MEDICAL IMAGING SCIENCES

Program Description
Radiology Program is a continuous 24-month program which begins each year in the Summer semester. The program is designed to prepare a radiographer to perform diagnostic procedures in a Medical Imaging Sciences department, as well as other health settings. The program is accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT), (312) 704-5300, and the California Department of Public Health, (916) 323-2786. JRCERT accreditation qualifies all graduates of the Radiology Program to take the American Registry of Radiologic Technology (ARRT), Diagnostic Radiography Certification Examination (provided they have not been convicted of a felony), and the California Department of Public Health fluoroscopy examination. Anyone convicted of a misdemeanor or felony may not qualify to take the ARRT certification exam. It is highly recommended that if you have a conviction on your record that you directly contact the ARRT for eligibility (651) 687-0048 ext. 8580.

Courses are arranged in a meaningful sequence and must be taken in the order planned. Progression toward and completion of the Associate Degree requires the attainment of a minimum grade of “C” in all program and adjunct courses. (See “Department Requirements” to follow.) Campus classes provide theory and laboratory practice, which are correlated with clinical experience in the medical imaging sciences departments of affiliated institutions. A prescribed, regulation uniform is worn during clinical assignments. Students must provide their own transportation to all facilities and must be willing to travel 100 miles each way to the various clinical sites. Students are required to complete four clinical site rotations at any of the 15 affiliate sites they are assigned to. Clinical site locations extend from Santa Paula to San Luis Obispo. There is no guarantee that the clinic site will be in their city of residence. Any student that misses 10% or more of the clinical portion of the program, in a given semester, is subject to dismissal pending faculty review.

All students are required to pass a physical exam, background check, and drug screening. If at any time before or after acceptance into the program, the student’s conduct or physical or emotional health is such that there is potential threat to the well-being of patients, the applicant will be denied admission to, or be withdrawn from, the major. In addition to the policies and standards of Santa Barbara City College, Health Technologies programs have policies and requirements based on the professional standards and guidelines of their individual regulating state and national accrediting boards. These policies, including our pregnancy policy are available online at www.sbcc.edu/radiology (http://www.sbcc.edu/radiology). Mission Statement
The mission of the Associate in Science Degree program is to educate students to become competent radiographers who can serve the needs of a diverse patient population in an ethical and compassionate manner. Our basics goals are to

1. Graduate students that are clinically and technically prepared to enter the current job market.
2. Graduate students that are professional and ethical.
3. Graduate students that communicate effectively in the work care setting.

4. Graduate students that demonstrate clinical thinking and problem-solving skills in the performance of their duties.

Admission Requirements
2. Eligibility for ENG 110 Composition and Reading or ENG 110H Composition and Reading, Honors — Composition and Reading.
3. Eligibility for MATH 104 or MATH 107 Intermediate Algebra or MATH 111 — Intermediate Algebra.
4. Complete BMS 107 Human Anatomy, (4 units), and BMS 108 Human Physiology, (4 units), or equivalent, with a grade of “C” or better.

Before entering the program, applicant will be required to:
1. Complete RT 100 Radiography and Health Care;
2. Attend a program Orientation meeting;
3. Complete a physical examination, including immunizations and/or titers (must be on the SBCC physical exam form which will be provided);
4. Obtain a CPR card—must be kept current throughout the program;
5. Pay required badge and materials fees;
6. Pass a criminal background check and drug screening examination;
7. Students will need a valid, government-issued Social Security card prior to testing for the ARRT and CRT board exams after the completion of the program.

Failure to comply with any of the above requirements will make the student ineligible for admission to the program.

Refresher Students
Refresher students are those who are certified as radiographers in California and who want to participate in one or more SBCC Radiographic and imaging courses. In most cases, this will be done because of a time lapse since being actively exposed to the practice of radiography. To participate in the program, call ext. 2366 for information.

Sonography
Program Description
The Diagnostic Medical Sonography Program (DMS) is a continuous 21-month program which begins every-other Fall semester. The program is accredited by the Commissions on Accreditation of Allied Health Education Programs (CAAHEP) as a general concentration program. With the general concentration, students will be able to perform sonographic examinations of the abdomen, superficial structures, non-cardiac chest, and the gravid and non gravid pelvis. CAAHEP accreditation qualifies all graduates of the DMS program to take the American Registry for Diagnostic Medical Sonography (ARDMS) Sonographic Principles and Instrumentation Examination, Abdomen examination, and Obstetrics and Gynecology Examination. Anyone convicted of a misdemeanor or felony may not qualify to take the ARDMS certification exam. It is highly recommended that if you have a conviction on your record that you directly contact the ARDMS for eligibility, (800) 541-9754, ext. 1.

