. Introduction to Digital Imaging
      i. Computerized Radiography (CR)
      ii. Digital Radiography (DR)
   15. Introduction to Exposure Technique
   16. Pre-Exposure Instructions

B. General Anatomy and Radiographic Positioning Terminology
   1. Introduction
   2. General Anatomy
   3. Definition of Terms
   4. Body Planes
   5. Body Cavities
   6. Divisions of Abdomen
      i. Quadrants
      ii. Regions

7. Surface Landmarks
8. Body Habitus
9. Osteology
    i. Bone Function
    ii. Skeletal Divisions
    iii. General Bone Features
    iv. Bone Development
    v. Classifications of Bones
10. Arthrology
    i. Functional Classification
    ii. Structural Classification
        1. Fibrous
        2. Cartilaginous
        3. Synovial
        4. Gliding
        5. Hinge
        6. Pivot
        7. Ellipsoid
        8. Saddle
        9. Ball & Socket
11. Bone Markings & Features
    i. Processes & Projections
    ii. Depressions
    iii. Fractures
12. Anatomic Relationship Terms
13. Radiographic Positioning Terminology
14. Essential Projections
15. Positions
16. Body Movement Terminology
17. Medical Terminology

C. Thoracic Viscera
1. Anatomy Review
    i. Body Habitus
    ii. Thoracic Cavity
    iii. Respiratory System
        1. Trachea
        2. Bronchi
        3. Alveoli
    iv. Lungs
    v. Mediastinum
2. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position
    iii. IR size
    iv. SID
    v. ID markers

vi. Radiation protection
vii. Patient instructions

3. Essential Projections: Chest, Lungs & Pleurae
    i. Postero-Anterior (PA)
        1. Positioning Considerations
            a. Anatomy
            b. Indications
            c. Receptor Size
            d. Technique
            e. Patient Position
            f. Part Position
            g. CR
            h. Respiration
            i. Film Critique
    ii. Lateral
        1. Positioning Considerations
    iii. PA oblique
        1. Positioning Considerations
    iv. Antero-Posterior (AP) oblique
        1. Positioning Considerations
    v. AP
        1. Positioning Considerations
    vi. AP or PA
        1. Right or left lateral decubitus position
            a. Positioning Considerations
    vii. Lateral
        1. Ventral or dorsal decubitus position
            a. Positioning Considerations

D. Digestive System: Abdomen, Biliary Tract
1. Anatomy Review
    i. Digestive System
    ii. Abdominopelvic cavity
    iii. Liver and Biliary System
    iv. Gallbladder
2. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position
    iii. IR size
    iv. SID
    v. ID markers
    vi. Radiation protection
    vii. Patient instructions
3. Essential Projections: Abdomen
    i. Three-way abdomen or acute abdominal / Obstruction series
    ii. Two-way abdomen series

iii. AP, supine and upright positions
1. Positioning Considerations
iv. AP, left lateral decubitus position
1. Positioning Considerations

E. Upper Extremity:
1. Anatomy Review
i. Hand & Fingers
1. Divisions
a. Phalanges
b. Metacarpals
c. Carpals
2. Articulations
2. General Procedural Guidelines
i. Patient preparation
ii. General patient position
iii. IR size
iv. SID
v. ID markers
vi. Radiation protection
vii. Patient instructions
3. Essential Projections: Digits 2-5
i. PA
1. Positioning Considerations
ii. Lateral
1. Positioning Considerations
iii. PA oblique
1. Positioning Considerations
4. Essential Projections: Thumb
i. AP
1. Positioning Considerations
ii. Lateral
1. Positioning Considerations
iii. PA oblique
1. Positioning Considerations
5. Essential Projections: Hand
i. PA
1. Positioning Considerations
ii. Lateral
1. Lateral in extension position
a. Positioning Considerations
2. Fan lateral position
a. Positioning Considerations
iii. PA oblique
1. Positioning Considerations
6. Essential Projections: Wrist
i. PA

1. Positioning Considerations
   ii. Lateral
      1. Positioning Considerations
   iii. PA oblique
      1. Positioning Considerations
   iv. PA projection in ulnar deviation position
      1. Positioning Considerations
7. Common Fractures
   i. Bennett's
   ii. Boxer's
   iii. Colles'
   iv. Smith's
   v. Torus or buckle
8. Anatomy Review
   i. Forearm, Elbow, and Humerus
      1. Forearm
         a. Ulna
         b. Radius
      2. Elbow
      3. Humerus
9. General Procedural Guidelines
   i. Patient preparation
   ii. General patient position
   iii. IR size
   iv. SID
   v. ID markers
   vi. Radiation protection
   vii. Patient instructions
10. Essential Projections: Forearm
   i. AP
      1. Positioning Considerations
   ii. Lateral
      1. Positioning Considerations
11. Essential Projections: Elbow
   i. AP
      1. Positioning Considerations
   ii. Lateral
      1. Positioning Considerations
   iii. AP oblique
      1. Medial rotation position
         a. Positioning Considerations
      2. Lateral rotation position
         a. Positioning Considerations
12. Essential Projections: Humerus
   i. AP
      1. Positioning Considerations

ii. Lateral
1. Positioning Considerations

13. Common Fractures
i. Monteggia
ii. Supracondylar fracture

F. Shoulder Girdle:
1. Anatomy Review
i. Shoulder Girdle
ii. Shoulder
iii. Clavicle
iv. Scapula
2. General Procedural Guidelines
i. Patient preparation
ii. General patient position
iii. IR size
iv. SID
v. ID markers
vi. Radiation protection
vii. Patient instructions
3. Essential Projections: Shoulder
i. AP projections
1. Internal rotation
a. Positioning Considerations
2. External rotation
a. Positioning Considerations
3. Neutral position
a. Positioning Considerations
ii. Transthoracic lateral (Lawrence)
1. Positioning Considerations
iii. Inferosuperior axial (Lawrence)
1. Positioning Considerations
iv. PA oblique (scapular Y)
1. Positioning Considerations
v. AP oblique (Grashey)
1. Positioning Considerations
4. Essential Projections: Proximal Humerus
i. Tangential projection (Fisk modification)
1. Positioning Considerations
5. Essential Projections: AC Joints
i. AP projection (Pearson method)
1. Positioning Considerations
6. Essential Projections: Clavicle
i. AP
1. Positioning Considerations
ii. AP axial
1. Positioning Considerations

7. Essential Projections: Scapula
    i. AP
        1. Positioning Considerations
    ii. Lateral
        1. Positioning Considerations
8. Common Fractures
    i. Impacted fracture of the posterolateral aspect of the humeral head with dislocation

G. Lower Extremity:
1. Anatomy Review
    i. Toes, Foot, Calcaneus, and Ankle
        1. Foot & Ankle
            a. Phalanges
            b. Metatarsals
            c. Tarsals
            d. Calcaneus
            e. Talus
            f. Cuboid
            g. Cuneiforms
        2. Toes & Foot
        3. Ankle Joint
2. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position
    iii. IR size
    iv. SID
    v. ID markers
    vi. Radiation protection
    vii. Patient instructions
3. Essential Projections: Toes
    i. AP or AP axial
        1. Positioning Considerations
    ii. AP oblique
        1. Positioning Considerations
    iii. Lateral (mediolateral or lateromedial)
        1. Positioning Considerations
4. Essential Projections: Foot
    i. AP or AP axial
        1. Positioning Considerations
    ii. AP oblique
        1. Positioning Considerations
    iii. Lateral (mediolateral)
        1. Positioning Considerations
    iv. Weight-Bearing/Longitudinal Arch projection
        1. Positioning Considerations
5. Essential Projections: Calcaneus

    i. Axial (plantodorsal)
        1. Positioning Considerations
    ii. Lateral (mediolateral)
        1. Positioning Considerations
6. Essential Projections: Ankle
    i. AP
        1. Positioning Considerations
    ii. Lateral (mediolateral)
        1. Positioning Considerations
    iii. AP oblique
        1. Ankle
            a. Positioning Considerations
        2. Mortise joint
            a. Positioning Considerations
    iv. AP (stress)
        1. Positioning Considerations
7. Common Fractures
    i. Jones
8. Anatomy Review
    i. Leg, Knee, and Femur
        1. Leg
            a. Tibia
            b. Fibula
        2. Knee
            a. Patella
        3. Femur
9. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position
    iii. IR size
    iv. SID
    v. ID markers
    vi. Radiation protection
    vii. Patient instructions
10. Essential Projections: Leg
    i. AP
        1. Positioning Considerations
    ii. Lateral (mediolateral)
        1. Positioning Considerations
11. Essential Projections: Knee
    i. AP
        1. Positioning Considerations
    ii. Lateral (mediolateral)
        1. Positioning Considerations
    iii. AP (Weight-bearing)
        1. Standing

a. Positioning Considerations

iv. AP oblique

1. Lateral rotation position

a. Positioning Considerations

2. Medial rotation position

a. Positioning Considerations

12. Essential Projections: Intercondylar Fossa

i. PA Axial (Holmblad)

1. Positioning Considerations

ii. PA Axial (Camp-Coventry)

1. Positioning Considerations

13. Essential Projections: Patella

i. PA

1. Positioning Considerations

ii. Lateral (mediolateral)

1. Positioning Considerations

iii. Tangential (Settegast method)

1. Patella and patellofemoral joint

a. Positioning Considerations

14. Essential Projections: Femur

i. AP

1. Positioning Considerations

ii. Lateral (mediolateral)

1. Positioning Considerations

H. Pelvis and Upper Femora & Hip:

1. Anatomy Review

i. Pelvis

1. Pelvic Girdle
2. Ileum
3. Ischium
4. Pubis
5. Hip Bone
6. Proximal Femur
7. Joints of the pelvis
8. Gender Differences
9. Boney Landmarks
10. Hip Joint Localization

2. General Procedural Guidelines

i. Patient preparation

ii. General patient position

iii. IR size

iv. SID

v. ID markers

vi. Radiation protection

vii. Patient instructions

3. Essential Projections: Pelvis

i. AP
1. Positioning Considerations

4. Essential Projections: Femoral Necks
   i. AP Oblique (modified Cleaves)
      1. Positioning Considerations
5. Essential Projections: Hip
   i. AP
      1. Positioning Considerations
   ii. Lateral (mediolateral) (Lauenstein; Hickey)
      1. Positioning Considerations
   iii. Trauma: Axiolateral (Danelius-Miller)
      1. Positioning Considerations

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.

B. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.

C. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby.

D. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)

B. Course homepage available through Blackboard

C. Index card holder/binder, ½" Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts

B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos

C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

Fifty percent of this grade is figured from all classroom activities, to include but not be limited to attendance, worksheets, quizzes, homework, and exams. Fifty percent of this grade is figured from all lab activities, to include but not be limited to attendance, and all lab competency testing. A final semester grade of 85% or above must be achieved in both the classroom and lab sections of this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

Classroom: *50% of grade*

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

Lab: *50% of grade*

A. Competencies: 90%
B. Attendance: 10%
C. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Positioning II

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career and Technical Education

RADxxx Radiographic Positioning II

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course consists of lecture and practicum in routine radiographic procedures for the thorax and spine as well as contrast studies using relevant structural relationships, landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine positioning and techniques of the region, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Identify the major anatomical structures and positioning terms related to the chest, abdomen, upper & lower extremities, and hip & pelvis	Written Assignments Class Discussion/Activity Written Examinations Competency Testing
Compare traditional and non-traditional projections used for thorax, spine, and contrast study procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Determine film size, exposure factors, central ray direction and/or angulation for radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate an understanding of pre-examination patient criteria practices for thorax, spine, and contrast study procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate radiation safety protection practices utilized in radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate Knowledge of basic	Class Discussion/Activity

positioning terms, body movements and joint classifications	Written Examinations Written Assignments Competency Testing
Identify the anatomical structures visible on radiographs of the thorax, spine, and contrast study procedures	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Vertebral Column
   1. Anatomy Review: Vertebral Column and Cervical Spine
      i. Vertebral Column
         1. General information
         2. Divisions
         3. Curvatures
         4. Disks
      ii. Typical Vertebra
         1. Cervical
   2. General Procedural Guidelines
      i. Patient preparation
      ii. General patient position
      iii. Image Receptor (IR) size
      iv. Source to Image Distance (SID)
      v. Identification (ID) markers
      vi. Radiation protection
      vii. Patient instructions

