

BISMARCK MEDICAL CENTER RADIOGRAPHY PROGRAM COURSE DESCRIPTIONS (IN ALPHABETICAL ORDER)

Advanced Procedures

During this class, students will study various techniques to aid in radiographing children. Age appropriate methods for radiography, communication, proper technique, radiation protection methods, and immobilizing the child will be taught. This course also offers a review of basic positioning of specific areas of the body. A study of non-routine procedures relating to specialized examinations for each body part will also be included. The student will gain a better understanding of special exams such as biliary duct procedures, hysterosalpingography, orthoroentgenography, arthrography and myelography. Instruction will include reasons for doing exams, how they are performed, and the projections used for many exams. Angiography, interventional, and noninterventional procedures will be discussed.

Prerequisite: Radiographic Procedures

Anatomy & Physiology I

This course is the study of the body structure including size, shape, composition and also how the body functions. It is taught during the Junior year. We will cover the organ systems from simplest to most complex that make up an individual person. We will also cover the function of each system. During this course, the student will learn the proper terminology to describe the location of body parts with respect to one another. This course includes the study of body cavities, membranes, and organs within each cavity.

Prerequisite: college A & P

Anatomy & Physiology II

This course continues on in the study of the body structure including size, shape, composition and also how the body functions. It is taught during the Senior year. We will cover the organ systems from simplest to most complex that make up an individual person. We will also cover the function of each system. During this course the student will learn the proper terminology to describe the location of body parts with respect to one another. This course includes the study of body cavities, membranes, and organs within each cavity.

Prerequisite: A & P I

Clinical Education I

This involves all of the student's clinical experiences during the first semester. It begins with hospital orientation, Radiology orientation, and program orientation. Following orientation week, the student will have "Float" days that allow them to spend limited time in all of the major rotations, and includes an introduction into the Radiology office, and transportation. This float time provides students with an insight into what is involved in each of these areas on a daily basis. The student is able to observe what goes on in the different areas in which they will be rotating. In the weeks following, through the end of the semester, the student will assist with many different examinations within the clinical setting. The student progresses through a series of clinical assignments, including rotations in Diagnostic Radiography, Fluoroscopy, Surgery & Mobile, Emergency Department, Pain Clinic, Evenings, Orthopedics, and some Sanford clinics. Students are required to complete objectives and clinical performance evaluations (beginning in November) for each rotation. During this first semester, students will also spend some limited time in specialty areas. During this semester, the student will begin performing competencies. *After a student has passed the didactic and laboratory phases of an exam*, the student will be able to perform the exam under direct supervision. After the student has demonstrated competency, they will be able to perform the exam under indirect supervision.

6 competencies must be completed by the end of the first semester.

Prerequisites: None

Clinical Education II

This correlates to the second semester for the student, during their junior year. The student progresses through a series of clinical assignments, including rotations in Diagnostic Radiography, Fluoroscopy, Surgery & Mobile, Emergency Department, Pain Clinic, Evenings, Orthopedics, and some Sanford clinics. The student becomes more confident and has passed competencies for some of the basic exams, so they will now be performing more of them under indirect supervision. The student rotations during this semester will include rotations to more of the specialty imaging areas. The student is continually learning more radiographic examinations and performing them under direct supervision. The student must continue to complete objective checklists for each rotation and clinical performance evaluations weekly. **25 competencies** must be completed by the end of the second semester.

Prerequisite: Clinical Education I

Clinical Education III

Clinical Education III begins at the start of the second year for the student. It involves the third semester of education. The student progresses through a series of clinical assignments, including rotations in Diagnostic Radiography, Fluoroscopy, Surgery & Mobile, Emergency Department, Pain Clinic, Evenings, Orthopedics, and some Sanford clinics. Students continue to assist/perform radiographic examinations under direct and indirect supervision. During the 3rd and 4th semesters, the student will spend more time in the specialty areas, and some of their choice (see information following this section). The student is progressing clinically during this time, and must continue to complete objective checklists for each rotation and clinical performance evaluations weekly.

43 competencies must be completed by the end of the third semester.

Prerequisite: Clinical Education II

Clinical Education IV

This is the fourth semester of the senior year. The student progresses through a series of clinical assignments, including rotations in Diagnostic Radiography, Fluoroscopy, Surgery & Mobile, Emergency Department, Pain Clinic, Evenings, Orthopedics, and some Sanford clinics. During this time, emphasis is placed on *proficiency* in performing examinations. Students are now capable of performing many examinations under indirect supervision. Students are able to work more independently during this time. During this semester, students are required to complete all the mandatory and elective competencies. Focus is placed on critiquing images and understanding techniques. Students must complete all objectives and clinical assignments for graduation.

56 competencies must be completed by the end of May, in order to graduate.

Prerequisite: Clinical Education III

Digital Imaging

This course will assist the junior student's understanding of how digital imaging works and how they can improve the patient's care with better imaging techniques. This course will give the student a basic understanding of how digital (CR and DR) images are created and captured, pre- and post-processing techniques, storage of images, the display systems and electronic images, and the difference between CR and DR in the clinical use.

Prerequisite: None

Image Analysis I

This course is designed to give the first year student a basic understanding of acceptable radiographic images. We will cover the anatomy and positioning of images. They will also learn to identify the anatomy and projection as they look at each image. Image Analysis is the terminal point in the radiographic process, and therefore relates and integrates with all other courses, especially Radiographic Procedures.