Courses are arranged in a meaningful sequence and must be taken in the order planned. Progression toward and completion of the Certificate requires the attainment of a minimum grade of “C” in all program and adjunct courses. (See Entrance Requirements and Required Core Courses
to follow.) Campus classes provide theory and laboratory practice, which are correlated with clinical experience in the medical imaging departments of affiliated institutions. A prescribed, regulation uniform is worn during clinical assignments. Students must provide their own transportation to all facilities and must be willing to travel 100 miles each way to the various clinical sites. Students are required to complete two clinical rotations at any of the 15 affiliate sites they are assigned to. Clinical site locations extend from Templeton to Mission Hills. There is no guarantee that the clinic site will be in their city of residence. Any student that misses 10% or more of the clinical portion of the program, in a given semester, is subject to dismissal pending faculty review.

All students are required to pass a physical exam, background check, and drug screening. If at any time before or after acceptance into the program, the student’s conduct or physical or emotional health is such that there is potential threat to the well-being of patients, the applicant will be denied admission to, or be withdrawn from, the major. In addition to the policies and standards of Santa Barbara City College, Health Technologies programs have policies and requirements based on the professional standards and guidelines of their individual regulating state and national accrediting boards. These policies, including our pregnancy policy are available online at www.sbcc.edu/sonography (http://www.sbcc.edu/sonography).

**Entrance Requirements**

After acceptance to the DMS program, and before entering, students are required to:

1. Attend a mandatory orientation meeting the semester prior to entry (accepted students will be notified individually of the date and time).
2. Student must have a physical exam done by a physician of their choice using the SBCC physical exam form, which will be handed out at orientation.
3. Submit results of a current negative TB test, and update annually.
4. Submit lab results showing proof of immunity to Measles, Mumps, and Rubella (the MMR vaccination).
5. Submit lab results showing proof of immunity to Hepatitis B. Note: The Hepatitis B vaccination is given in three doses over a six month period.
6. Submit proof of having received the Tdap vaccination.
7. Submit lab results showing proof of immunity to varicella.
8. Submit proof of having received the influenza vaccination each flu season.
9. Submit a copy of a CPR card, which must be kept current throughout the program.
10. Pass a background check.

**Application Procedure**

Submit the following to:

**SBCC Health Technologies Office:**

- Completed DMS application
- A copy of professional license
- Official transcripts

**Program Cost and Outcome**

For planning purposes, the website below provides information on the cost of attendance, program length (assuming a student attends full-time), financing options and historical student completion rates:

http://www.sbcc.edu/financialaid/gainfulemployment

**Programs of Study**

- Radiography, Associate in Science (AS) (https://catalog.sbcc.edu/academic-departments/medical-imaging-sciences/radiography-as)
- Diagnostic Medical Sonography, Certificate of Achievement (C) (https://catalog.sbcc.edu/academic-departments/medical-imaging-sciences/diagnostic-medical-sonography-certificate-achievement)

**Credit Courses**

**Diagnostic Medical Sonography (DMS)**

**DMS 148 Clinical Experience 1A (4-4.2 Units)**
Prerequisites: DMS 165.
Skills Advisories: Eligibility for ENG 110 or ENG 110H, proficiency in MATH 104 or MATH 107 or MATH 111.
Hours: 228 (228 lab)
Introduction to the clinical setting and exposure to departmental organization, policies and procedures, patient flow and observation of clinical case techniques and protocols.
Transfer Information: CSU Transferable

**DMS 149 Clinical Experience 1B (4.2 Units)**
Prerequisites: DMS 165 and DMS 156.
Hours: 228 (228 lab)
Continuation of clinical experience. Exposure to departmental organization, policies and procedures, patient flow and observation of clinical case techniques and protocols.
Transfer Information: CSU Transferable

**DMS 150 Physics and Instrumentation (3 Units)**
Prerequisites: PHYS 101 or RT 119 or PHYS 102 and MATH 117 or MATH 107 or PSY 150 or MATH 120.
Hours: 54 (54 lecture)
Introduction to the basic acoustical physics and acoustical waves in human tissue. Emphasis is on ultrasound transmission in soft tissues, attenuation of sound energy, parameters affecting sound transmission and resolution of sound beams.
Transfer Information: CSU Transferable