B. Essential Projections: C-Spine
   1. AP open-mouth position for C1 and C2
      i. Positioning Considerations
         1. Anatomy
         2. Indications
         3. Receptor Size
         4. Technique
         5. Patient Position
         6. Part Position
         7. Computed Radiography (CR)
         8. Respiration
         9. Film Critique
   2. AP axial
      i. Positioning Considerations
   3. Lateral (Grandy)
      i. Positioning Considerations
   4. AP axial oblique
      i. Right Posterior Oblique (RPO)
         1. Positioning Considerations
      ii. Left Posterior Oblique (LPO)

1. Positioning Considerations

5. PA axial oblique
    i. Right Anterior Oblique (RAO)
        1. Positioning Considerations
    ii. Left Anterior Oblique (LAO)
        1. Positioning Considerations
6. Lateral (swimmer's technique)
    i. Positioning Considerations

C. Special Projections: C-Spine
1. AP (Fuchs or extended Waters) for dens
    i. Positioning Considerations
2. Lateral
    i. Hyperflexion
        1. Positioning Considerations
    ii. Hyperextension
        1. Positioning Considerations
3. Pillar's (vertebral arch projection)
    i. Positioning Considerations
4. Ottenello (wagging jaw)
    i. Positioning Considerations
5. Soft Tissue Neck/Trachea
    i. Positioning Considerations

D. Essential Projections: Thoracic and Lumbar Vertebrae, Sacrum, and Coccyx
1. Anatomy Review
    i. Thoracic
    ii. Lumbar
    iii. Sacrum
    iv. Coccyx
2. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position
    iii. IR size
    iv. SID
    v. ID markers
    vi. Radiation protection
    vii. Patient instructions

E. Essential Projections: Thoracic Spine
1. AP
    i. Positioning Considerations
2. Lateral
    i. Positioning Considerations

F. Essential Projections: Lumbar Spine
1. AP
    i. Positioning Considerations
2. Lateral

i. Positioning Considerations
3. Lateral L5-S1
    i. Positioning Considerations
4. AP oblique
    i. RPO
        1. Positioning Considerations
    ii. LPO
        1. Positioning Considerations
5. AP axial L-S junction and SI joints (Ferguson)
    i. Positioning Considerations

G. Essential Projections: Sacral Iliac Joints
1. AP oblique
    i. RPO
        1. Positioning Considerations
    ii. LPO
        1. Positioning Considerations

H. Essential Projections: Sacrum & Coccyx
1. Sacrum
    i. AP axial
        1. Positioning Considerations
    ii. Lateral
        1. Positioning Considerations
2. Coccyx
    i. AP axial
        1. Positioning Considerations
    ii. Lateral
        1. Positioning Considerations

I. Essential Projections: Scoliosis
1. PA (or AP) upright
    i. Positioning Considerations
2. PA (or AP) upright with lateral bending
    i. Positioning Considerations
3. Lateral upright (with or without bending)
    i. Positioning Considerations
4. PA (or AP) recumbent
    i. Positioning Considerations

J. Bony Thorax:
1. Anatomy Review
    i. General Information
    ii. Functions
    iii. Sternum
    iv. Ribs
    v. Diaphragm
2. General Procedural Guidelines
    i. Patient preparation
    ii. General patient position

iii. IR size
iv. SID
v. ID markers
vi. Radiation protection
vii. Patient instructions

K. Essential Projections: Sternum
    1. PA obliques
        i. RAO – 15 to 20 degrees
            1. Positioning Considerations
        ii. LAO - 15 to 20 degrees
            1. Positioning Considerations
    2. Left Lateral
        i. Upright
            1. Positioning Considerations

L. Essential Projections: Sternoclavicular Joints
    1. PA oblique: *Body rotation method*
        i. RAO and LAO
            1. Positioning Considerations

M. Essential Projections: Ribs
    1. Upper Rib Injury
        i. PA Chest x-ray
            1. Upper, anterior ribs
                a. Positioning Considerations
        ii. AP – Upper
            1. Posterior ribs
                a. Positioning Considerations
        iii. AP –Lower
            1. Posterior ribs
                a. Positioning Considerations
        iv. AP obl <u>Upper-</u> 45 degrees
            1. Axillary portion
                a. Positioning Considerations
    2. Lower Rib Injury
        i. PA Chest x-ray
            1. Upper, anterior ribs
                a. Positioning Considerations
        ii. AP – Upper
            1. Posterior ribs
                a. Positioning Considerations
        iii. AP –Lower
            1. Posterior ribs
                a. Positioning Considerations
        iv. AP obl <u>Lower</u> 45 degrees
            1. Axillary portion
                a. Positioning Consideration

N. Digestive System / Alimentary Canal:

1. Anatomy Review
    i. Alimentary Canal, Esophagus, Stomach, and Duodenum
        1. General Information
        2. Esophagus
        3. Stomach
2. Technical Considerations
    i. Gastrointestinal transit
    ii. Examination procedure
    iii. Contrast media
        1. Patient education
            a. Radiographer's responsibility
            b. Standard procedure
        2. Patient preparation and care per procedure
        3. Follow-up care
            a. Post exam
            b. Infiltrate
        4. Reactions to Contrast Agents
            a. Signs and symptoms
            b. Medical intervention
            c. Vasovagal reactions
    iv. Preparation of examination room
    v. Exposure time
    vi. Radiation protection
3. Essential Projections: Esophagus
    i. AP or PA
        1. Positioning Considerations
    ii. AP or PA oblique
        1. Positioning Considerations
    iii. Lt. Lateral
        1. Positioning Considerations
4. Essential Projections: Upper Gastro Intestinal (UGI)
    i. AP
        1. Positioning Considerations
    ii. PA
        1. Positioning Considerations
    iii. PA oblique / RAO
        1. Positioning Considerations
5. Anatomy Review
    i. Small Intestines
        1. General Information
        2. Function
6. Technical Considerations
    i. Gastrointestinal transit
    ii. Examination procedure
    iii. Contrast media
    iv. Preparation of examination room

v. Exposure time
vi. Radiation protection

7. Essential Projections: Small Bowel Follow-through (SMB)
    i. PA or AP
        1. Positioning Considerations
8. Anatomy Review
    i. Large Intestines
        1. General Information
        2. Function
    ii. Large Intestine Procedures
    iii. Examination methods
    iv. Contrast media
    v. Preparation of intestinal tract
    vi. Barium enema (BE) apparatus
    vii. Preparation of BE suspensions
    viii. Patient care and preparation
    ix. Enema tip insertion
    x. Single-contrast BE
    xi. Double-contrast BE
9. Essential Projections: Single-contrast/Full Column BE
    i. AP scout
        1. Positioning Considerations
    ii. AP/PA
        1. Positioning Considerations
    iii. AP/PA sigmoid
        1. Positioning Considerations
    iv. LPO
        1. Positioning Considerations
    v. Post Evacuation LPO
        1. Positioning Considerations
10. Essential Projections: Double-contrast/Air contrast BE
    i. AP scout
        1. Positioning Considerations
    ii. AP
        1. Positioning Considerations
    iii. LPO sigmoid
        1. Positioning Considerations
    iv. PA
        1. Positioning Considerations
    v. RAO sigmoid
        1. Positioning Considerations
    vi. Rt. & Lt. Lateral Decubitus
        1. Positioning Considerations

O. Urinary System & Venipuncture:
1. Anatomy Review
    i. Urinary System

1. General Information
2. Kidneys
    a. Nephron
3. Ureter
4. Urinary Bladder
5. Urethra
    a. Prostate

2. Overview
    i. Contrast studies
    ii. Contrast media
    iii. Adverse reactions to contrast media
    iv. Preparation of intestinal tract
    v. Patient preparation
    vi. Equipment
3. Essential Projections: Intravenous urography (IVU)
    i. Indications
    ii. Contraindications
    iii. Risk Factors
    iv. Procedure Preperation
    v. AP
        1. Positioning Considerations
    vi. AP Oblique
        1. Positioning Considerations
    vii. Nephrotomography and Nephrourography / Tomo's
        1. Positioning Considerations
    viii. AP Axial Bladder
        1. Positioning Considerations
    ix. AP Oblique Baldder
        1. Positioning Considerations
4. Essential Projections: Retrograde Urography (RUG)
    i. General Information
    ii. RPO Bladder – Male
        1. Positioning Considerations
    iii. AP Bladder - Female
        1. Positioning Considerations
5. Essential Projections: Cystography/Cystogram
    i. Indications
    ii. Contraindications
    iii. <u>Without Fluoro</u>:
        1. Scout KUB
    iv. During gravity infusion of contrast:
        1. ½ Volume
        2. Full Volume
        3. Drain KUB
    v. For Voiding Cystourethrogram (VCUG) only:
        1. Voiding KUB 14 x 17

vi. With Fluoro:
    1. Scout KUB
vii. During gravity infusion of contrast:
    1. Fluoro spot films are taken at the discretion of the radiologist while the patient is moved into different positions to view the bladder effectively.
i. Voiding:
    1. Drain KUB

P. Reproductive System:
1. Anatomy Review
    i. Female
        1. Ovaries
        2. Uterine tubes
        3. Uterus
        4. Vagina
        5. General Procedural Guidelines
    ii. Male
        1. Penis
        2. Scrotum
            a. Testes
            b. Ductus deferens or vas deferens
            c. Prostate
            d. Ejaculatory ducts
            e. Seminal vesicles
            f. Bulbourethral glands
2. Essential Projections: Hysterosalpingography (HSG)
    i. General Information
    ii. Preliminary scout image made
    iii. Patient placed in lithotomy position
    iv. Physician places speculum into vagina
    v. Uterine cannula placed in cervix
    vi. Contrast injected

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

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D. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Index card holder/binder, ½" Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

Fifty percent of this grade is figured from all classroom activities, to include but not be limited to attendance, worksheets, quizzes, homework, and exams. Fifty percent of this grade is figured from all lab activities, to include but not be limited to attendance, and all lab competency testing. A final semester grade of 85% or

above must be achieved in both the classroom and lab sections of this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment <u>prior</u> to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the <u>beginning</u> of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

<u>Classroom</u>: *50% of grade*

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   A= 100-95%

B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

Lab: *50% of grade*

A. Competencies: 90%
B. Attendance: 10%
C. Grading Scale: *(Jefferson College Radiologic Technology Program's)*

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Positioning III

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Positioning III

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course consists of lecture and practicum in routine and trauma radiographic procedures for skull, facial bone and sinus studies using relevant structural relationships, anatomical landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine and non-routine positioning and techniques of the region, body planes and lines, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. The student will evaluate radiographic image quality in simulated clinical conditions. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Identify the major anatomical structures and positioning terms related to the skull, facial bones and sinuses	Written Assignments Class Discussion/Activity Written Examinations Competency Testing Oral Presentation
Compare traditional and non-traditional projections used for skull, facial bones and sinuses	Class Discussion/Activity Written Examinations Written Assignments Competency Testing Oral Presentation
Determine film size, exposure factors, central ray direction and/or angulation for radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing Oral Presentation
Demonstrate an understanding of pre-examination patient criteria practices for skull, facial bones and sinuses procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing Oral Presentation

Demonstrate radiation safety protection practices utilized in radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing Oral Presentation
Demonstrate Knowledge of basic positioning terms, body movements and joint classifications	Class Discussion/Activity Written Examinations Written Assignments Competency Testing Oral Presentation
Identify the anatomical structures visible on radiographs of the skull, facial bones and sinuses	Class Discussion/Activity Written Examinations Written Assignments Oral Presentation

III. OUTLINE OF TOPICS

A. Neuro Radiography

1. Skull Positioning
    i. Anatomy
        1. Skull
        2. Cranial Bones
        3. Ear
        4. Facial Bones
        5. Articulations of the skull
    ii. Terminology
    iii. Pathology
    iv. Exposure Technique
    v. Skull Topography
    vi. Skull Morphology
    vii. Technical Considerations
    viii. Radiation Protection
    ix. Protocols
    x. Positioning Considerations
        1. Type
        2. Anatomy
        3. Indications
        4. Radiographic Film Size
        5. Radiographic Technique
        6. Patient Position
        7. Radiographic Film Image
        8. Film Critique
        9. Trauma
2. Facial Bone Positioning
    i. Anatomy
        1. Facial Bones

ii. Terminology
iii. Pathology
iv. Exposure Technique
v. Technical Considerations
vi. Radiation Protection
vii. Protocols
viii. Positioning Considerations
    1. Type
    2. Anatomy
    3. Indications
    4. Radiographic Film Size
    5. Radiographic Technique
    6. Patient Position
    7. Radiographic Film Image
    8. Film Critique
    9. Trauma

3. Paranasal Sinuses Positioning
    i. Anatomy
        1. Sinuses
        2. Maxillary Sinuses
        3. Frontal Sinuses
        4. Ehtmoid Sinuses
        5. Sphenoid Sinuses
    ii. Terminology
    iii. Pathology
    iv. Exposure Technique
    v. Technical Considerations
    vi. Radiation Protection
    vii. Protocols
    viii. Positioning Considerations
        1. Type
        2. Anatomy
        3. Indications
        4. Radiographic Film Size
        5. Radiographic Technique
        6. Patient Position
        7. Radiographic Film Image
        8. Film Critique
        9. Trauma
4. Orbits & Nasal Bones Positioning
    i. Anatomy
        1. Orbits
        2. Nasal Bones
    ii. Terminology
    iii. Pathology
    iv. Exposure Technique

v. Technical Considerations
vi. Radiation Protection
vii. Protocols
viii. Positioning Considerations
    1. Type
    2. Anatomy
    3. Indications
    4. Radiographic Film Size
    5. Radiographic Technique
    6. Patient Position
    7. Radiographic Film Image
    8. Film Critique
    9. Trauma

5. Zygomatic Arches & Mandible Positioning
    i. Anatomy
        1. Zygomatic Arches
        2. Mandible
    ii. Terminology
    iii. Pathology
    iv. Exposure Technique
    v. Technical Considerations
    vi. Radiation Protection
    vii. Protocols
    viii. Positioning Considerations
        1. Type
        2. Anatomy
        3. Indications
        4. Radiographic Film Size
        5. Radiographic Technique
        6. Patient Position
        7. Radiographic Film Image
        8. Film Critique
        9. Trauma

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic

Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.

B. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby.

C. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Index card holder/binder, ½" Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

Fifty percent of this grade is figured from all classroom activities, to include but not be limited to attendance, worksheets, quizzes, homework, and exams. Fifty percent of this grade is figured from all lab activities, to include but not be limited to attendance, and all lab competency testing. A final semester grade of 85% or

above must be achieved in both the classroom and lab sections of this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

Classroom: *50% of grade*

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   A= 100-95%

B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

Lab: *50% of grade*

A. Competencies: 90%
B. Attendance: 10%
C. Grading Scale: *(Jefferson College Radiologic Technology Program's)*

A= 100-95%
B= 94-90 %
C= 85-89%
F= Below 85%
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Positioning IV

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Positioning IV

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course consists of lecture and practicum in advanced imaging techniques and approaches for imaging adult, pediatric and geriatric trauma/emergency radiography, routine pediatric studies, angiographic and interventional procedures, digital imaging and computer tomography as well as mobile and operating room equipment and procedures using relevant structural relationships, anatomical landmarks in radiographic positioning, types and sizes of image receptors used for each study, routine and non-routine positioning and techniques of the region, body planes and lines, medical terms, definitions, abbreviations and symbols. Radiographic anatomy, radiation protection and patient care skills are reinforced. The student will evaluate radiographic image quality in simulated clinical conditions. This course is a portion of the five steps to clinical competency and must be completed with an 85% or better in both the lecture and practicum sections. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Determine bony anatomy and landmarks for positioning trauma, pediatric and Operating Room (OR) procedures	Written Assignments Class Discussion/Activity Written Examinations Competency Testing
Differentiate positioning strategies for trauma, pediatric and OR studies	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Determine film size, exposure factors, central ray direction and/or angulations for radiographic procedures	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate immobilization methods relevant for all exams	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Demonstrate radiation safety	Class Discussion/Activity

protection practices utilized in radiographic procedures	Written Examinations Written Assignments Competency Testing
Determine Radiographic equipment and supplies for angiographic and interventional studies	Class Discussion/Activity Written Examinations Written Assignments Competency Testing
Assess principles and pathologies of angiographic and interventional examinations	Class Discussion/Activity Written Examinations Written Assignments
Summarize patient care criteria for vascular and non-vascular procedures	Class Discussion/Activity Written Examinations Written Assignments
Determine principle components of computer anatomy and pictures archiving of digital imaging and computer tomography	Class Discussion/Activity Written Examinations Written Assignments
Integrate application techniques and imaging principles for computer hardware and software	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Medical Emergencies
   1. Terminology
   2. Latex reactions
   3. Emergency equipment
   4. Levels of trauma centers
   5. Energy sources/Mechanism of injury
   6. Patient Considerations
      i. Patient Assessment
         1. Primary survey
            a. Airway Breathing Circulation (A-B-C's)
            b. Head to toe evaluation
         2. Secondary survey
         3. Continuity of patient care during imaging procedures
         4. Risk Reduction
            a. BSI Techniques
            b. Use of Security Officers
         5. Guidelines to follow before attempting imaging procedures
            a. Enlist patient's help and cooperation
            b. C-Spine clearance
            c. Removal of bandages, splints or cervical collars

ii. Trauma Guidelines, Comfort/Immobilization of Body Part
1. Communication
2. Immobilization techniques
iii. Universal Precautions
iv. Radiation Safety

7. Shock
i. Signs and symptoms
ii. Types
1. Hypovolemic
a. Hemorrhage
b. Plasma loss
c. Drugs
2. Disruptive
a. Anaphylactic
b. Neurogenic
c. Septic
3. Cardiogenic
iii. Medical intervention

8. Diabetic emergencies – signs, symptoms and interventions
i. Hypoglycemia
ii. Ketoacidosis
iii. Hyperosmolar coma

9. Respiratory and cardiac failure – signs, symptoms and interventions
i. Adult vs. pediatric
ii. Equipment

10. Airway obstruction – signs, symptoms and interventions
11. Cerebral vascular accident (stroke) – signs, symptoms and interventions
12. Fainting and convulsive seizures – signs, symptoms and interventions
i. Types
1. Nonconvulsive (petit mal)
2. Convulsive (grand mal)
ii. Reasons for fainting

13. Other medical conditions
i. Epistaxis
ii. Nausea
iii. Postural hypotension 41
iv. Vertigo
v. Asthma

B. Room & Equipment Considerations
1. Mobile Radiography
i. Transmission-Based Precautions
ii. Isolation Strategies
iii. Asepsis

iv. Sterile Technique
v. Radiation Safety & Protection
vi. Change of SID
vii. Tube angulation
viii. Horizontal Beam
ix. Grids

2. Emergency Department
    i. Equipment
    ii. Exposure Factors
    iii. Radiation Safety & Protection
    iv. Pt. Care Considerations
    v. Grids
3. Operating Room
    i. OR Team
    ii. Attire
    iii. Equipment Use & Cleaning
        1. Image Intensifier
        2. Locks
    iv. Radiation Safety & Protection

C. Trauma
1. Head injuries
    i. Four levels of consciousness
    ii. Symptoms
    iii. Medical intervention
2. Spinal injuries
    i. Assessment
    ii. Symptoms
    iii. Medical intervention
    iv. Transportation
3. Extremity fractures
    i. Types
    ii. Bone & Joint review
        1. Type of bone
        2. Bone anatomy
        3. Types & examples of joints
    iii. Factors effecting fractures
        1. Symptoms
        2. Sites
        3. Fracture repair
    iv. Fracture complications
        1. Osteomyelitis
        2. Embolism
            a. Pulmonary
            b. Fat
        3. Compartment Syndrome
        4. Hemorrhage

5. Avascular Necrosis

v. Fracture reduction
   1. Closed reduction
   2. Open reduction
   3. Traction

vi. Radiographic considerations
   1. Cast materials
      a. Plaster
      b. Fiberglass
   2. Patient age
   3. Patient gender
   4. Patient status
   5. Patient comfort

vii. External & Internal Fixation Devices
   1. Plate & Screw
   2. Pins
   3. Intramedullary Rods, Nail, Wires

viii. Pathology
   1. Osteoporosis
   2. Paget's Disease

ix. Sports injuries
   1. Soft Tissue Injury
   2. Sprain
   3. Strain
   4. Dislocation

x. Positioning

4. Wounds
   i. Symptoms
   ii. Medical intervention
5. Burns
   i. Classifications
   ii. Medical intervention

D. Geriatric Trauma
1. Health care issues and the elderly
   i. "Graying of America" – definition
   ii. Types of Aging
      1. Primary – Hereditary factors
      2. Secondary – results of disease/normal aging
   iii. Health as defined for the elderly
      1. Presence/absence of disease
      2. Degree of functional disability
2. Psychosocial experience of the elderly
   i. Fear
   ii. Impatience
   iii. Hysteria
   iv. Sadness

v. Confusion
vi. Loss of hearing
vii. Loss of Vision
viii. Diminished depth of perception

3. Patient assessment & Age specific guidelines
    i. Primary Survey
    ii. Secondary survey
    iii. Age specific guidelines
        1. Limited joint movement
        2. Positioning considerations
        3. Technique adjustments
4. Communication and Listening Skills
    i. Gathering medical information
    ii. Explanation of examination
5. Musculoskeletal Considerations
    i. Physical considerations
        1. Atrophy
        2. Osteoarthritis
        3. Rheumatoid Arthritis
        4. Osteoporosis
        5. Loss of subcutaneous fat
    ii. Radiology room considerations
        1. Patient safety
        2. Patient comfort

E. Pediatric Trauma
1. Communication and listening
    i. Parental fears
    ii. Small children's fears
    iii. Standard guidelines for age appropriate care in radiology
    iv. Dealing with the agitated parent
    v. Approaching the child
2. Immobilization
    i. Purpose
    ii. Types
        1. Head holders (non-stationary)
        2. Balsa wood blocks
        3. Sandbags
        4. Octagon board
        5. Flat board
        6. Velcro straps
        7. Plexi sticks
        8. Adhesive tape
        9. Sheets
    iii. Proper usage and placement
    iv. Advantages and disadvantages
    v. Safety precautions

1. Patient evaluation

3. Patient Assessment
    i. ABC's of assessment
    ii. Levels of consciousness
    iii. Patient conditions
        1. Combative

F. Trauma, Operating Room and Mobile
1. Prior to bedside procedure:
    i. Verify order
    ii. Right patient – right procedure
2. Thorax
    i. Wheelchair Chest
        1. Patient Considerations
            a. Level of Consciousness/Pt. Observation
            b. Trauma Guidelines/Comfort of Patient
            c. Universal Precautions
            d. Radiation Safety
        2. Positioning Considerations
            a. Anatomy
            b. Indications
            c. Receptor Size
            d. Technique
            e. Patient Position
            f. Part Position
            g. CR
            h. Respiration
            i. Film Critique
    ii. Stretcher Chest
        1. Patient Considerations
        2. Positioning Considerations
3. Upper Extremity
    i. Shoulder
        1. Patient Considerations
        2. Positioning Considerations
4. Lower Extremity
    i. Knee
        1. Patient Considerations
        2. Positioning Considerations
5. Spine & Pelvis
    i. Cervical Spine
        1. Patient Considerations
        2. Positioning Considerations
    ii. Hip
        1. Patient Considerations
        2. Positioning Considerations
6. Operating Room

i. Non-orthopedic
    1. Operative Cholangiography
    2. Myelography
    3. Arthrography
ii. Orthopedic
    1. Joint Replacement
iii. Post-op/Recovery room protocols
    1. Patient Considerations
    2. Positioning Considerations
iv. Mobile
    1. Chest – Adult & Pediatric
        a. Patient Considerations
        b. Positioning Considerations
    2. Abdomen– Adult & Pediatric
        a. Patient Considerations
        b. Positioning Considerations
    3. Orthopedic– Adult & Pediatric
        a. Patient Considerations
        b. Positioning Considerations

G. Basic Principles and Techniques of Angiographic and Interventional Procedures
    1. History
    2. Angiographic Accessories
        i. Catheterization techniques
        ii. Vascular access
            1. Seldinger technique
            2. Access needles
        iii. Sheaths and dilators
        iv. Vascular access sites
        v. Guide wires
            1. Sizes
            2. Shapes
        vi. Catheters
            1. Sizes
            2. Shapes
            3. Side holes
            4. Properties
    3. Filming and injection techniques
        i. Image acquisition
            1. Cut film
            2. DSA
        ii. Power injectors
            1. Flow rate
            2. Volume
            3. PSI
            4. Rise

4. Room Design
    i. Design team
    ii. Considerations
5. Sedation/Monitoring/Sterile Technique
    i. Conscious sedation
    ii. Deep/general anesthesia
    iii. Pre-angiographic care
        1. History/physical
        2. Baseline vital signs
        3. Pre-medication and diet
        4. Intraprocedural care
            a. Vital signs
            b. Misc. patient assessment
        5. Post-procedural care
            a. Vital signs
            b. Misc. patient assessment
        6. Sterile technique
            a. Basic principles
            b. Use of sterile technique
6. Non-Vascular Interventional Radiography
    i. Organ Access
        1. Supplies
        2. Procedure
    ii. Percutaneous needle biopsy and drainage
        1. Pre-procedure patient evaluation
        2. Supplies
        3. Techniques
        4. Complications
    iii. Gastrostomy and Gastrojejunostomy
        1. Indications/contraindications
        2. Pre-procedural assessment/prep
        3. Technique
        4. Complications
        5. Immediate/long term management