Prerequisite: None

Image Analysis II

Upon completion of this course, the student will be able to recognize the difference between technically acceptable and unacceptable quality of radiographic images and will be able to make adjustments in positioning. The student will also learn image evaluation criteria for many different projections. Image Analysis II is taught concurrently with Advanced Procedures, and Trauma II.

Prerequisites: Radiographic Procedures and Imaging Analysis I

Introduction to Specialized Imaging

This course does not involve any classroom hours. It is a self-study course, where students are given written assignments to complete. The information assigned relates to the specialized imaging of Radiology in order to provide the student with a better understanding of the areas of CT, Ultrasound, MRI, Nuclear Medicine, Radiation Therapy, and also bone densitometry. This course is intended to provide students with a background into these areas of imaging, so that they have a basic understanding of what goes on in these areas, prior to their clinical rotation. Students have clinical rotations through all of these areas, except bone densitometry, throughout their two years of training.

Prerequisite: None

Medical Terminology

For radiographers to function intelligently and interact effectively with health professionals in the clinical environment, they must be able to read, write, and speak the medical language. The intent of this course is to introduce the student to commonly used medical words so that they may become more familiar with these medical words as they read them in patient charts, on patient exam requests, or hear them used in the health care setting.

Prerequisite: None

Pathology

This course involves the study of abnormal changes in the function or structure within the body. We will cover the signs and/or symptoms of diseases, their causes, and the radiographic appearance of certain diseases. Students will learn the role of the radiographer in imaging the changes in normal anatomy and tissue brought on by disease. The course involves studying many different diseases with which a radiographer must become familiar.

Prerequisite: Imaging Analysis I

Patient Care

This course is to introduce the junior radiography student to certain procedures, methods, techniques and equipment used for the general care of patients. The student will learn the importance of history taking and how to interact professionally and appropriately with all age groups. This course will cover basic transfer and immobilization techniques. Students will also learn about many of the common drugs, along with the different types of contrast media, and their functions. The course covers what to do in a medical emergency and what drugs are commonly found in a crash cart. Included in the course is the study of aseptic and nonaseptic techniques. The student will also learn about ethical and legal issues of Radiology, and medical law in the health care profession.

Prerequisite: None

Principles of Exposure

Principles of Exposure introduces the subject of radiographic image quality, describing principles that contribute to the sharpness and visibility of the recorded image. Each factor is examined separately, with emphasis on calculating its effects through the use of the appropriate formulas and their practical applications. Upon completion of the course, the student will be able to employ technical factors, use accessory items such as grids, screens, etc., and have the knowledge to obtain optimum radiographic results.

Prerequisites: None

Radiation Protection & Biology

This course includes methods of radiation protection including the different types of devices available. Students will study the biological effects of radiation, including short-term and long-term effects. Students will learn how to minimize exposure to the patient, themselves, and others. The course includes studying the rationale for shielding, the purpose of beam restriction, and the effects of filtration, both inherent and compensating. Sources of radiation will be taught along with maximum permissible dosages, both public and occupational as recommended by the NCRP. Students will learn about personnel monitoring and its proper uses, and survey meters. The student will also learn about the different units of measurement involved with radiation, and the basics of ALARA.

Prerequisite: Principles of Exposure, College A & P

Radiographic Physics

This course provides the student with an understanding of the principles involved in x-ray production, and learning of the parts of the x-ray equipment. It includes the study of atoms, learning about the difference between electromagnetic and particulate radiation, the study of the x-ray tube and how x-rays are produced, and x-ray interactions with matter. Also included in this course are methods to control scatter, learning about automatic exposure control, and the study of the parts and function of the image intensifier. Students will also learn how equipment is designed for radiation protection, and the testing standards required to be performed on equipment.

Prerequisite: Principles of Exposure

Radiographic Procedures

This course includes a step-by-step process into teaching the student to take radiographs on actual patients. This course goes hand in hand with Clinical Education I and II by learning in the classroom, Lab, and performing examinations on actual patients. Students start by learning in the classroom about specific body anatomy, then studying the positions and projections necessary to take each specific radiograph. Students will learn various anatomical parts and routine projections by studying the skeleton, bones, drawings, and radiographs in addition to hands on learning in the clinical setting.

Prerequisite: None

Registry Review

This course is a review of information taught throughout the two years in the program. It prepares the student to take the national board examination offered by the ARRT. The student will complete a variety of exams in order to prepare them for Boards such as Corectec online, ASRT Seal Exams, Elsevier EAQs, and questions from Lange Q & A Radiography. Instructors also provide handouts and worksheets to be completed by the student. This course begins in January of the senior year, prior to graduation.

Prerequisite: majority of all courses

Trauma and Mobile Radiography I

This course will prepare the student in handling trauma patients and how to radiograph them as quickly and as easily as possible. The student will learn how to radiograph patients within the surgical setting. Students will learn about the various types of fractures that can occur. In addition, much of this course involves introductory information to trauma and mobile radiography. Expanded information on this topic is included in Trauma and Mobile Radiography II.

Prerequisites: None

Trauma and Mobile Radiography II

This course will continue to prepare the student in handling trauma patients and teach them how to radiograph these patients as quickly and as easily as possible. The goal is to produce quality images with the least amount of discomfort to the patient. Some of the topics covered include technique adjustments, simplified centering, and rules of shift. This course also teaches the student how to use props (sponges, sandbags, etc.), tube tilt and IR placement to obtain projections without moving the trauma patient.

Prerequisites: Trauma and Mobile Radiography I