



MANDL SCHOOL, THE COLLEGE OF ALLIED HEALTH

**DIAGNOSTIC MEDICAL SONOGRAPHY
PROGRAMS**

**TRACK1:
ABDOMEN AND OB/GYN**

**TRACK2:
VASCULAR TECHNOLOGY AND
ADULT ECHOCARDIOGRAPHY**

STUDENT HANDBOOK

**2021-2022
Introduction**

The Sonography Student Handbook has been compiled to provide information pertinent to students enrolled in the Sonography Programs offered at Mandl. The faculty and staff wish you success in the pursuit of your educational goals.

The Sonography Student Handbook provides detailed procedures and policies specific to all Sonography Programs offered by Mandl. This handbook is used as a supplement to the Mandl's Student Handbook and College Catalog, and serves to bridge the overriding policies of the College with the policies specific to this program. The information, policies and procedures set forth in this handbook are designed to support the success of the student and are provided to the Sonography student during the Sonography Programs Orientation session.

A copy of the DMS Student Handbook is available at the administrative offices or may be downloaded from Mandl's website at: <http://www.mandl.edu/dmshandbook/>. Continuing Sonography students will receive an updated or revised copy of the Sonography Student Handbook at the start of the semester.

The Sonography Program is just one of the programs offered at Mandl. The college is committed to providing quality educational programs for the purpose of developing successful health care professionals. Developing caring, competent health care professionals prepared for diverse contemporary practice requires interactions with patients and patient services, thereby resulting in an educational environment with unique characteristics and requirements.

Welcome to Mandl. We wish you success.

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Mission of Mandl School

Mandl is dedicated to educating men and women, regardless of their backgrounds, to serve ably and effectively in the allied health industry. To accomplish this mission, Mandl offers academic programs specifically designed:

- To provide educational and employment opportunities through concentrated, highly structured programs of study that prepare students for entry-level positions within the broad and varied field of health.
- To provide curricula in health that reflect the needs of a changing job market. • To provide an opportunity for students to acquire the skills for occupational growth, including the understanding of employer expectations.
- To provide graduates with assistance in securing employment within the health care field.

- To provide students with the foundation for lifelong learning.

Mission Statement

In keeping with the mission of Mandl School, the College of Allied Health, the Sonography Programs are committed to providing students with a well-rounded education in the General Learning (Abdominal and OB/GYN) or Adult Echocardiography Concentration with Vascular Technology specializations. The Sonography Programs include instruction in sonographic practices and principles and basic medical imaging skills intended to prepare the student for employment in the field of diagnostic medical ultrasound. The Sonography faculty is committed to assisting the student toward the optimum academic, personal, and professional potential through quality instruction and rigorous coursework.

Description

The mission of Mandl School- the College of Allied Health's Associate of Applied Science Degree (A.A.S.) program in Diagnostic Medical Sonography (DMS) is to provide a quality comprehensive education in sonography in a learner-centered environment. As a result, graduates will obtain the required knowledge and skills needed to perform quality sonograms; serve as integral members of the health care team by providing the physician accurate sonographic images that the physician utilizes to diagnose patients' illnesses; think critically and problem-solve to meet the required examination protocol and technical needs of patients; and embrace the concept that learning is a life-long experience in order to maintain currency in the dynamic field of sonography.

Mandl's DMS Degree consists of two parallel tracks: Track 1 will concentrate on specialties in Abdomen and Ob/Gyn and Track 2 will concentrate on specialties in vascular technology and adult echocardiography. Both tracks are designed to prepare entry-level sonographers for employment in Imaging departments, Radiology, Cardiology and Vascular offices and specialty practices, with each being a length of six semesters for completion.

The A.A.S in DMS programs is designed for students who wish to explore the field of sonography, as well as those who have made a career decision to seek certification from the American Registry of Diagnostic Medical Sonographers (ARDMS). Diagnostic medical sonographers are highly specialized members of the health care team who provide patient services using ultrasound under the direction of a physician. Sonographers provide care essential to diagnostic ultrasound imaging by operating equipment and performing examinations for medical diagnosis. Sonographers have an in-depth knowledge of physics, disease processes, physiology, cross-sectional anatomy, positioning and sonographic techniques necessary

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to create ultrasound images. The Associate degree, requiring students to complete six semesters to complete, offers the student a well-structured academic and clinical program. Students are trained to be skilled health care professionals and use their education and training to create images of internal body structures to aid physicians in making medical diagnosis.

Program Accreditation

The Associate Degree in Diagnostic Medical Sonography (A.A.S. in DMS) under both tracks is institutionally accredited by The Accrediting Bureau of Health Education Schools (ABHES).

Students who successfully complete either track of the DMS program may apply to take the American Registry of Diagnostic Medical Sonography (ARDMS) certification examinations in Sonography Principles and Instrumentation (SPI) at the end of the third semester of the degree plan program.

Successful completion of the ARDMS exam, SPI exam, and specialty exams is required to earn the Registered Diagnostic Medical Sonographer (RDMS) or Registered Diagnostic Cardiac Sonographer (RDCS) credential and the Registered Vascular Technologist credential (RVT).