**DMS 155 Abdominal and Small Parts Scanning (3 Units)**
Prerequisites: BMS 107 and BMS 108 and COMM 131 or COMM 131H or ENG 110 or ENG 110H.
Hours: 90 (36 lecture, 54 lab)
Interpretation of normal anatomy, sonographic and gross anatomy, demonstrating scanning techniques and identifying normal sonographic protocols for abdomen and small parts.
Transfer Information: CSU Transferable

**DMS 156 Ob/Gyn Scanning (2.7 Units)**
Prerequisites: DMS 155 and RT 120 and RT 250.
Hours: 72 (36 lecture, 36 lab)
Interpretation of normal anatomy, sonographic and gross anatomy, demonstrating scanning techniques and identifying normal sonographic protocols for OB/GYN.
Transfer Information: CSU Transferable

**DMS 160 Pathophysiology (3 Units)**
Prerequisites: DMS 150 and DMS 155.
Hours: 54 (54 lecture)
Specific study of pathology and pathophysiological mechanisms related to diagnostic medical sonography.
Transfer Information: CSU Transferable
DMS 165 Abdominal and Small Parts Scanning and Pathology (3 Units)
Prerequisites: DMS 155 and DMS 150.
Hours: 90 (36 lecture, 54 lab)
Interpretation of normal and abnormal anatomy of abdomen and small parts. Sonographic and gross anatomy, comparing one disease to another. Identification of pathophysiological anatomic structures in various sonographic planes and images.
Transfer Information: CSU Transferable

DMS 166 Ob/Gyn Scanning and Pathology (2 Units)
Prerequisites: DMS 156, DMS 160.
Hours: 36 (36 lecture)
Interpretation of normal and abnormal OB/GYN anatomy, sonographic and gross anatomy, comparing one pathological condition to another. Identification of pathophysiological anatomic structures in various sonographic planes and images.
Transfer Information: CSU Transferable

DMS 170 Introduction to Vascular Ultrasound (4 Units)
Prerequisites: DMS 165, DMS 160, DMS 150, DMS 148. Students must pass summer clinicals in order to take this class.
Hours: 108 (54 lecture, 54 lab)
Introduction to Doppler (color flow), with a hands-on approach. Overview of normal and pathological sonographic data includes arterial and venous peripheral vascular, abdominal vasculature and extracranial carotid.
Transfer Information: CSU Transferable

DMS 183 Clinical Experience 2 (9.3 Units)
Prerequisites: DMS 148.
Hours: 504 (504 lab)
Continuation of clinical experience. Exposure to departmental organization, policies and procedures, patient flow, darkroom and processing procedures, observation of clinical case techniques and protocols. Beginning hands-on experience and equipment setup.
Transfer Information: CSU Transferable

DMS 184 Clinical Experience 3 (2.4 Units)
Prerequisites: DMS 183, DMS 166 and DMS 170.
Hours: 128 (128 lab)
Clinical experience in ultrasound, including equipment handling, patient management, as well as departmental operations and scope.
Transfer Information: CSU Transferable

DMS 185 Clinical Experience 4 (9.5 Units)
Corequisites: DMS 183.
Hours: 513 (513 lab)
Advanced clinical experience, including sonographic study of the abdomen, small parts, and pelvis as well as OB/Gyn exams to identify normal anatomy and pathologic conditions.
Transfer Information: CSU Transferable

DMS 250 Sonography Interpretation (3 Units)
Prerequisites: DMS 166.
Hours: 54 (54 lecture)
Interpretation and critique of normal anatomy with correlation of didactic, clinical presentations and critiques. Written and oral case presentations with emphasis on OB/GYN subjects.
Transfer Information: CSU Transferable

DMS 290 Work Experience in Sonography (1-4 Units)
Limitations on Enrollment: Enrollment in a Sonography course, or current Sonography license and at least one year’s experience as a licensed Sonographer in a medical establishment within the preceding three years.
Hours: 300 (300 lab)
Consists of supervised on-the-job work experience for students whose sonography career objectives and course of study or employment complement each other. Students must accomplish specific course objectives. Students must work 75 paid hours or 60 non-paid hours per unit earned. Course restricted to 3 repetitions.
Transfer Information: CSU Transferable

Radiographic and Imaging Sciences (RT)

RT 100 Radiography and Health Care (2 Units)
Hours: 36 (36 lecture)
Introduction, overview and orientation for those interested in exploring radiographic imaging or other health care careers. Completion of this course and departmental prerequisites satisfy the requirements for entry into the Radiography Associate Degree Program.
Transfer Information: CSU Transferable