H. Vascular Anatomy Above the Diaphragm and Angiography
1. Arterial Anatomy
    i. Aorta
    ii. Great vessels
    iii. Arteries of the upper extremity
    iv. Intracranial circulation
2. Venous Anatomy
    i. SVC/IVC
    ii. Jugular veins
    iii. Veins of the upper extremity
    iv. Intracranial veins
3. Cardiac Anatomy and Vasculature

i. Anatomy
    1. Atria
    2. Ventricles
    3. Valves
    4. Vasculature
    5. Pulmonary arteries
    6. Pulmonary veins
    7. Coronary arteries

ii. Angiography
    1. Pulmonary Angiography
        a. Indications
        b. Procedure
    2. Bronchial Angiography
        a. Indications
        b. Procedure
        c. Thoracic Aorta Angiography
            i. Indications
            ii. Procedure
        d. Thoracic Outlet and Upper Extremity Angiography
            i. Indications
            ii. Procedure
        e. Carotid, Vertebral, and Spinal Angiography
            i. Indications
            ii. Procedure
        f. Cardiac Angiography
            i. Indications
            ii. Approach
        g. Basic EKG
            i. Electrical pathway
            ii. Parts of the EKG wave
            iii. Calculating heart rate
            iv. Arrhythmias
            v. Lead placement

I. Vascular Anatomy Below the Diaphragm and Angiography
    1. Arterial anatomy
        i. Abdominal
        ii. Aorta
        iii. Arteries of the lower extremity
    2. Venous anatomy
        i. IVC
        ii. Renal and adrenal veins
        iii. Hepatic and portal veins
        iv. Veins of the pelvis and lower extremity
    3. Angiography

i. Renal Angiography
    1. Indication/contraindications
    2. Procedure
ii. Angiography of the pelvis and lower extremities
    1. Indication/contraindications
    2. Procedure
iii. Angiography of the Liver/Spleen/Pancreas
    1. Indication/contraindications
    2. Procedure

J. Interventional Angiography
1. Angioplasty
    i. Indications
    ii. Technique
2. Vascular Stent Placement
    i. Indications
    ii. Technique
3. Thrombolysis
    i. Indications
    ii. Technique
4. Embolization
    i. Indications
        1. Non-neoplastic
        2. Neoplastic
    ii. Technique
        1. Delivery systems
        2. Embolic agents
5. Foreign Object Retrieval
    i. Indications
    ii. Technique
6. Transjugular Interhepatic Portal Systemic Shunt
    i. Indications
    ii. Technique
7. Atherectomy
    i. Indications
    ii. Technique
8. IVC Filter Placement
    i. Indications
    ii. Technique
9. Central Venous Access
    i. History
    ii. Devices
        1. Non-tunneled
        2. Tunneled
    iii. Placement techniques
    iv. Catheter management
    v. Complications

10. Myelography
    i. Anatomy
        1. Vertebral column
        2. Spinal cord
        3. Meninges
        4. Ventricles
    ii. Indications
    iii. Procedure
        1. Equipment
        2. Contrast
        3. Positioning/filming
        4. Patient care
        5. Complications
    iv. Sialography
        1. Anatomy
        2. Indications
        3. Supplies
        4. Contrast
    v. Arthrography
        1. Indications
        2. Anatomy demonstrated
            a. Knee
            b. Shoulder
            c. Wrist
            d. Hip
            e. TMJ
        3. Contrast
            a. Single
            b. Double

K. Introduction to Computers
1. History of computers
2. Types of computers
3. Functional components
    i. Hardware /CPU
    ii. Software
    iii. Output hardware
    iv. Storage hardware/devices/media
4. Digital fundamentals
    i. Binary system
    ii. Binary to decimal
    iii. Terminology of binary bits
    iv. Digital signal processor
5. Computers in Radiology
    i. Radiology equipment
    ii. Communications systems
    iii. Image archival/storage (PACs)

iv. Satellite workstations (3D)
v. Scheduling, billing, film tracking

L. Computed Tomography- An Overview
1. History of computed tomography
2. Scanner generations
3. Components of a CT scanner
i. Gantry
ii. Table
iii. Detectors
iv. Collimators
v. Slip ring technology
vi. Cooling system
vii. Computers
viii. Accessories
1. Injectors
2. Cardiac monitors

M. Image Formation
1. Image acquisition
2. Digital processing
3. Image processing
i. Pixel
ii. Matrix
iii. Analog to digital conversion
iv. Hounsfield units
v. Window width/window level
vi. Voxel

N. Image Formation and Artifacts
1. Image quality
2. Resolution
3. Noise
4. Linearity
5. Artifacts
i. Motion
ii. Beam hardening
iii. Partial volume effect
iv. Ring artifact
v. Halo
vi. Streaks
vii. Shading
viii. Metal

O. Computed Tomography Process
1. Data acquisition
i. Methods
1. Slice-by-Slice
2. Volumetric
ii. Elements

1. Beam geometry
    a. Parallel
    b. Fan
    c. Spiral

2. Data acquisition system
    i. Components
        1. Tube
        2. Detectors
        3. Filters
        4. Collimators
        5. Analog to digital conve1ier (ADC)

3. Data acquisition process
    i. Scanning/raw data/image data
    ii. Rings
    iii. Views
    iv. Profiles
        1. Pixels
        2. Matrix
        3. Voxels
    v. Sampling
        1. Angular
        2. Ray
    vi. Attenuation
        1. Lambert - Beer Law
        2. Linear attenuation coefficient
        3. Hounsfield number
    vii. Variable scan factors
        1. Single Field of View (SFOV)
        2. Dual Field of View (DFOV)
        3. Matrix size
        4. Slice thickness
        5. Reconstruction increment
        6. Algorithm
        7. Scan time
        8. Window/level
        9. Region of Interest (ROI)
        10. Exposure Factors
            a. mA
            b. kVp
            c. Time
    viii. Image reconstruction
        1. Image Reconstruction System (IRS)
            a. Microcomputers/micro processors
            b. Array processor
    ix. Image display/manipulation
        1. Display

a. Cathode Ray tube (CRT)

2. Manipulation
    a. Reformation
    b. Smoothing
    c. Edge enhancement
    d. Gray scale
    e. 3D recon/processing
    f. Stereotactic planning
    g. Radiation oncology planning

P. Advanced Applications
1. Volume Rendering Technique (VRT)
2. Maximum Intensity Projection (MIP)
3. 3D
4. Virtual Computed Tomography (CT)
5. Multiplanar Reconstruction (MPR)

Q. Contrast Media
1. Methods of introducing contrast
    i. Injection
    ii. Retrograde
    iii. Intrathecal
    iv. Parenteral
2. Chemical properties
    i. Ring structure
    ii. Anions
    iii. Cations
    iv. Osmolality
    v. Viscosity
    vi. Ionic
    vii. Non-ionic
    viii. Concentration
3. Effects of contrast media
    i. To organs
    ii. Precaution and prevention
    iii. Recognition of reaction
    iv. Response to reactions
    v. Treatment

R. Radiation Safety/Protection
1. Rules of radiation safety
    i. Time
    ii. Distance
    iii. Shielding
2. Appropriate dose to patient
3. Shielding
4. Area specific

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures, Vol. I-III (12th ed.). St. Louis: Mosby. Frank, E., Long, B., Smith, B. (2012). Merrill's Atlas of Radiographic Positioning & Procedures "Workbook", Vol. 1& 2 (12th ed.). St. Louis: Mosby.

B. Martensen, K. (2011). Radiographic Image Analysis. (3rd ed.) St. Louis, MO: Elsevier Saunders.

C. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby.

D. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Index card holder/binder, ½" Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication

projects, class attendance/participation, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

Fifty percent of this grade is figured from all classroom activities, to include but not be limited to attendance, worksheets, quizzes, homework, and exams. Fifty percent of this grade is figured from all lab activities, to include but not be limited to attendance, and all lab competency testing. A final semester grade of 85% or above must be achieved in both the classroom and lab sections of this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 85% must be retaken until a score of 85% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment <u>prior</u> to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the <u>beginning</u> of class on the

assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

Classroom: *50% of grade*

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

Lab: *50% of grade*

A. Competencies: 90%
B. Attendance: 10%
C. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-95%
   - B= 94-90 %
   - C= 85-89%
   - F= Below 85%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Patient Care Management

2 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Patient Care Management

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 2

A. Description: This course focuses on technological and assessment skills and concepts required to build a foundation for holistic care of patients. The student gains a beginning understanding of the nurse's responsibilities as a member of the interdisciplinary health care team so to apply that understanding to the diagnostic imaging environment. Instruction will introduce the basic concepts of cultural and legal aspects of patient care, vital signs, medical asepsis and infection control, hygiene, body mechanics and mobility, safety, documentation, evaluation of physical needs and surgical asepsis. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Integrate knowledge and skills from prior and current liberal arts, support sciences and radiologic technology courses while performing basic patient care skills	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Demonstrate basic explanations while performing patient care skills	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Demonstrate select patient care skills in an efficient, accurate and professionally accountable manner	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Demonstrate principles of medical and surgical asepsis	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Record findings and procedures in a legally appropriate manner	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Create a safe environment while	Written Assignments

performing basic patient care skills	Class Discussion/Activity Written Examinations Competency Check off
Demonstrate routine patient transfer and immobilization techniques	Class Discussion/Activity Written Examinations Competency Check off
Explain the importance of observing a patient's vital signs and status	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Describe proper standard precautions and practice appropriate infection control	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Describe actions, indications, precautions and documentation procedures related to drug administration	Written Assignments Class Discussion/Activity Written Examinations Competency Check off
Examine medical emergencies	Written Assignments Class Discussion/Activity Written Examinations

III. OUTLINE OF TOPICS

A. Health Care Team
   1. Responsibilities of the health care facility
      i. Caring for all patients regardless of condition
      ii. Promoting health
      iii. Preventing illness
      iv. Education
      v. Research
   2. Members and responsibilities
   3. Legal aspects of patient care
      i. Selected legal terms
         1. Assault
         2. Battery
      ii. Intentional torts
      iii. Unintentional torts
      iv. Legal responsibilities
   4. Responsibilities of the radiographer
      i. Performing radiographic examination
      ii. Performing patient care and assessment
      iii. Adhering to radiation protection guidelines
      iv. Following practice standards
      v. Assisting the radiologist

B. Professionalism and Communication in Patient Care

1. Health and illness continuum
2. Developing professional attitudes
    i. Teamwork
    ii. Work ethic
    iii. Health role model
    iv. Sympathy
    v. Empathy
    vi. Assertiveness
3. Age- and generation-specific communication
    i. Neonatal
    ii. Pediatric
    iii. Adolescence
    iv. Young adulthood
    v. Middle adulthood
    vi. Geriatric
4. Communication
    i. Verbal
    ii. Nonverbal communication
    iii. Language/cultural variations
        1. Challenges
        2. Hearing, vision and speech impairments
        3. Impaired mental function
        4. Altered states of consciousness
        5. Human diversity
        6. Artificial speech
    iv. Other factors that impede communication
        1. Colloquialism/slang
        2. Medical terminology
    v. Patient interactions
        1. Eye contact
        2. Volume and speed of speech
        3. Effective listening
        4. Feedback
    vi. Communication with families
    vii. Communication with other health care professionals
5. Psychological considerations
    i. Dying and death
        1. Understanding the process
        2. Aspects of death
            a. Emotional
            b. Personal
            c. Physical
        3. Stages of grief
            a. Denial
            b. Anger
            c. Bargaining

d. Depression
e. Acceptance

4. Patient support services
    a. Family/friends
    b. Pastoral care
    c. Patient-to-patient support groups
    d. Psychological support groups
    e. Hospice
    f. Home care

ii. Factors affecting patient's emotional responses
    1. Age
    2. Gender
    3. Marital/family status
    4. Socioeconomic factors
    5. Cultural/religious variations
    6. Physical condition
    7. Self-image
    8. Past health care experiences
    9. Beliefs
    10. Attitudes
    11. Prejudices
    12. Self-awareness