Goals

The goals of the Mandl's Sonography Program respond to the expectations of the communities of interest served by the Program: students, graduates, faculty, employers (institutions and physicians), patients, and the profession of Sonography. Achievement of these goals will be assessed through annual Program outcome data (graduate and employer surveys, ARDMS exam pass rates, and employment rates), the College's Instructional Program Review and the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS) Annual Report. The Sonography faculty and Advisory Committees review outcome reports annually and make recommendations for changes to the curricula if outcomes do not meet benchmark levels. On-going assessment of course content and structure is performed by the Sonography faculty through the use of established benchmarks.

The Goals of the Diagnostic Medical Sonography program are:

- To prepare competent entry-level sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for the abdominal sonography-extended concentration.
- To prepare competent entry-level sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for the obstetrics and gynecology concentration.
- To prepare competent entry-level sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for the adult cardiac concentration.
- To prepare competent entry-level sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for the vascular concentration.
- To maintain high retention, as well as ensure adherence to the highest academic and professional standards by students and graduates.
- To serve as a resource for clinical agencies in the tristate area.
- To provide an educational experience that promotes effective communication skills, critical thinking abilities, and professionalism, including soft skills.
- To promote the development of core values and ethical standards necessary for the delivery of quality, patient-centered care.

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- To provide a clinical educational experience that enables students to perform routine sonographic procedures and related functions specific to General Diagnostic Medical Sonography and Echocardiography as well as Cardiovascular sonography.

The figure below illustrates the relationship between psychomotor, cognitive, and behavioral competencies

Classroom instruction
Application of knowledge in
the clinical setting Reflection
on experiences

Psychomotor: Simultaneous transducer
manipulation/scanning motions and
Operation of machine controls

Cognitive:

Appropriate patient care
Appropriate patient
communication Punctual
consistent attendance

Behavioral:
Awareness of

actions

Discipline Specific Learning Outcomes and Competencies:

At the conclusion of the program and a student's selected course of study (track), he or she will:

- Demonstrate the ability to perform diagnostic quality general abdomen, obstetrics, or adult cardiac, and vascular (as applicable) sonographic examinations.
- Evaluate the normal, abnormal, and normal variant sonographic appearances of organs and structures of the abdomen, superficial structures, non-cardiac chest, and the gravid and non-gravid female pelvis, or the adult heart and the vascular system (as applicable).
- Be a skilled medical sonographer who actively applies accepted principles and techniques within the fields of Diagnostic Medical or Cardiac Sonography and cardio-vascular technology throughout his or her career.
- Function in the capacity of an entry-level sonographer who acquires diagnostic ultrasound images of the patient's anatomy to aid the physician in the diagnosis of various pathological conditions.
- Act in the best interest of the patient and the employing institution through the prudent use of safety measures, techniques, and equipment to prevent harm to patient, facility, or oneself.

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- Act within the Diagnostic Ultrasound Professional Scope of Practice as outlined by the Society of Diagnostic Medical and Cardio-Vascular Sonographers.
- Exercise independent judgment and discretion in the technical performance of medical imaging procedures.
- Assimilate pertinent clinical information, ultrasound findings, and knowledge of normal and abnormal conditions into a cohesive and complete ultrasound examination for interpreting physicians.
- Communicate effectively with patients, family members, hospital staff, and the general public, and demonstrate professionalism in all actions and communications.

- Demonstrate professional integrity, honesty, dependability, respect for self and others, compassion, and an ability to protect patient confidentiality and trust at all times.
- Demonstrate the ability to follow OSHA standards in clinical practice.
- Demonstrate the ability to maintain quality control of the ultrasound equipment. • Be eligible to sit for and be able to pass the American Registry of Diagnostic Medical Sonography (ARDMS. ARDCS. RVT) specialty certification exams upon graduation.

STUDENT LEARNING GOALS:

Mandl's DMS program's goal is to prepare competent entry-level general sonographers in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains. Graduates of the program will be able to perform, at a minimum, the following objectives:

GOAL 1: Obtain, review, and integrate pertinent patient history and supporting clinical data to facilitate optimum diagnostic results.

Student Learning Outcomes:

- Students will identify the importance of obtaining patient history
- Students will interpret patient history
- Students will demonstrate application of didactic information necessary for specific DMS study results
- Students will correlate pertinent data from a variety of medical sources

Goal 2: Perform appropriate procedures and record anatomic, pathologic, and/or physiologic data for interpretation by a physician.

Student Learning Outcomes:

- Students will use appropriate knobology when scanning to produce optimal images • Students will reproduce scanning protocols for general sonography
- Students will utilize critical thinking skills to modify protocols for non-standard patients
- Students will perform sonographic procedures appropriately and accurately recording all anatomic and physiologic information for interpretation by a physician

Goal 3: Record, analyze, and process diagnostic data and other pertinent observations made during the procedure for presentation to the interpreting physician

Student Learning Outcomes:

- Students will critique images
- Students will demonstrate critical thinking skills necessary to analyze and process diagnostic data

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- Students will document and present complete and accurate sonographic findings to the interpreting physician and/or clinical instructors in order to facilitate patient diagnosis

Goal 4: Exercise discretion and judgement in the performance of sonographic and/or other diagnostic services.