RT 101 Introduction To Radiography (2.33 Units)
Prerequisites: RT 100 and BMS 107 and BMS 108.
Skills Advisories: Eligibility for ENG 110 or ENG 110H.
Hours: 54 (36 lecture, 18 lab)
Proficiency in MATH 104 or MATH 107 or MATH 111. Orientation to Radiography, providing students with entry-level information and skills to begin practice in an X-ray department. Topics include ethics, introduction to fluoroscopy, lab practice, basic radiation protection and patient care.
Transfer Information: CSU Transferable

RT 102 Fundamentals of Radiographic Positioning and Procedures I (4 Units)
Prerequisites: RT 101 and HIT 136.
Hours: 108 (54 lecture, 54 lab)
Precise and detailed information on routine radiographic procedures of the chest, abdomen and appendicular skeleton. Portable and traumatic exams also included.
Transfer Information: CSU Transferable

RT 103 Fundamentals Of Radiographic Positioning And Procedures II (4 Units)
Prerequisites: RT 102.
Hours: 108 (54 lecture, 54 lab)
Basic principles of positioning for the axial skeleton to include vertebral column, skull, facial bones contrast procedures for the gastrointestinal and genito-urinary tract.
Transfer Information: CSU Transferable

RT 109 Principles of Radiographic Exposure (3 Units)
Prerequisites: RT 101.
Hours: 54 (54 lecture)
Provides first-year radiography students with the basic principles of image production, exposure techniques, photographic and geometric factors, computed and direct digital radiography and radiation protection.
Transfer Information: CSU Transferable

RT 111 Advanced Principles of Exposure (3 Units)
Prerequisites: RT 109.
Hours: 54 (54 lecture)
Principles of x-ray exposure are examined on image production in computed radiography, digital imagine systems, analog and digital fluoroscopic systems.
Transfer Information: CSU Transferable
RT 119 Radiological Technology (3 Units)
Prerequisites: RT 109 and RT 102.
Skills Advisories: Eligibility for ENG 110 or ENG 110H and proficiency in MATH 4 or MATH 41.
Hours: 54 (54 lecture)
Designed specifically for radiation physics. The primary focus is on the fundamental concepts of energy and measurement, atomic structure, molecules, electricity, magnetism, electromagnetism, x-ray tubes, production, emission and interactions.
Transfer Information: CSU Transferable

RT 120 Patient Care in Radiography (3 Units)
Prerequisites: BMS 107 and BMS 108.
Hours: 54 (54 lecture)
Provides the student with the concepts of patient care. Routine and emergency patient care procedures are described. Also included are topics on venipuncture and contrast media/medication administration. The role of the imaging professional in practicing patient care is explored. Aspects of death and dying reviewed.
Transfer Information: CSU Transferable

RT 121 Venipuncture in Radiography (0.6 Units)
Limitations on Enrollment: Must be a Licensed Radiographer.
Hours: 11 (11 lecture)
Provides the student with concepts of venipuncture and contrast media/medication administration. The role of the radiographer in administration of contrast media, legal aspects of contrast media injection, anatomy and physiology related to I.V. injections are identified.
Transfer Information: CSU Transferable

RT 191 Radiographic Technology Clinical Practicum I (5 Units)
Prerequisites: RT 101.
Corequisites: RT 102.
Hours: 306 (306 lab)
Concurrent Introduction to clinical settings and exposure to departmental organization, patient flow, CR/DR and PACS, observation of techniques employed, and policies and procedures of clinical cases. The student performs basic radiographic procedures under direct supervision.
Transfer Information: CSU Transferable

RT 191A Radiographic Technology Clinical Practicum 1A (2.1 Units)
Prerequisites: RT 191 and RT 109.
Hours: 112 (112 lab)
Designed to give each advanced student the opportunity to improve on clinical skills, as well as accumulate the clinical hours required by the California Department of Health.
Transfer Information: CSU Transferable

RT 192 Radiographic Technology Clinical Practicum 2 (5 Units)
Prerequisites: RT 191.
Hours: 306 (306 lab)
Second in a series of clinical education courses. Student is assigned 17 hours per week at a clinical education center. During this supervised experience, the student observes and performs diagnostic radiographic procedures. The student must demonstrate competency in recently taught radiographic exam, as well as in the exams previously evaluated.
Transfer Information: CSU Transferable

RT 202 Advanced Radiographic Procedures (3 Units)
Prerequisites: RT 250.
Hours: 54 (54 lecture)
Provides the advanced radiography student with a survey of advanced imaging and an introduction to special invasive procedures in radiation sciences.
Transfer Information: CSU Transferable

RT 203 Radiology Certification Preparation (4 Units)
Hours: 72 (72 lecture)
Review of those subjects deemed critical for the ARRT examination. Consists of lectures, both by the instructor and guest, simulated registry examinations and a computer-assisted learning program.