C. Patient/Radiographer Interactions
    1. Patient identification methods
        i. Interviewing/questioning
        ii. Chart/requisition
        iii. Wrist band
        iv. Institution-specific
    2. Procedure questions and explanations
        i. Positioning
        ii. Length of procedure
        iii. Immobilization devices
        iv. Machine movement/sounds
    3. Interaction with patient's family members and friends

D. Safety and Transfer Positioning
    1. Environmental safety
        i. Fire
        ii. Electrical
        iii. Hazardous materials
        iv. Radioactive materials
        v. Personal belongings
        vi. Occupational Safety and Health Administration (OSHA)
        vii. Environmental Protection Agency (EPA)
    2. Body mechanics
        i. Proper body alignment
        ii. Proper movement

3. Patient transfer and movement
    i. Assess the patient's mobility
    ii. Rules for safe patient transfer
    iii. Wheelchair transfers
    iv. Stretcher transfers
    v. Sheet transfer
    vi. Three-carrier lift
    vii. Log roll
    viii. Positioning for safety, comfort or exams
    ix. Transfer devices
4. Fall prevention
5. Patient Positions
    i. Supine
    ii. Prone
    iii. Decubitus
    iv. Oblique
    v. Fowler's
    vi. Semi-Fowler's
    vii. Sims'
    viii. Trendelenburg
    ix. Lithotomy
6. Safety and immobilization
    i. Types
    ii. Applications
    iii. Devices
        1. Adult
        2. Pediatric
7. Magnetic Resonance Safety
    i. Pacemakers and other implanted devices
    ii. Aneurysm clips
    iii. Oxygen (O2) containers
8. Incident reporting
    i. Legal considerations
    ii. Documentation
    iii. Procedures

E. Evaluating Physical Needs
1. Assess patient status
    i. Evaluation methodology
    ii. Clinical information
2. Vital signs – ranges and values
    i. Temperature
    ii. Pulse
    iii. Respiration
    iv. Blood pressure
    v. Normal values
    vi. Interfering factors

vii. Terminology
viii. Adult vs. pediatric
ix. Documentation
x. Pain assessment
xi. Body type

3. Acquiring and recording vital signs
4. Procedures
5. Demonstration
6. Normal ranges of laboratory data
    i. Blood urea nitrogen (BUN)
    ii. Creatinine
    iii. Glomerular filtration rate (GFR)
    iv. Hemoglobin
    v. Red blood cells (RBCs)
    vi. Platelets
    vii. Oxygen (O2) saturation
    viii. Prothrombin
    ix. Partial thromboplastin time
7. Patient chart (paper and electronic)
    i. Aspects of patient chart
    ii. Retrieval of specific information
    iii. Proper documentation in the chart
8. Infection Control
    i. Terminology
    ii. Hospital acquired
    iii. Communicable
    iv. Infectious pathogens
    v. Human immunodeficiency virus (HIV)
    vi. Hepatitis
    vii. Multidrug-resistant organisms (MDRO)
    viii. Other
9. Centers for Disease Control and Prevention (CDC)
    i. Purpose
    ii. Publications and bulletins
10. Cycle of infection
    i. Infectious pathogens – blood borne and airborne
    ii. Reservoir of infection
    iii. Susceptible host
    iv. Transmission of disease
        1. Direct
        2. Indirect
11. Prevent disease transmission
    i. Transmission-based precautions
    ii. Health care worker
        1. Immunization
        2. Booster

3. Post-exposure protocols

12. Asepsis
    i. Medical
        1. Hand washing
        2. Chemical disinfectants
    ii. Surgical
        1. Growth requirements for microorganisms
        2. Methods used to control microorganisms
            a. Moist heat
            b. Dry heat
            c. Gas
            d. Chemicals
        3. Procedures
            a. Opening packs
            b. Gowning/gloving
            c. Skin preparation
            d. Draping
            e. Dressing changes
        4. Packing
        5. Storage
        6. Linen
    iii. Isolation techniques and communicable diseases
        1. Category-specific
        2. Disease-specific
        3. Standard precautions
    iv. Isolation patient in radiology department
        1. Procedure
            a. Gowning
            b. Gloving
            c. Masking
        2. Patient transfer
        3. Cleaning and proper disposal of contaminated waste
        4. Cleaning image receptors and imaging equipment
    v. Precautions for the compromised patient (reverse isolation)
        1. Purpose
        2. Procedure
    vi. Psychological considerations

F. Oxygen administration
    1. Values
    2. Oxygen therapy
    3. Oxygen delivery systems
        i. Low-flow systems
        ii. High-flow systems
    4. Documentation
    5. Special precautions

G. Urinary collection

1. Procedure
    i. Male
    ii. Female
2. Alternative methods of urinary drainage
3. Documentation

H. Ostomies
1. Ileostomy
2. Ureteroileostomy

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Adler, Arlene M., Carlton, Richard R., Introduction to Radiologic Sciences and Patient Care, 5th Edition, Saunders. St. Louis, MO. 2006.
B. Potter, P., & Perry, A. (2009). Fundamentals of Nursing. (7th ed.). St. Louis, MO: Mosby.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
    1. Textbooks
    2. Periodicals
    3. Films On Demand Videos
C. Internet Resources
    1. On-line references
    2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, competencies, homework assignments, and exams.

GRADES – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A."

Fifty percent of this grade is figured from all classroom activities, to include but not be limited to attendance, worksheets, quizzes, homework, and exams. Fifty percent of this grade is figured from all lab/clinical activities, to include but not be limited to attendance, and all lab competency testing. A final semester grade of 75% or above must be achieved in both the classroom and lab sections of this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment <u>prior</u> to the following class meeting.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently

without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

Classroom: *50% of grade*

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

Lab: *50% of grade*

A. Competencies: 90%
B. Attendance: 10%
C. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Biology

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Biology

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course will provide an overview of the principles of the interaction of radiation on the human body. Radiation effects on molecules, organisms, and factors affecting biological response, and acute and chronic effects of radiation are discussed. This course will also review radiation protection measures. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Distinguish the fundamental principles of radiobiology on the human body	Class Discussion/Activity Written Examinations Written Assignments
Specify the natural sources of radiation exposure and the means for protection	Class Discussion/Activity Written Examinations Written Assignments
Evaluate the radiation effects on DNA	Class Discussion/Activity Written Examinations Written Assignments
Correlate the Law of Bergonie and Tribondeau and the physical and biological factors	Class Discussion/Activity Written Examinations Written Assignments
Determine the fetal, early and late systemic effects of radiation sensitivity	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Introduction to Radiobiology
   1. Definition of radiobiology
   2. Importance of and necessity for medical radiobiology in today's world

B. Radiation Protection Review
    1. Radiation Units
        i. Roentgen – Coulomb/kilogram
        ii. Rad – Gray
        iii. Rem – Sievert
        iv. Curie – Bacquerel
    2. Radiation Sources
        i. Natural Background
            1. Radon
            2. Cosmic
            3. Terrestrial
            4. Internal
        ii. Man Made
            1. Medical x-rays
            2. Nuclear Medicine
            3. Other
    3. Absorbed Dose Equivalent and MPD
    4. NCRP Report #91 (1987)
    5. Organ Dose Limits
    6. Review of Radiation Protection Methods
        i. Time
        ii. Distance
        iii. Shielding
        iv. 10 Day Rule
C. Human Biology
    1. Seven Structural Levels
        i. Atomic/Molecular
        ii. Organelle
        iii. Cellular
        iv. Tissue
        v. Organ
        vi. Organ System
        vii. Organism
    2. Molecular Composition
    3. Macromolecular Composition
        i. Proteins
        ii. Lipids
        iii. Carbohydrates
        iv. Nucleic Acids
            1. DNA
            2. Messenger RNA
            3. Transfer RNA
            4. Ribosomal RNA
    4. Cellular Structure
        i. Nucleus and Cytoplasm
        ii. Cell and Nuclear Membrane

iii. Mitochondria
iv. Endoplasmic Reticulum
    1. Rough
    2. Smooth
v. Ribosomes
    1. Attached
    2. Free Floating
vi. Lysosomes

5. Cell Growth
    i. Cell Cycle
    ii. Protein Synthesis
    iii. DNA Synthesis
    iv. Mitosis
    v. Meiosis
6. Tissue & Organ Radiosensitivity

D. Fundamental Principles of Radiobiology
1. Law of Bergonie and Tribondeau
2. Physical Factors Effecting Radiosensitivity
    i. Linear Energy Transfer (LET)
    ii. Relative Biological Effect (RBE)
    iii. Fractionation & Protraction
3. Biological Factors Effecting Radiosensitivity
    i. Oxygen Enhancement Ratio (OER)
    ii. Age
    iii. Gender
    iv. Recovery of Cell
    v. Chemical Agents
        1. Radiosensitizer
        2. Radioprotectant
4. Dose-Response Relationship Curves

E. Molecular and Cellular Radiobiology
1. Irradiation of Macromolecules
    i. In Vivo
    ii. In Vitro
    iii. Solution
    iv. Effects of Macromolecular Irradiation
        1. Main-Chain Scission
        2. Cross-Linking
        3. Point Lesions/Point Mutations
2. Radiation Effects on DNA
    i. Main-Chain Scission
        1. 1 side rail severed
        2. 2 side rails severed
    ii. Cross-Linking
    iii. Base Separation
    iv. Change/Loss of a Base/Point Lesion/Point Mutation

3. Radiolysis of Water
    i. No Damage/No Effect
    ii. Damage
        1. Hydrogen Peroxide
        2. Hydrogen Peroxyl
        3. Free Radicals
4. Direct and Indirect Effects
5. Target Theory
6. Cell Survival Kinetics
    i. Single Target, Single Hit
        1. D37 – Radiosensitivity of the Cell
    ii. Multitarget, Single Hit
        1. D0 – Mean Lethal Dose
        2. DQ – Threshold Dose
    iii. Recovery
    iv. Cell Cycle Effects
    v. LET, RBE, OER revisited

F. Early Effects of Radiation
1. Acute Radiation Lethality
    i. Acute Radiation Syndromes
        1. Prodromal Syndrome
        2. Latent Period
        3. Manifest Illness Stage
        4. Hemotologic Syndrome
        5. Gastrointestinal (GI Syndrome)
        6. Central Nervous System (CNS) Syndrome
    ii. LD 50/30
    iii. Mean Survival Time (MST)
2. Local Tissue Damage
    i. Skin
        1. Erythemia
        2. Desquamation
        3. Epilation
        4. Carcinoma
        5. Non-Malignant Changes
    ii. Gonads
        1. Ovaries
        2. Testies
3. Hemotologic Effect
    i. Hemopoietic System
        1. Lymphocytes
        2. Granulocytes
        3. Thrombocytes/Platelets
        4. Erythrocytes
    ii. Hemopoietic Cell Survival
4. Cytogenetic Effects

i. Karyotype
    1. Single & Double Hit Aberrations
    2. Reciprocal Translocation
    3. Point Mutations
ii. Chromosomal Aberrations
    1. Chromatid Deletion
    2. Acentric Fragment
    3. Dicentric Fragment
    4. Isochromatid
    5. Ring Formation
    6. Reciprocal Translocation

G. Late Effect of Radiation
1. Local Tissue Effects
    i. Skin
    ii. Chromosomes
    iii. Cataracts
2. Life Span Shortening
3. Risk Estimates
    i. Relative Risk
    ii. Excessive Risk
    iii. Absolute Risk
4. Radiation – Induced Malignancies
    i. Leukemia
    ii. Cancer
        1. Thyroid
        2. Bone
        3. Skin
        4. Breast
        5. Lung
        6. Liver
5. Radiation and Pregnancy
    i. Effects on Fertility
    ii. Irradiation in Utero
    iii. Genetic Effects
        1. Double Dose

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby. Cost-Previously purchased for Intro to Radiography
B. Statkiewicz-Sherer, Visconti, and Ritenour.(2011). Radiation Protection in Medical Radiography, (6th Edition). St. Louis, MO: Mosby. Cost-Previously purchased for Intro to Radiography

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
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VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

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QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

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C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
    - A= 100-92%
    - B= 91-84 %
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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Exposures

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Exposures

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course introduces the student to the fundamental principles of radiographic exposure: radiation production, equipment function, collimation and filtration of the beam, control of secondary radiation, and automatic processing technique. In addition the application of anatomical and pathological conditions affecting image quality will be addressed. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Analyze the technical and patient factors which modify the x-ray beam and govern and influence the production of the radiographic image on radiographic film	Written Assignments Class Discussion/Activity Written Examinations
Calculate principle factors of exposure technique for image resolution	Class Discussion/Activity Written Examinations Written Assignments
Debate the advantages and disadvantages of grids in relation to construction, patient radiation exposure and image quality	Class Discussion/Activity Written Examinations Written Assignments
Differentiate film-screen combinations, relating to patient radiation exposure and image quality	Class Discussion/Activity Written Examinations Written Assignments
Describe chemistry and systems of automatic film processors	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. X-rays and X-ray production