Student Learning Outcomes:

- Students will demonstrate appropriate sonographer-to-patient relationship skills • Students will modify exam positioning and protocols due to patient condition • Students will recognize unique needs in a culturally diverse population.

Goal 5: Demonstrate appropriate communication skills with patients and colleagues.

Student Learning Outcomes:

- Students will demonstrate oral communication skills necessary to communicate with patients and health care professionals
- Students will demonstrate written communication skills necessary to communicate with patients and health care professionals

Goal 6: Act in a professional and ethical manner.

Student Learning Outcomes:

- Students will demonstrate understanding of HIPAA law
- Students will exemplify professional manners within recognized ethical and legal standards at all times
- Students will consistently manifest a professional attitude and honor SDMS code of ethics
- Students will demonstrate a respect for diversity and the ability to work with others and special patient populations
 - Students will demonstrate workplace behavior conducive to professional advancement
- Students will differentiate between ARDMS and ARRT exams and additional certification opportunities
- Students will recognize professional organizations pertaining to the field of ultrasound
- Students will illustrate professionalism with acceptable grooming and appearance standards

Goal 7: Provide patient education related to medical ultrasound and promote principles of good health

Student Learning Outcomes:

- Students will summarize the value of lifelong learning
 - Students will participate in personal and professional growth opportunities.
- Students will verbalize principles of good health

Goal 8: Employ safety practices

Student Learning Outcomes

- Students will demonstrate practices for optimal function of the sonographic equipment
- Students will employ a safe work environment
- Students will practice ALARA standards
 - Students will illustrate time management skills while performing general concentration ultrasounds

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- Students will administer standard infection control standards

PROGRAM REQUIREMENTS

A.A.S. Diagnostic Medical Sonography Track One

Concentration in General & OB/GYN Sonography

Prepares students for RDMS Credentials

Core Requirements (23 credits)

ALH175 Law and Ethics for Allied Health Professionals 3 credits BIO115 Anatomy & Physiology I 4 BIO215 Anatomy & Physiology II 4 ENG101 English Composition 3 MAT102 Advanced College Math 3 PHY101 Physics 3 SPH101 Interpersonal Communications 3

Elective General Education Courses (3 Credits)

PSY101 Introduction to Psychology 3 credit SOC101 Introduction to Sociology 3

Major Requirements (59 Credits)

DMS100 Intro to Sonography, Medical Terminology & Patient Care 3 credits DMS105 Ultrasound Physics 4 DMS110 Cross Sectional Anatomy/ Superficial Structures 3 DMS115 Ultrasound Physics II 3 DMS120 Pathophysiology (Abdomen) I 3 DMS125 Pathophysiology (OB/GYN) I 3 DMS130 Pathophysiology (Abdomen) II 3 DMS135 Pathophysiology (OB/GYN) II 3 DMS140 Pathophysiology (OB/GYN) III 2 DMS145 Advanced Topics 2 DMS150 Pathophysiology Superficial Structures 3 DMS155 SPI Registry Review for Specialty Exams 1 DMS500 Registry Review 2 DMSC100 Diagnostic Medical Sonography Clinical I 12 DMSC200 Diagnostic Medical Sonography Clinical II 12 **TOTAL CREDITS 85**

A.A.S. Diagnostic Medical Sonography Track Two

**Concentration in Vascular Technology & Adults Echocardiography
Prepares students for RDCS & RVT Credentials**

Core Requirements (23 credits)

ALH175 Law and Ethics for Allied Health Professionals 3 credits BIO115 Anatomy & Physiology I 4

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BIO215 Anatomy & Physiology II 4 ENG101 English Composition 3 MAT102 Advanced College Math 3 PHY101 Physics 3 SPH101 Interpersonal Communications 3 ***Elective***

General Education Courses (3 Credits)

PSY101 Introduction to Psychology 3 credits SOC101 Introduction to Sociology 3

Major Requirements (36 Credits)

CVT120 Echocardiography I 3 credits CVT125 Vascular Pathology I 3 CVT130 Echocardiography II 3 CVT135 Vascular Pathology II 3 CVT140 Cardiovascular Pharmacology 3 CVT145 Cardiovascular Clinical Research 4 CVT500 Registry Review 2 CVTC100 Cardiovascular Technology Clinical I 12 CVTC200 Cardiovascular Technology Clinical II 12 DMS100 Intro to Sonography, Medical Terminology & Patient Care 3 DMS105 Ultrasound Physics 4 DMS110 Cross Sectional Anatomy/ Superficial Structures 3 DMS115 Ultrasound Physics II 3 DMS155 SPI Registry Review for Specialty Exams 1 **TOTAL CREDITS 85**