RT 220 Radiation Biology Protection (3 Units)
Prerequisites: RT 103 and RT 111.
Hours: 54 (54 lecture)
Radiation protection for operator and patients complying with the State of California Administrative Code, Title 17. Biological effects, dose-effect relationships and long-term somatic and genetic effects of radiation exposure are discussed, in addition to fluoroscopic radiation safety regulations. Approved by the California Department of Public Health (CDPH) and prepares students for the California State Fluoroscopy Examination.
Transfer Information: CSU Transferable

RT 230 Radiographic Pathology (3 Units)
Prerequisites: RT 103.
Hours: 54 (54 lecture)
Introduction to more advanced pathological conditions for second-year students. Differentiates normal radiographic anatomy from pathologic conditions. Encompasses both the anatomy and physiology of each pathologic condition. Students expected to identify, evaluate and present common pathologic conditions throughout the course.
Transfer Information: CSU Transferable

RT 250 Principles and Applications of Cross-Sectional Anatomy in Imaging (2 Units)
Prerequisites: BMS 107 and BMS 108.
Hours: 36 (36 lecture)
Provides an understanding of cross-sectional anatomy and knowledge of the relationships of human organs to each other as they appear in the sagittal, coronal and axial plane. The practical applications of cross-sectional with C.T., M.R.I. and ultrasound are emphasized.
Transfer Information: CSU Transferable

RT 251 Principles of Mammography and Procedures (2 Units)
Prerequisites: RT 119 and BMS 107 and BMS 108.
Hours: 36 (36 lecture)
Prepares the radiographer for state and national certification in mammography. Content covers the anatomy and physiology of the breast, positioning, radiation biology and protection, and QA and QC regulations for mammography equipment.
Transfer Information: CSU Transferable

RT 290 Work Experience in Radiography (1-4 Units)
Limitations on Enrollment: Enrollment in a Radiology course, or current California Radiologic Technology license and at least one year’s experience as a licensed Radiologic Technologist in a medical establishment within the preceding three years.
Hours: 300 (300 lab)
Consists of supervised on-the-job work experience for students whose radiology career objectives and course of study or employment complement each other. Students must accomplish specific course objectives. Class meetings are scheduled each semester. Course restricted to 3 repetitions
Transfer Information: CSU Transferable
RT 293 Radiographic Technology Clinical Practicum 3 (7 Units)
Prerequisites: RT 192.
Hours: 376 (376 lab)
Third in a series of clinical experiences requiring 40 hours per week for nine weeks in the clinical setting. This rotation allows the student opportunity to enhance basic skills, positioning techniques, patient care and understanding of clinical operations. The student must demonstrate continued competency in those exams previously mastered and additional competencies throughout the semester.
Transfer Information: CSU Transferable

RT 294 Radiographic Technology Clinical Practicum 4 (8 Units)
Prerequisites: RT 293.
Hours: 432 (432 lab)
Fourth in a series of clinical education courses to increase technical and clinical proficiency in routine and advanced X-ray procedures under supervision of the clinical coordinator/clinical instructor and departmental radiographers. The student must demonstrate competency of recently taught radiographic exams, plus continued competency of exams previously evaluated.
Transfer Information: CSU Transferable

RT 295 Radiographic Technology Clinical Practicum 5 (8.6 Units)
Prerequisites: RT 294.
Hours: 464 (464 lab)
Fifth in a series of clinical education courses to increase technical and clinical proficiency in routine and advanced X-ray procedures under supervision of the clinical coordinator/clinical instructor and departmental radiographers. The student must demonstrate competency of recently taught radiographic exams, plus continued competency of exams previously evaluated.
Transfer Information: CSU Transferable

RT 299 Independent Study In Radiography (1-4 Units)
Limitations on Enrollment: Completion of a minimum of 12 units at SBCC, with a 2.5 G.P.A., and a minimum of 6 units, with a 3.0 G.P.A. within the department One to three hours of work/conference time per week to be coordinated with number of enrolled units.
Course Advisories: RT 103.
Hours: 216 (216 lab)
Independent research in radiography under the guidance of a sponsoring faculty member. The project to be consistent with the ability and interest of the student and may be conducted in the laboratory and/or the field. Each unit of credit is equal to three hours of work. NOTE: Continuation in the clinical area on a full-time basis will take place after graduation. This is done in order to complete the 24-month program requirement and will terminate upon the student's anniversary date.
Transfer Information: CSU Transferable