1. What are x-rays?

i. Electromagnetic spectrum
ii. Photons: Bundles or packets of energy
iii. Discovery and history of x-rays
iv. How x-rays are produced
    1. Conditions necessary for x-ray production
    2. Brem's production
    3. Characteristic radiation
v. Properties of x-rays

2. X-ray tubes
    i. Crookes tube
    ii. Coolidge tube
    iii. Anode
    iv. Cathode
    v. Tube housing
    vi. X-ray tube care
3. The x-ray beam
    i. Primary radiation
    ii. Exit (remnant) radiation
    iii. Absorption factors

B. Film and Processing
1. Film base
    i. Purpose, support emulsion
    ii. Composition: glass, cellulose nitrate, cellulose acetate, polyester
    iii. Must be transparent but is usually tinted blue
2. Emulsion
    i. Purpose
    ii. Composition: Silver Bromide (AgBr) crystals dissolved in gelatin
    iii. Structure of AgBr crystals
        1. Ag and Br ions
        2. Sensitivity spec
3. Subcoat
    i. glues emulsion to base
4. Protective coat
5. Latent image
    i. Absorption of photons
    ii. AgBr crystal ionized
    iii. Sensitivity speck collects Silver (Ag) atoms
6. Development – makes latent image visible
    i. Reducing agent
    ii. Bromine barrier
7. Fixation
    i. Stops reduction
    ii. Removes underdeveloped AgBr crystals
8. Density

9. Contrast
    i. Definition of contrast
    ii. Scale of contrast
10. Recorded detail
    i. Unsharpness
11. Distortion
    i. Size, magnification
    ii. Shape, elongation or foreshortening
12. Radiographic quality
    i. Visibility functions: density, contrast, noise
    ii. Recognizability functions: sharpness, distortion

C. Properties of x-ray film
    1. Characteristics Hurter & Driffield (H&D) curve
        i. Density formula
        ii. Toe
        iii. Straight line portion
        iv. Shoulder
        v. D-Max
        vi. Solarization
    2. Film Speed
    3. Film contrast
    4. Film latitude
    5. Effects of development on H&D curve
    6. Double coated film, non-screen, and screen film

D. Interactions of x-ray with matter
    1. Photoelectric effect
        i. Responsible for radiographic contrast
        ii. Process –Absorption of photon with ejection of inner shell electron
        iii. Factors affecting occurrence of interaction
    2. Compton Scatter
        i. Responsible for scatter fog
        ii. Process – Photon dislodges outer shell electron, photon's path changes
        iii. Factors affecting interaction

E. Technical Factors
    1. Milliamperage
        i. Effect of milliamps (mA) on tube current
    2. Time
        i. Reciprocity Law
        ii. Rules of thumb for density changes
        iii. Motion unsharpness
    3. Kilovoltage
        i. Effect on photon energy/wavelength
        ii. Effect on radiographic quality
        iii. 15% rule and 5% changes

iv. Exposure Latitude
v. Optimum kilovolt peak (kvp) and penetration
vi. Advantages of high kvp techniques

4. Distance
    i. Terminology and abbreviations
    ii. Effects on image quality
    iii. Inverse Square Law
    iv. Square Law

F. Patient Status and Contrast Media
1. Body types
    i. Hypersthenic
    ii. Sthenic
    iii. Asthenic
    iv. Hyposthenic
2. Body Tissues
    i. Inorganic vs. organic
    ii. Fat
    iii. Muscle
    iv. Bone
3. Evaluation of patient
    i. Age
    ii. Sex
    iii. Body type
    iv. Pathology
    v. Calipers
4. Respiration
5. Contrast Media
    i. Negative
    ii. Positive

G. Grids
1. History
    i. Gustav Bucky – 1913
    ii. Hollis Potter – 1920
2. Types
    i. Stationary or moving
    ii. Linear or cross hatched
    iii. Focused
3. Grid Specifications
    i. Grid ratio
    ii. Frequency
    iii. Focusing Distance
4. Grid Efficiency
    i. Grid ratio
    ii. Grid Frequency
5. Effect on density and contrast
    i. Calculating exposure factors

        ii. Contrast Improvement factor
    6. Grid Cutoff
H. Intensifying Screens
    1. History
    2. Composition
        i. Calcium tungstate
        ii. Rare earth materials
    3. Cassette Construction
    4. How screens work
        i. Absorb x-rays
        ii. Convert x-ray energy to light energy
        iii. Emit light
    5. Screen speed
        i. Screen thickness
        ii. Crystal size
        iii. Rare earth materials
    6. Effect of screens on density and technique conversion factors
    7. Effect on contrast
    8. Effect on sharpness of detail
        i. Lateral diffusion
        ii. Screen crossover
        iii. Screen film contact
        iv. Screen speed
    9. Spectral matching of screen with film
    10. Screen lag – phosphorescence
    11. Screen care
        i. Artifacts
        ii. Cleaning
        iii. Mesh test
    12. Image noise – Quantum mottle
I. Focal Spot
    1. Focal spot size
    2. Anode angle
        i. Line focus principle
        ii. Anode heel effect
J. Source-to-image Distance (SID) Film Focal Distance (FFD)
    1. Effect of SID on sharpness of detail and penumbra
    2. Effect of SID on magnification
    3. Effect on SID on shape distortion
    4. Effect of SID on density
        i. Inverse Square Law
        ii. Direct Square Law
K. Object to Image Distance (OID), Object to Film Distance (OFD)
    1. Effect of OID on detail, magnification, distortion, contrast, density
    2. Magnification percentage factor
    3. Air gap technique

4. Macroradiography, magnification technique

L. Beam Limiting Devices
    1. Definition
    2. Purpose
        i. Reduce Patient exposure
        ii. Improve Image Quality
    3. Types of Beam Limitation Device (BLD)
        i. Cones/cylinders
        ii. Apertures/Diaphragms
        iii. Collimators
        iv. Automatic collimation system, Positive Beam Limitation Device (PBLD)

M. Beam Filtration
    1. Effect on filtration
        i. On the x-ray beam, quality and intensity
        ii. On patient dose
        iii. On film quality
    2. Half-value layer (HVL)
    3. Types of filtration
        i. Inherent
        ii. Added
        iii. Compensating

N. Radiographic Processing
    1. Processing steps
        i. Wetting
        ii. Developing
        iii. Stop bath
        iv. Fixing
        v. Washing
        vi. Drying
    2. Development process and chemistry
        i. Solvent
        ii. Reducers
        iii. Activators
        iv. Preservatives
        v. Restrainer
        vi. Hardener
        vii. Reduction and oxidation
    3. Fixing Process and chemistry
        i. Solvent
        ii. Acidifier
        iii. Clearing agent
        iv. Hardening agent
        v. Preservative
    4. Automatic Processors
        i. Advantages

ii. Systems
    1. Transport
    2. Circulation/filtration
    3. Tempering
    4. Replenishment
    5. Dryer
iii. Maintenance

5. Film Handling/Storage
    i. Temperature and humidity
    ii. Pressure
    iii. Handling
    iv. Safelights
6. Artifacts
    i. Crescent or crinkle marks
    ii. Static discharge
    iii. Pi lines
    iv. Processor scratches
    v. Dirty Cassettes

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby.
B. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.
C. Selman, Joseph C. (2000). The fundementals of Imaging Physics and Radiobiology (9th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Pathology

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Pathology

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course is an introduction to the basic nature and cause of disease, radiographic manifestation of disease processes and acute injury, and their related radiographic significance. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Compare etiology, sites, complications and prognosis of selected disease processes and conditions	Written Assignments Class Discussion/Activity Written Examinations Oral Communication Assignment
Determine common radiographic procedures and techniques appropriate for selected disease processes and conditions	Class Discussion/Activity Written Examinations Written Assignments Oral Communication Assignment
Describe the areas that are scrutinized in survey techniques to identify pathologic changes on a radiographic image.	Class Discussion/Activity Written Examinations Written Assignments Oral Communication Assignment
Discuss the effects, changes and impact of disease on radiographic image quality	Class Discussion/Activity Written Examinations Written Assignments Oral Communication Assignment

III. OUTLINE OF TOPICS

A. Introduction to Pathology
    1. Definitions
        i. Pathology
            1. Disease
                a. Structural
                b. Functional
            2. Cause of Disease
                a. Exogenous
                b. Endogenous

3. Injury
4. Inflammation
5. Repair
6. Fundamental Tissues
7. Altered Tissue Growth

ii. Disease Categories
1. Congenital Anomalies
2. Inflammation
3. Trauma
4. Tumor
5. Post-Operative Changes
6. Localized Manifestation of Generalized Disease

iii. Etiology
iv. Diagnosis
v. Prognosis
vi. Embryology

2. Purpose of Study
i. Manifestation of Pathology
ii. Relevance to Radiographic Procedures
iii. Pathology Principles

B. Radiographic Pathology Principles
1. Respiratory Anatomy/Physiology and Pathology
i. Definitions/Pathology
ii. Etiology
iii. Radiographic Procedures
iv. Survey Methods – Radiographic Image Review
1. Bones and Soft Tissue
2. Mediastinum
3. Heart
4. Hilar Region
5. Lungs
6. Pleura

v. Prognosis
vi. Effects on Image Quality

2. Skeletal Anatomy/Physiology and Pathology
i. Definitions/Pathology
ii. Etiology
iii. Radiographic Procedures
iv. Survey Methods – Radiographic Image Review
1. Soft Tissue
2. Boney Surfaces
3. Abnormalities in the shape, size and relationship with bones
4. Internal Structures
5. Location of pathological problems in relationship to other structures

6. Determine if Follow-up Exam is necessary

v. Prognosis
vi. Effects on Image Quality
vii. Types of Fractures

3. Abdominal Anatomy/Physiology and Pathology
   i. Definitions/Pathology
   ii. Etiology
   iii. Radiographic Procedures
   iv. Survey Methods – Radiographic Image Review
      1. Fat and Muscle Planes
      2. Solid Organs
      3. Gas- Patterns
      4. Calcifications
      5. Intraperitoneal Air and Fluid
      6. Unrelated Areas
         a. Lung Bases
         b. Extra-Abdominal Soft Tissue
         c. Skeletal Structures
   v. Prognosis
   vi. Effects on Image Quality
4. Circulatory and Lymph System Anatomy/Physiology and Pathology
   i. Definitions/Pathology
   ii. Etiology
   iii. Radiographic Procedures
   iv. Congenital Anomalies
   v. Inflammatory and Degenerative Processes
   vi. Neoplasms
   vii. Survey Methods
   viii. Prognosis
   ix. Effects on Image Quality
5. Nervous System Anatomy/Physiology and Pathology
   i. Definitions/Pathology
   ii. Etiology
   iii. Physiology and Function
   iv. Special Imaging Procedures
   v. Congenital Anomalies
   vi. Inflammatory and Degenerative Processes
   vii. Trauma
   viii. Neoplasms
   ix. Prognosis
   x. Effects on Image Quality
6. Reproductive System Anatomy/Physiology and Pathology
   i. Definitions/Pathology
   ii. Etiology
   iii. Physiology and Function

iv. Special Imaging Procedures
v. Congenital Anomalies
vi. Inflammatory and Degenerative Processes
vii. Neoplasms
viii. Prognosis
ix. Effects on Image Quality

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Pharmacology

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Pharmacology

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course covers the fundamentals of pharmacology including drug absorption, metabolism, and excretion responses for selected drugs and contrast media used in radiology and radiographic procedures. The desired effects, mechanism of actions and adverse effects of contrast media on the human body are discussed. An introduction to venipuncture is included. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Recognize common drug nomenclature in venipuncture and contrast administration and the basic concepts of pharmacology	Class Discussion/Activity Written Examinations Written Assignments
Compare the basic concepts of radiopharmaceuticals, exams using radiopharmaceuticals and radiation safety	Class Discussion/Activity Written Examinations Written Assignments
Differentiate the drugs used for adverse contrast reactions or emergency situations during radiological procedures	Class Discussion/Activity Written Examinations Written Assignments
Compare the biological factors that affect the action of drugs	Class Discussion/Activity Written Examinations Written Assignments
Analyze legal issues pertaining to drugs	Class Discussion/Activity Written Examinations Written Assignments
Distinguish between photon and electron interactions with matter.	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Evolution of Radiologic Technology