Admissions Requirements

Admission to either track of the program (DMS or CVT) is on a competitive basis. The number of students accepted into either of the Sonography tracks each year is determined

by the number of appropriate clinical sites available for clinical placements throughout the length of the program. The number of students accepted may therefore vary from year to year but is not to exceed 15 students per cohort in the initial five-year cycle. Applicants to this program must fulfill the following requirements:

1. Completion of a High School Diploma or GED and/or
2. Completion of a high-school or College-level Chemistry, Biology, General Physics, Math, and English with a minimum grade of C+ or better in each stated course.
3. Submission of Official transcripts for transfer credit (No credits will be transferred without official transcripts). Credits may be considered when evaluating an unofficial transcript.
4. A short essay stating why the applicant wants to be a sonographer.
5. An interview of the applicant with the Department Chair.
6. Assessment of student's motor skills and physical ability to move the necessary equipment by the Program Director. The best candidates for sonography technologists are those who are physically fit, since sonographers may spend up to 80% of their working hours on their feet. Maneuvering equipment and assisting patients with positioning means that sonography technicians routinely are required to lift more than 50 pounds and must have full use of their upper bodies.
7. Two letters of recommendation certifying student's cognitive and affective ability for the program.
8. Clinical background checks and drug/urine tests may also be required by clinical affiliates.

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9. T.E.A.S. test with the combined passing score of 45 in Science and Math segments. Students with remedial English, Reading, and Math classes will not be admitted into the program. 10. Computer skills competencies test prepared by the College. Communication and interpersonal skills, including proficiency in the use of Microsoft Office are also very important when entering this field. Sonography technologists will have to explain complicated tests or give patients a series of instructions

The admissions process is competitive, with students being accepted every fall and winter semesters. Applicants will be interviewed by the program's Director. Meeting the minimum admission requirements does not guarantee admission into the Sonography Programs.

This is a two-year (including summer semesters) full-time Associates Degree Day program that must be completed in a sequential manner. There are required clinical internships at area hospitals and clinical sites that may require travelling.

PROGRAM PROGRESSION REQUIREMENTS:

1. A minimum G.P.A. of 2.5 in each semester of the program
2. Prior to the start of the program, students will have to have a physical examination, immunizations, and a recommendation from the examining physician that s/he is physically fit for the program and subsequent clinical affiliation.
3. **Minimum Grade Requirement:** The Sonography student must achieve a minimum grade of "C+" (77%) in all courses registered as DMS, CVT, BIO and PHY and MAT. Students must also maintain an overall GPA of 2.5 each semester. Students not meeting program grade requirements will be terminated.
4. Students must complete and pass all competencies satisfactorily.
5. Successful completion of all required clinical hours and clinical courses as established for each specialty during each semester is a pre-condition for

- progressing into the program.
6. All clinical records must be submitted by the required deadline.
 7. All clinical site and/or Program property returned by the required deadline.
 8. Each assigned competency evaluation passed with a grade of 85% or higher

Acceptance into the Sonography Programs:

Acceptance into the program will be determined by the Academic Committee appointed by the Vice President of Academic Affairs, the chief academic officer of the College. The Committee will use an objective academic rubric as part of the process of determining who will be able to enter and continue in the program. Students that do not meet the requirements of the program may repeat the core courses only once. Two failures of any one course with designations of CVT, DMS, BIO, PHY, and MAT will be considered an automatic dismissal from the program.

Transfer of Course Credit from Other Institutions

Course work satisfactorily completed at another regionally accredited institution of higher education can be evaluated for transfer and may be applied toward completion of the prerequisite and co-requisite

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courses of a Sonography Program at Mandl. Transfer courses that are accepted by Mandl, must be comparable to course content of Mandl courses, and must be reviewed by the Sonography Department Chair and the Vice President of Academic Affairs. Students may be required to perform a challenge exam to receive credit for Sonography coursework. No transfer credits will be accepted without official transcript.

Advanced Placement / Course Challenge Exam Policy:

1. A qualified applicant/student may request a challenge exam to receive credit for a Sonography didactic course(s). Sonography clinical courses may not be challenged for credit.
2. To qualify to request a challenge exam for a Sonography didactic course, the applicant/student must produce acceptable documentation (transcript, military documents, or original letter from previous program director and/or instructor) of formal Sonography training to include one or more of the following:
 - a. military service training
 - b. completion of or credit hours in Sonography courses obtained at a regionally accredited college or university OR from a CAAHEP accredited Sonography program;
 - c. foreign Sonography training programs recognized by Mandl through its formal transcript evaluation process;
 - d. other class work, as evaluated by the Sonography program faculty prior to determination of eligibility;
 - e. documentation of previous training in a hospital-based Sonography program accredited by CAAHEP.
3. Any prerequisites for a course that the applicant/student is requesting to challenge for credit must be successfully completed prior to the applicant/student requesting the Sonography course challenge.
4. The student must file a written request for a challenge examination. Forms may be obtained from the Sonography Department Chair and must be filed at least two weeks prior to the test date.
5. To successfully complete the challenge, the student must pass an exam covering fundamental concepts and demonstrate all competencies required by the course. A minimum grade of 84% ("B") must be achieved in order for credit to be awarded.

Orientation

Approximately one month prior to the start of the first Sonography semester, newly admitted students are required to attend the Sonography New Student Orientation. The Orientation includes a review of the College Catalog and the Sonography Student Handbook (policies and procedures), registration information, and an orientation to first semester courses as well as other information pertinent to the Programs.

At the end of the session, the students will receive their letter of full acceptance into a Sonography Program.

Course Descriptions

Please see the current College Catalog at www.mandl.edu/catalog. Any proposed changes to the Sonography curriculum and/or course descriptions will be posted on the College website) at least 1 month prior to publication of the changes in the Mandl College Catalog.

Textbooks, Supplies and Uniforms

Textbook supplies and/or additional course requirements are listed in each course syllabus. The Sonography textbooks are available in College Bookstore approximately 1-2 weeks prior to the start of the semester. It is recommended that students retain possession of anatomy, physiology, and medical terminology texts used in previous courses. Students should also have English language and medical

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dictionaries for reference.

Students are required to purchase the appropriate clinical and lab attire. Information on purchasing the required uniforms is provided to the student prior to the start of the first clinical semester.

Computer Access / Email / Skills

Students may utilize computers on the campus to check their email accounts and to use them as workstations.

Sonography students are required to demonstrate a variety of computer skills throughout the length of the program. Students will access the Internet and perform Web searches, submit all writing assignments as Word documents. Students may be required to develop charts and tables, Power Point presentations, etc. for specific courses (refer to course syllabus for assignments). In addition, Sonography clinical sites utilize computer systems for patient schedules and patient information. All Sonography students must be able to utilize any clinical site's data/patient management system as allowed by the clinical site.

A student who is unfamiliar with using a computer or who has limited computer skills should obtain instruction in computer programs and usage so that he/she will be able to meet the requirements of his/her courses. Computer usage comprises a part of the grading for clinical course evaluations.

Exams:

In the event of serious illness, injury or emergency that directly affects the student, the student must contact the course instructor prior to the start of the exam. If the Final Exam is missed, the student may be offered a set of options for completing the course. The Sonography Department Chair must approve any arrangement developed and offered to the student for completion of the course requirements.

Grading Scale

100% - 95% = A 89%- 87% = B+ 79%-77% = C+ 69%- 65% = D 94% -90% = A-
86%- 84% = B 76%- 74%= C 64%- 0% = F 83%- 80% = B- 73%- 70% = C-

*A course grade of “C+” or greater in all Sonography courses is required for progression in the program.

Graduation Requirements

Graduation from any Sonography Program requires successful completion of all pre-requisite courses (by transfer credit, course challenge or course completion) and all Sonography courses. The Application for Graduation must be completed using the graduation form by the deadline specified in the College Catalog for the applicable semester.

Student Records

The Program maintains records for Sonography students in the Department Chair’s office; graduate files are stored in the Office of the Registrar. The individual Program Clinical Coordinator maintains all current student clinical files for each clinical course. Sonography instructors maintain coursework and grade files for the students enrolled in the courses taught by that instructor. These documents are secured and may be reviewed by making arrangements with the Department Chair and/or individual instructor. Student course grades are maintained by the Registrar and are available by requesting an official transcript.

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Classrooms and Labs

Classrooms are assigned by the Dean of Academic Services.

Sonography Lab resources include ultrasound scanning simulators for DCS, DMS and VT courses; state of- the-art ultrasound units purchased in 2019; ergonomic workstations for each live scanning room; student use computers; software for General Sonography, Echocardiography and Vascular Technology (tutorials, testing); headphones; case files; textbooks, anatomy/pathology models and posters.

Sonography students have access to designated student use computer labs located at the campus.

Students have access to the Sonography Labs throughout the length of a Program during assigned times, between on-campus classes, and during Open Lab sessions (if utilized) each semester. Program specific sonography faculty must be present to provide supervision whenever students use the lab during non assigned times.

ACADEMIC STANDARDS:

Students enrolled in DMS program are expected to conduct themselves in an appropriate fashion at all times. The criteria for evaluating appropriate performance include, but are not limited to, demonstrating professional competencies and skills; adhering to the DMS Program’s policies and procedures; displaying sensitivities to patient and to community needs; demonstrating ability to relate to peers, instructors, and other members of health care team; and maintaining regular and punctual attendance in classes and professional settings. Compliance with the following academic standards is essential:

1. The student shall assume as his or her primary responsibility the health and safety of the patient.
2. If there is any question or complaint concerning an assignment during a clinical activity, the student should discuss the problems with the assigned supervisor, preceptor or program clinical coordinator or program director.
3. The student shall state truthfully and accurately his or her student status in interactions with patients, health professionals and others.
4. The student shall deliver needed health care service to patients without regard to race, age, sex, creed, sexual orientation, disability or health, marital status etc.
5. The student shall conduct his or herself in a professional manner relating to patients, faculty, and professional staff. The student shall refuse to participate in, or conceal any, illegal or unethical practice or procedure.
6. The student shall hold all privileged patient information in confidence, following HIPAA guidelines.
7. The student shall perform only those procedures authorized by the clinical affiliate, preceptor, and the Program.