1. Scope of Practice
2. Educational Standards
3. Position on Venipuncture

B. Legal Opinions Pro and Con
    1. Cope of Practice
    2. Personal Responsibility
    3. Cost of Health Care
    4. Medical Malpractice/Negligence
    5. Current Practices and the Law

C. Pharmacology
    1. Defined
        i. Medical Terminology
        ii. Sources of Drugs
    2. Pharmacological Divisions
    3. Nomenclature
        i. Chemical Name
        ii. Generic Name
        iii. Trade or Brand Name
        iv. OTC Over-The-Counter
        v. Legend or Prescription Drugs
        vi. Controlled Substance
    4. Drug Laws and Standards
        i. Food and Drug Administration (FDA)
            1. Drug Testing and Standards
        ii. Drug Enforcement Agency (DEA)
            1. Drug Laws and Enforcement
            2. Controlled Substance
            3. Guidelines for Health Care Workers Involved in Medication Dispensing
    5. Drug References
        i. Drug Categories
        ii. Package Insert Information
        iii. Physician's Desk Reference (PDR)
        iv. US Pharmacopeia/National Formulary (USP/NF)
        v. Facts and Comparison
    6. Charting and Consent Forms

D. Drug Abuse
    1. Categories of Abuse
        i. Stimulants
        ii. Depressants
        iii. Narcotics
        iv. Hallucinogenic
        v. Safeguards to Prevent Drug Abuse
    2. Terminology
        i. Addiction
        ii. Dependency

iii. How to Safeguard Against Potential Drug Abuse in Patient Areas

E. Factors Affecting Drug Action
    1. Dosage Forms
        i. Aqueous Preparation
        ii. Alcohol Preparations
        iii. Solid and Semisolid Preparations
    2. Absorption
        i. Surface Area
        ii. Blood Flow
        iii. Passive
        iv. Active
        v. Ionization/Acid-Based Properties
        vi. Lipid Solubility
    3. Distribution
        i. Plasma Binding
        ii. Blood Flow
        iii. Tissue Barriers
    4. Metabolism
        i. Oxidation
        ii. Conjunction
        iii. Factors Adversely Affecting Metabolism
    5. Excretion
        i. Kidney
        ii. G.I. Tract
        iii. Respiratory
    6. Individual and Environmental Factors
F. Basic Concepts
    1. Site of Action
    2. Mechanism of Action
    3. Receptor Site
    4. Agonist/Antagonist/Potentiation
    5. Half Life
    6. Therapeutics Index
    7. Dose-Response Curve
    8. Time Response Curve
    9. Adverse Effects
        i. Toxic Effects
        ii. Carcinogenic
        iii. Teratogenic
        iv. Allergic Reactions
        v. Idiosyncratic Reactions
G. Radiopaque Contrast Media
    1. Chemical Make-up of Contrast
    2. Osmolality, Osmolarity, Osmotic Activity
    3. Intravascular and Enteral Contrast Media

H. Pharmacodynamics of Radi-opaque contrast media (ROCM)
    1. Iodine Concentration
    2. Osmolality Effect
    3. Chelation Effect
    4. Coagulation Effect
    5. Immune Response
    6. Renal Effects
    7. Thyroid Effects
    8. Patient Screening
    9. Drug Interactions
I. Routes of Administration
    1. Five “Rights” of Drug Administration
    2. Routes
        i. Oral
        ii. Sublingual/Buccal
        iii. Parenteral
        iv. Topical
        v. Rectal
    3. Administration Guidelines
    4. Abbreviation & Symbols of Medication
J. Venipuncture
    1. Universal Precautions
        i. Terms Related to Infection Control
        ii. Cycle of Infection
        iii. Infectious Organisms
        iv. Medical Asepsis
        v. CDC Precautions
    2. Venous Anatomy
    3. Venipuncture Technique
        i. Supplies
        ii. Vein Selection
        iii. Procedure
        iv. Contrast Screening
        v. Complications
        vi. Post Procedure
    4. Injecting Through Existing Lines
        i. Chemical Compatibility
        ii. Avoiding Causing an Infection
        iii. Proper Use of Power Injector
        iv. The Do’s and Don’ts of Injecting Through Existing Lines
K. Emergency Medications
    1. Drugs for Cardiac Arrest
    2. Drugs for Respiratory Arrest
    3. Drugs for Contrast Reactions
L. Overview of Drugs Encountered in Radiology
    1. Cardiac Medications

2. Diuretics
3. Antihypertensive
4. Antiallegics/ Antihistamine
5. Bronchial Dilator
6. Chemotherapy
7. Antibacterials/Antiviral
8. Conscious Sedation

M. Radiopharmaceuticals
1. Beta/Gamma/Alpha Particles
2. Organ Imaging
3. Radiation Safety

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Jensen, S. & Peppers, M. (2005). Pharmacology and Drug Administration for Imaging Technologists, (2^{nd} ed). St. Louis, MO: Mosby.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
1. Textbooks
2. Periodicals
3. Films On Demand Videos
C. Internet Resources
1. On-line references
2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and

assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   A= 100-92%
   B= 91-84 %
   C= 83-75%
   F= Below 75%
   I= Incomplete
   W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiographic Physics

3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiographic Physics

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course provides the student with the principles of x-ray generation and use, including the mathematical, electrical, chemical, and physical concepts necessary for x-ray production and beam characteristics. An introduction to the x-ray equipment, instrumentation and control, and the unit of measure is provided. An analysis of production and measurement of radiation, interaction with matter and film, the study of x-ray tubes, rating charts, and x-ray circuits will be presented. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Explain the general principles of the Law of Conservation of Energy	Class Discussion/Activity Written Examinations Written Assignments
Integrate the Bohr's model of atomic structure with the chemical characteristics of a molecule	Class Discussion/Activity Written Examinations Written Assignments
Integrate the principles and application of electrostatics, magnetism and electrodynamics	Class Discussion/Activity Written Examinations Written Assignments
Compare single phase, three phase and high frequency generators in terms of radiation production and efficiency	Class Discussion/Activity Written Examinations Written Assignments
Assess the design characteristics of the radiographic tube, housing and circuitry	Class Discussion/Activity Written Examinations Written Assignments
Distinguish between photon and electron interactions with matter	Class Discussion/Activity Written Examinations Written Assignments

III. OUTLINE OF TOPICS

A. Mathematics

1. Review of Base Arithmetic

i. Addition, Subtraction, Multiplication, Division
ii. Fractions and Decimal Numbers
iii. Graphs and Charts

2. Algebra
    i. Negative Numbers
    ii. Equations
    iii. Ratio and Proportion
    iv. Exponential Notation
    v. Inverse Square Law
3. Geometry
    i. Formulae for areas of plane shapes, including circle
    ii. Proportionality of parts of similar triangles
4. Calculators
    i. Methods for obtaining roots, powers, reciprocals and exponential functions

B. Units of Measurement
1. Definition of Science
    i. Branches of Science
    ii. Scientific Terms
2. Standard Units
    i. Fundamental Units
    ii. Derived Units
    iii. S.I. System
        1. Meter, Kilogram, and Second (MKS)
        2. Centimeter, Gram, and Second (CGS)
    iv. Unit Conversions

C. Energy
1. Physical Concepts of Energy
    i. Force
    ii. Work (force x distance)
    iii. Potential Energy
    iv. Kinetic Energy
2. Law of Conservation of Energy
    i. Energy Levels
    ii. Forms of Energy
    iii. Transformation of Energy
    iv. E=mc2

D. Structure of Matter
1. Subdivisions of Matter
    i. Mixture
    ii. Elements
    iii. Compounds
    iv. Atoms
    v. Molecules
2. Atomic Structures
    i. Electrons

        ii. Protons
        iii. Neutrons
    3. The Elements
        i. Atomic and Mass Numbers
        ii. Isotopes
        iii. Periodic Table
        iv. Valence Number
    4. Compound Bonding
        i. Ionic Bonds
        ii. Covalent Bonds
    5. Ionization
E. Electrostatics
    1. Electrification
        i. Positive and Negative Charges
        ii. Methods of Electrification
        iii. Conductors, Insulators and Semiconductors
    2. Law of Electrostatics
    3. Electroscope
    4. Static Discharge
F. Electrodynamics – Direct Current Electricity
    1. Sources of Electric Current
        i. Batteries – Cell
        ii. Generator – Dynamo
    2. D.C. Circuits
        i. Potential Difference – Voltage
        ii. Current
        iii. Resistance
        iv. Ohm's Law
        v. Components of a Basic Circuit
        vi. Ammeters and Voltmeters
        vii. Series Circuits
        viii. Parallel Circuits
    3. Electric Capacitor
    4. Work and Power of a Direct Current Circuit
G. Magnetism
    1. Classification of Magnets
        i. Natural magnets
        ii. Artificial Permanent Magnets
        iii. Electromagnets
    2. Nature of Magnetism
        i. Laws of Magnetism
        ii. Magnetic domains
        iii. Magnetic Fields
        iv. Lines of Force
        v. Detection of Magnetism
    3. Magnetic Classification of Matter

i. Permeability
ii. Retentivity
iii. Ferromagnetic Materials
iv. Paramagnetic Materials
v. Nonmagnetic Materials
vi. Diamagnetic Materials

H. Electromagnetism
    1. Electromagnetism
        i. Phenomena – Hans Oersted and Davy
        ii. Solenoid
        iii. Electromagnet
        iv. Left Thumb Rule
    2. Electromagnetic Induction
        i. Factors Affecting EMF Induction
        ii. Left Hand Rule
    3. Self-Induction
        i. Counter – EMF
        ii. DC Circuits
        iii. AC Circuits

I. Generators, Motors and Alternating Current
    1. Electric Generator
        i. Construction
        ii. Generation of Current
    2. Alternating Current
        i. Sine Curve
        ii. Root Mean Square
        iii. Ohm’s Law for AC Circuits
        iv. Advantages of AC
    3. Electric Motor
        i. Motor Principle
        ii. Right Hand Rule
        iii. Synchronous Motors
        iv. Induction Motor
        v. Current Measuring Devices
            1. Galvanometer
            2. Electrodynamometer

J. Production and Control of High Voltage – Current Regulations
    1. Transformers
        i. Mutual Induction
        ii. Transformer Law
        iii. Construction
            1. Step up, Step down, Isolation
            2. Air core, Open core, Closed core, Shell
        iv. Transformer Efficiency
            1. Efficiency Formula
            2. Power Losses

2. Auto Transformers
3. Control of Filament and Tube Current
    i. Choke Coil
    ii. Rheostat
    iii. Saturable Reactor

K. Rectification A.C. to D.C.
1. Methods
    i. Self-Rectification
    ii. Half Wave
    iii. Full Wave
    iv. Three Phase Rectification
2. Types of Rectifiers
    i. Vacuum Tube (Valve Tube)
    ii. Solid State Diode Rectification
3. Spinning Top Test
    i. Full wave Rectification
    ii. Timer Accuracy
    iii. Three Phase Rectification

L. X-Rays
1. Discovery
2. Electromagnetic Spectrum
    i. Frequency – Wavelength Relationship
    ii. Cosmic, Gamma, X, UV, Visible Light, IR rays
    iii. Quantum Theory – Photons
3. X-Ray Tube
    i. Component Parts
    ii. Crookes Tube
    iii. Coolidge Tube
4. X-Ray Production
    i. Conditions Necessary for Production
    ii. Electron Interactions
        1. Brems Radiation
        2. Characteristic Radiation
    iii. Target material
    iv. Efficiency of X-Ray Production

M. Properties of X-Rays

N. X-Ray Beam Specifications
1. Exposure (Quantity)
2. Tube Current (mA)
3. Tube Potential (kVp)
4. Distance
5. Filtration
6. Quality
7. Energy
    i. E = hv
    ii. Polyenergetic

iii. Lambda Minimum
8. Half Value Layer
9. Spectral Distribution Curves

O. Interactions of X-Rays with Matter
1. Attenuation – Absorption, Scatter, Distance
2. Photon Energy
3. Energy Levels and Electron Shells
4. Photon Interactions
i. Coherent (Unmodified) Scatter
ii. Compton (Modifies) Scatter
iii. Pair Production
iv. Relative Importance of Various Interactions

P. X-Ray Dosimetry
1. Linear Energy Transfer(LET)
2. Exposure – Roentgen – R
3. Absorbed Dose –Rad

Q. X-Ray Tubes and Rectifiers
1. Radiographic Tubes
i. Cathode Assembly
ii. Filament Thinning
iii. Space Charge Compensation
iv. Stationary Anodes
v. Rotating Anodes
vi. Anode Angle
2. Factors Governing Tube Life
i. Filament Factors
ii. Anode Factors
iii. Tube Charts
1. Tube Rating Charts
2. Cooling Curves
3. Heat Units

R. X-Ray Circuits
1. Equipment Design
i. Source of Electricity – Line Voltage
ii. Primary Circuit – Switch, Fuses, Line Voltage Compensator
iii. Secondary Circuit – Step-up Transformer, mA Meter, Rectifiers, High Voltage Cable, X-ray Tube
iv. Timing Devices
1. Mechanical Timers
2. Synchronous Timers
3. Old Electronic Impulse Timers
4. Modern Electronic Timers
5. mAs Timers
6. Automatic Exposure Control
a. Phototiming

b. Ionization Chamber
v. Filament Circuit
vi. Control Panel
2. Three Phase Generation of X-rays
3. High Frequency Generators
4. Mobile X-Ray Equipment
i. Rechargeable Battery Powered
ii. Capacitor Discharge Units
1. Wave-tail Cutoff
2. Grid Controlled Triodes
iii. AC Wall Outlet Powered

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Bushong, S. (2001). Radiologic Science for the technologists: Physics, Biology, and Protection, (7th ed). St. Louis, MO: Mosby.
B. Carroll, Q.(1997). Fuch's Radiographic Exposure, Processing and Quality Control. (6th ed.). Springfield, IL: Thomas.
C. Selman, Joseph C. (2000). The Fundamentals of Imaging Physics and Radiobiology (9th ed.). Springfield, IL: Thomas.