Didactic Education

The didactic (lecture and lecture/lab) education portions of the Sonography Programs for both tracks consist of theory and principal courses; the sonography principles and instrumentation (physics) courses are central and common to all four Learning Concentrations. All Sonography courses are sequential and specific to the semesters listed in each Program curriculum. Many didactic sonography courses have a lab component which involves case study analysis, collaborative learning activities, testing, and may include scanning demonstrations/activities.

Required objectives for the Sonography didactic courses are included in the syllabus for each individual course; the Sonography courses may include additional objectives for each course. A detailed study of

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sonography principles and instrumentation, including Doppler principles and instrumentation and hemodynamics, is an integral part of each Program.

All didactic courses use a variety of Instructional Methods including all or some of the following: on line research and/or presentations, homework assignments, and quizzes (announced and un-announced), case presentations, scenarios, lab assignments, exams, and writing assignments to assess the student's knowledge and problem-solving skills. The student is responsible for meeting all course requirements stated in the course syllabus by the deadlines listed in the syllabus.

Most quizzes and all exams are conducted on site for the specific didactic course. The time frames for testing are set by the instructor as appropriate for each course level of the curriculum. The question type, i.e. short answer, essay, multiple choice, etc., is also taken into consideration.

Clinical Education

Clinical education is a crucial component of the program representing the majority of contact hours within Mandl's Sonography Programs. Semesters five and six will include intense competency based clinical with designated competencies.

All ultrasound scans require the sonographer to use the same critical thinking, scanning and technical skills while following exam protocols that state the minimum images, views, measurements, and blood

flow assessments required for each organ, structure, vessel or area of the body. During the performance of the sonographic exam, the sonographer must constantly assess and adjust the technical parameters and assess the region of interest to determine normalcy or presence of pathology in organs, structures, and blood vessels. The sonographer makes the decision which images/views to acquire, assess, and record; the sonographer is expected to go beyond the minimum protocol to provide a diagnostic ultrasound exam.

Proficiency in performing and evaluating ultrasound exams is a continuous and cumulative learning process. It requires consistent demonstration of accurate scanning skills, analysis of ultrasound images and decision-making skills based on those images. Competency in Clinical Skills will be assessed using timed scanning evaluations as well as timed case presentation and image analysis. These testing methods are designed to emulate the skills required of sonographers in the workplace.

All sonographers must demonstrate appropriate professional behavior, including, but not limited to consistent punctual attendance, effective communication with the patient, family members, physicians, and other medical personnel, and HIPAA compliance at all times and in all settings.

All sonographers must demonstrate appropriate patient care skills. The sonographer may spend a significant amount of time with patients and may be the sole care giver in the room while the sonographic exam is performed. Sonographers must be able to deal with a variety of patient conditions and physical settings.

The Sonography clinical courses are sequenced in order of psychomotor skills: from basic scanning techniques and patient interactions to performance of partial exams with appropriate accuracy, and to the performance of complete exams with accuracy and in a specified time frame. Allotted time frames for completing scans/exams are appropriate to the level of the course in the Program and are integral to attaining efficient scanning skills expected by employers and to meet the standards of the Profession. Final competencies are required to ensure that the Sonography student is prepared to enter the workplace and to take and pass his/her ARDMS exams.

Clinical evaluations are performed in both the Sonography Lab and clinical site settings; see course syllabi for specific requirements for each semester of the Program.

Clinical Rotations

Students are assigned by the Director of Clinical Education to clinical rotations at health care facilities that are affiliated with Mandl. A student may be assigned to any appropriate clinical facility utilized by the Sonography Programs. Sonography students are not assigned to clinical rotations in departments where they are employed in a patient care capacity and are prohibited from making their own clinical placement arrangements.

Clinical rotations give the Sonography student exposure to various types of learning environments, different volumes/variety of examinations, and opportunities to perform ultrasound examinations on patients in the clinical setting. Facilities range from private offices to acute care imaging departments. The student is responsible for transportation to and from the clinical site and any parking expenses related to the clinical assignment.

Every effort is made to secure clinical placements in which the student will have ample access to scanning opportunities. However, the Mandl Sonography Programs cannot control the type or volume of cases performed during the hours a student is scheduled to attend a clinical site. Heavy caseloads and/or schedules containing advanced procedures may, at times, preclude a Sonography student from participating in scanning patient. The on-site clinical instructor determines the extent of participation

based on the student's technical skill level and/or other mitigating factors.

The Clinical Site Assignment (rotation assignment) forms are provided to the student prior to the start of the semester. The student will receive information on the assigned clinical site including name of site, name(s) of clinical instructor(s), directions to site (if applicable), parking information and how to obtain a parking pass if required by the site (some sites require employees and students to park off-site), obtaining a site-specific name badge if required, and any other pertinent information or requirements of the site.

- Clinical agencies (sites) can establish more stringent standards to meet regulatory requirement for their facility at their discretion
- Clinical agencies can conduct additional background checks at their discretion • Clinical agencies can require additional drug screens to be in compliance with their policies

The student is required to complete the Orientation to the Clinical Site within the time frame specified on the forms. Copies of all forms completed by the student to meet the requirements of the clinical site must be provided to the Director of Clinical Education for inclusion in the student's clinical file.

- It is the student's responsibility to complete all site-specific requirements and place an introductory phone call to the clinical instructor prior to the first day of the clinical rotation.

Sonography On-Campus Clinical Sessions

Scheduled Sonography On-Campus Clinical sessions which are part of clinical courses are designed to provide instruction in the technical and psychomotor skills involved in learning basic and advanced scanning skills, efficient completion of sonographic exams, and appropriate analysis and critique of sonographic images and/or exams. On-campus sessions may involve case analysis, image critique, video reviews, computer tutorials, hands-on scanning instruction and practice, instruction and practice using an ultrasound training simulator, and other activities as deemed pertinent to the student's learning.

Comprehensive Clinical Performance Objectives

The Comprehensive Clinical Performance Objectives are drawn from and correlate with the Sonography Student Clinical Skills and each specialty area (Abdomen, Adult Cardiac, OB/Gyn, and Vascular). Upon completion of the Program, the student will be able to meet the following **criteria**:

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I. Patient Care and Safety

Objective: Perform the following procedures with 100% accuracy at all times.

- A. Demonstrate Professional Behavior.
- B. Identify the patient and exam.
- C. Enter patient data/information into the ultrasound unit.
- D. Obtain patient history and information.
- E. Communicate appropriately with the patient before, during, and after the exam.
- F. Provide assistance for the patient before, during, and after the exam.
- G. Ensure patient safety and follow Standard Precautions at all times.
- H. Demonstrate sonographer safety by utilizing appropriate ergonomic practices while scanning and interacting with patients.

II. Equipment Usage

Objective: The student will with 100% accuracy:

- A. Prepare the examination room and sonographic equipment.

- B. Describe the orientation and manipulation of the transducer.
- C. Describe the basic operation, controls, and features of the entire sonographic unit.
- D. Demonstrate efficient operation of machine controls.
- E. Demonstrate safe handling and appropriate operation of the ultrasound unit, keyboard, transducer, cables, and ancillary equipment.
- F. Cleans transducer, cables, and unit using appropriate methods and disinfection solution/wipes.

III. Anatomy and Structure Identification

Objective: The student will with 100% accuracy:

- A. Identify normal anatomical structures as demonstrated by sonography.
- B. Identify acoustic artifacts.
- C. Describe normal structures using correct sonographic terminology.

IV. Sonographic Imaging Procedure

Objective: The student will with 100% accuracy and within allowed time frame:

- A. Describe the preparation necessary for examination.
- B. Utilize additional transducers and/or transducer frequency to obtain appropriate images.
- C. Locate required anatomy using standard views and selecting the appropriate scan planes.
- D. Perform complete scans of required anatomy.
- E. Evaluate anatomy and pathology as demonstrated by the sonographic exam. F. Appropriately center and clearly demonstrate anatomical structures and pathology. G. Adjust for artifacts and patient condition; utilize various patient positions as needed. H. Perform required measurements using calipers; use software packages as applicable and/or perform manual calculations.
- I. Select required/documentary images, label images according to standard protocols. J. Performs routine sonographic imaging procedures and tests within time frames allotted.

V. Recording Images/Views

Objective: The student will with 100% accuracy:

- A. Ensure images/views are adequately recorded using any and all media available.

VI. Discussion and Conclusion

Objective: The student will with 100% accuracy:

- A. Discuss the images/views with the instructor; verbalize scanning procedure and technique.
- B. Discuss anatomy and pathology on recorded images.
- C. Discuss acoustic artifacts as they relate to diagnosis and image quality.
- D. Complete technical reports using legible writing.

Clinical/Lab Education Semesters / Program Sequence

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The Clinical Education Semesters provide a format for progressive, competency-based clinical education in which the student attains acceptable clinical skills and behaviors.

Lab I / Program Semester 2

Didactic and Lab Instruction

- a) The Sonography didactic courses in this semester focus on specific normal anatomy and physiology, sonographic anatomy and imaging, critical thinking skills, and medical ultrasound physics principles.

The Sonography lab courses in this semester address basic scanning techniques/methods, scanning ergonomics, patient care skills, clinical procedures and practices, critical thinking

skills, and student clinical behaviors and performance expectations. Students practice scanning techniques utilizing an ultrasound training simulator, peer scanning, and/or volunteers under instructor supervision. The student is assigned to on-campus clinical sessions in this semester. Affective Domain, Clinical Skills, Benchmark, and Challenge evaluations are performed at frequent and regular intervals (stated on the Semester Assignment Sheet). Students should utilize the Clinical Skills, Benchmarks, and Challenge evaluations for this semester to guide their practice scanning experiences.