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
1. Textbooks
2. Periodicals
3. Films On Demand Videos
C. Internet Resources
1. On-line references

2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in

at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84

JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiologic Technology Independent Study

1-3 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiologic Technology Independent Study

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 1-3

C. Description: This independent study course is designed to give the student the opportunity to study and be tested on specific areas of radiologic technology that they may be interested in. This self-paced course is designed to assist the radiologic technology student to obtain a deeper education in the selected area of the radiologic sciences including, but not limited to, CT, MRI, nuclear medicine, radiation therapy and ultrasound career paths. Students have the opportunity to repeat this course as many times as they would like. (F, S, Su)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Develop and pursue a unique study question through substantial, legitimate research that fosters focus and flexibility	Written Assignments Oral Communication Assignment
Maintain a research journal documenting work and observations	Written Assignments Oral Communication Assignment
Gain a thorough understanding of the topic through investigation, observations and discussion of aesthetics and cultural contexts, such as social, and/or healthcare issues	Written Assignments Oral Communication Assignment
Prepare a final paper based on work and experience	Written Assignments Oral Communication Assignment

III. OUTLINE OF TOPICS

A. Setting up an independent study involves agreeing on a topic of research, and preparing a one page outline of intended study area.

IV. METHOD(S) OF INSTRUCTION

This course is an independent study utilizing extensive readings, research, and experiential learning. Questions and observations are strongly encouraged.

Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. None

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

ASSIGNMENTS – Please plan to devote at least four to six hours per week for completing journal entering, reviewing, composing rough and final drafts, and preparing for the next portions of project. Assignments may consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research journal, written or oral communication projects of findings and analysis and attendance/participation.

Expect to meet weekly with the instructor for discussion, advising, and constructive criticism. However, the student is personally responsible for the development and progress of the project. Contact via email and phone is encouraged.

All assignments must be typewritten and are due at the beginning of meeting on the assigned due dates. Late assignments will not be accepted.

A. Paper: 50%
B. Research Journal: 30%
C. Attendance/Participation: 20%
D. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
   - A= 100-92%
   - B= 91-84 %
   - C= 83-75%
   - F= Below 75%
   - I= Incomplete
   - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiologic Technology Prep Workshop

.5 Credit Hours

Prepared by: Stuart E. Frew MS, RT(R)
Date: 4/12/2012

Mary Beth Ottinger, Division Chair
Dena McCaffrey, Interim Dean, Career & Technical Education

RADxxx Radiologic Technology Prep Workshop

I. CATALOGUE DESCRIPTION

A. Requires application to the Radiologic Technology Program and is by invitation only; all other Radiologic Technology classes require admission to the program, Reading Proficiency

B. Credit hour award: .5

C. Description: All students who meet minimum eligibility requirements upon application to the Radiologic Technology Program will be invited to the workshop. If invited, the applicant must attend the workshop to be considered for the Radiologic Technology Program. The workshop will inform potential students of all aspects of the Radiologic Technology Program and review program requirements. All applicants in attendance will complete an interview, type an essay in our computer lab, and complete a critical thinking exam. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Demonstrate oral communication skills	Interview
Demonstrate written communication skills	Essay
Demonstrate a thorough understanding of the radiologic technology profession through investigation, observations and discussion of all aspects of the career field, such as work requirements, and/or healthcare issues	Interview Essay Required radiologic observation evaluation
Demonstrate reading skills	Exam
Demonstrate critical thinking skills	Interview Essay Required radiologic observation Exam

III. OUTLINE OF TOPICS

A. All applicants in attendance will complete an interview, type an essay answer in our computer lab, and complete a critical thinking exam. Students invited to the workshop will receive a letter via email with

specific dates and times and the essay topic. Students who have been invited to the Radiologic Technology workshop must attend the workshop session to be considered for the program.

IV. METHOD(S) OF INSTRUCTION

This course is a workshop utilizing extensive readings, research, and experiential learning. Questions and observations are strongly encouraged. Students are expected to be *ACTIVE* participants in the learning process.

V. REQUIRED TEXTBOOK(S)

A. None

VI. REQUIRED MATERIALS

A. None

VII. SUPPLEMENTAL REFERENCES

A. Letter via email with specific dates and times and the essay topic.

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES – The following chart lists how applicants earn points toward admission into the Radiologic Technology Program:

Candidates will be evaluated on a 500 point scale.
Points will be awarded as described below:

Criteria	**Formula for calculating points**	**Points Possible**
# Pre-Req and Gen Ed. Classes completed	Hrs completed x 100/24-30	100
GPA in Pre-Req and Gen Ed. Classes	GPA x 100/4.0	100
Interview	Avg. scores from interview	100
Essay	Avg. scores from essay	100
Critical Thinking & Reading Exam	Score from exam	100
Total		**500**

In addition, students who were selected as alternates for last year's class, add 5 points.

When we receive the test scores for the critical thinking & reading exam, the Admissions Committee will meet. The student will be notified via email in **mid to late May** as to their standing. Please do not call, as this information is not given out by telephone. All applicants will be notified of their status – accepted

or alternate. All applicants, accepted or alternate, must return the acceptance notification by the deadline indicating acceptance or decline of the offer as a class member or alternate. Please be sure to have a current address and email in the STARS system. If unsure, please stop by the Admissions and Student Records Office and provide them with a current address, email address (Jefferson College email is considered the primary email unless the applicant is not a current Jefferson College student) and telephone number.

We cannot offer admission to all the qualified applicants. Our enrollment is limited to 15 students. Only students meeting the minimum requirements will be presented to the Admissions Committee. Final selection will be made by the Admissions Committee and the 15 applicants with the highest total scores will be selected for the class. The following information is evaluated during the selection process:

Personal References, number of Prerequisite and General Education Classes Completed, GPA in Prerequisite and General Education Classes, Oral Communication Skills, Written Communication Skills, Professionalism, Critical Thinking Ability, Motivation for the Profession, and Realistic Expectations. Also, all materials submitted to program in previous years will be reviewed each year if applicant chooses to re-apply.

The information above is directly related to the program's Mission, Vision and Goals. The information listed above is the only information that is considered during the selection process. Every effort is made to insure that the selection process is fair and equitable to all applicants. Multiple interview ratings and essay ratings are averaged in determining the final score. The selection process strives to achieve a well-rounded assessment of the student as a whole. The number of classes completed is just as important as the grades in those classes. Critical thinking skills are just as important as GPA.

A. Grading Scale:

P= Meet, complete and participate in all requirements of the application and workshop processes.

F= Failure to meet, complete and participate in all requirements of the application and workshop processes.

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JEFFERSON COLLEGE

COURSE SYLLABUS

RADxxx

Radiography Curriculum Review and Professional Development

3 Credit Hours

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Date: 4/12/2012

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RADxxx Radiography Curriculum Review and Professional Development

I. CATALOGUE DESCRIPTION

A. Prerequisites: Acceptance to Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 3

C. Description: This course provides the student with a general review of all previous coursework through multiple examinations on concepts in radiation protection, patient care management, radiographic procedures, image production and equipment operation, so as to prepare the student for the national registry exam. This course also discusses matters involving current trends in imaging, career options, the importance of critical thinking skills and continuing education to the profession, and professionalism of registered Radiologic Technologists. (S)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

Expected Learning Outcomes	Assessment Measures
Restate the principle concepts regarding image production and equipment operation to enhance image quality	Written Assignments Class Discussion/Activity Written Examinations
Relate practicum experience for all traditional and non-traditional procedures including radiation protection/safety precautions	Class Discussion/Activity Written Examinations Written Assignments
Analyze radiographs for optimal and sub-optimal image quality as it relates to patient's medical condition or disease process	Class Discussion/Activity Written Examinations Written Assignments
Develop a cover letter, resume and thank you letters	Class Discussion/Activity Written Assignments
Develop/demonstrate improving interview skills	Oral Communication Assignment
Discuss current trends in imaging, career options and continuing education	Class Discussion/Activity
Internalize critical thinking skills	Class Discussion/Activity Oral Communication Assignment

III. OUTLINE OF TOPICS

A. Professional Development
    1. Current Trends in Imaging
    2. Career Options
    3. Importance of Critical Thinking Skills
        i. Definition of Critical Thinking
    4. Importance of Continuing Education to the Profession
        i. Professional requirements of ARRT
    5. Professionalism of Registered Technologists
        i. ASRT Code of Ethics
    6. Portfolio & Interviewing
        i. What is a professional portfolio
        ii. Components/parts that constitute an effective portfolio
            1. Cover letter
            2. Resume
            3. Thank You Letters
            4. Necessary Documentation
        iii. Develop, Compile and Present a portfolio
        iv. Utilize a professional portfolio effectively as an interview instrument

B. Introduction to Pathology
    1. Orientation to Examination
    2. Review of ARRT Examination Handbook
    3. Helpful hints for review and studying
    4. Academic requirements for exams
    5. Evaluation methods
    6. Content Review

C. Testing Areas
    1. Radiographic Exposure
    2. Patient Care Management
    3. Medical Terminology
    4. Radiation Protection
    5. Radiobiology
    6. Radiographic Positioning
    7. Radiographic Pathology
    8. Radiographic Physics
    9. Image Intensification
    10. Quality Assurance

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be *ACTIVE* participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class

prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

A. Saia, D. A. (2012). Lange Q & A; Radiography Examination, (9th ed.). United States: McGraw-Hill Companies.
B. Corectec Online Registry Review (www.corectec.com)
C. ODIA Online - Online Digital Imaging Academy (www.arrt.org)

VI. REQUIRED MATERIALS

A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES

A. Class Handouts
B. Library Resources
   1. Textbooks
   2. Periodicals
   3. Films On Demand Videos
C. Internet Resources
   1. On-line references
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES –Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. The student should be aware that proofreading and revision are extremely important when preparing homework. All writing assignments submitted for grading should be final drafts. Only error-free documents will receive an "A." A final semester grade of 75% or above must be achieved in this course to successfully complete this course.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. **No make-up exam will be considered unless the instructor is personally notified prior to the absence**. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.

QUIZZES – will be given on the dates published in the class schedule. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. **No make-up quizzes will be considered.**

ASSIGNMENTS – Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting. Assignments will consist of worksheets, textbook reading, review questions and other activities to enhance the learning experience.

Evaluation tools will include research projects, written and oral communication projects, class attendance/participation, homework assignments, and exams.

Chapter objectives should be completed for each chapter and ready to be turned in at the beginning of each day. This assignment will be collected intermittently without verbal notice of collection dates.

All assignments must be typewritten and are due at the beginning of class on the assigned due dates. Late assignments will not be accepted. In-class quizzes and assignments cannot be made up.

A. Quizzes; 5%
B. Tests: 40%
C. Final: 10%
D. Homework: 15%
E. Written and Oral Communication Assignments: 20%
F. Attendance/Participation: 10%
G. Grading Scale: *(Jefferson College Radiologic Technology Program's)*
    - A= 100-92%
    - B= 91-84 %
    - C= 83-75%
    - F= Below 75%
    - I= Incomplete
    - W= Excused withdrawal from course

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu/jeffco/index.php?option=com_weblinks&catid=26&Itemid=84