Lab II / Program Semester 3

Didactic Instruction

- b) The didactic course load in this semester addresses pathophysiology, specific abnormal sonographic appearances, critical thinking skills, scanning techniques and procedures, including adaptive scanning techniques, and medical ultrasound physics and instrumentation.

Affective Domain, Clinical Skills, Benchmark, and Challenge evaluations are performed at frequent and regular intervals (stated on the Semester Assignment Sheet). Students should utilize the Clinical Skills, Benchmarks and Challenge evaluations for this semester to guide their practice scanning experiences.

The student's rate of progress and ability to gain additional scanning time in the clinical setting is directly dependent upon the student's ability to efficiently perform the scanning tasks within the times as assigned by the Program and/or Clinical Instructor/sonographer.

The student is required to complete the Clinical Skills, Benchmarks (if utilized), and Challenges listed on the Semester Assignment Sheet.

Direct Supervision Lab Performance

The student is assigned to on-campus lab hours in the Sonography lab.

Affective Domain, Clinical Skills, Benchmark, and Challenge evaluations are performed at frequent and regular intervals (stated on the Semester Assignment Sheet). Students should utilize the Clinical Skills, Benchmarks, and Challenge evaluations for this semester to guide their practice scanning experiences.

The student will begin to work on improving his/her scanning speed in order to complete entire scans/exams within time frames established by clinical agencies and/or the profession. The student's rate of progress and ability to gain additional scanning time is directly dependent upon the student's ability to perform the scanning tasks assigned by the Program and/or Clinical Instructor/sonographer.

To ensure that the student maintains learned skills and continues to improve, any procedure previously

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evaluated may be reassessed at random. The results of the re-evaluation will be discussed and compared to previous evaluations to note improvements and/or deficiencies. If a student is unsuccessful with a re-evaluation, the student will be required to return to directly supervised performance until the instructor determines that the deficiency has been corrected.

The student is required to complete the Clinical Skills and Challenges listed on the Semester Assignment Sheet. Evaluations for this semester will be conducted in both the on-campus clinical settings. Sonography faculty will discuss the student's progress and will provide feedback to the student throughout the semester.

Lab III / Program Semester 4

c) Didactic Instruction

The student is assigned to on-campus clinical hours in the Sonography lab. The didactic courses in this semester continue to address specific pathophysiology, specific abnormal sonographic appearances, critical thinking skills, scanning techniques and procedures including adaptive scanning techniques, Doppler physics and instrumentation, and hemodynamics.

Direct/Limited Supervision Performance

The student is expected to demonstrate advanced scanning skills and perform as independently as possible (little or no assistance from the supervising sonographer). The student should attempt any and all exams to improve his/her techniques, scanning speed, and skills.

The student's rate of progress and ability to gain additional scanning time in the clinical setting is directly dependent upon the student's ability to perform the scanning tasks assigned by the Program and/or Clinical Instructor/sonographer. Effort will be made to ensure the student maintains learned skills and continues to improve; any procedure previously evaluated may be reassessed at random.

The student is required to complete Clinical Skills and Challenges listed on the Semester Assignment Sheet. Evaluations for this semester are conducted on campus and students may be required to perform Challenges in the Sonography Lab setting as well. The Affective Domain evaluation is utilized in this semester.

Affective Domain, Clinical Skills, Benchmark, and Challenge evaluations are performed at frequent and regular intervals (stated on the Semester Assignment Sheet). Students should utilize the Clinical Skills, Benchmarks, and Challenge evaluations for this semester to guide their practice scanning experiences.

The student will begin to work on improving his/her scanning speed in order to complete entire scans/exams within time frames established by clinical agencies and/or the profession. The student's rate of progress and ability to gain additional scanning time is directly dependent upon the student's ability to perform the scanning tasks assigned by the Program and/or Clinical Instructor/sonographer.

To ensure that the student maintains learned skills and continues to improve, any procedure previously evaluated may be reassessed at random. The results of the re-evaluation will be discussed and compared to previous evaluations to note improvements and/or deficiencies. If a student is unsuccessful with a re-evaluation, the student will be required to return to directly supervised performance until the instructor determines that the deficiency has been corrected.

The student is required to complete the Clinical Skills and Challenges listed on the Semester Assignment Sheet. Evaluations for this semester may be conducted in both the on-campus and off-campus clinical settings. Sonography faculty will discuss the student's progress with the on-site Clinical Instructor(s) and will provide feedback to the student throughout the semester.

Clinical I / Program Semester 5

Didactic Instruction

The didactic courses from the previous four semesters are utilized to address specific pathophysiology, specific abnormal sonographic appearances, critical thinking skills, scanning techniques and procedures, including adaptive scanning techniques, Doppler physics and instrumentation, and hemodynamics.

Direct/Limited Supervision Clinical Performance

The student is assigned to off-campus clinical hours. The Clinical Instructor determines when the student is permitted to perform exams with the sonographer in the room or immediately nearby at all times (clinical affiliate student supervision rules will be followed).

For Medical and Cardiac sonograms, the student is expected to demonstrate scanning skills and perform as independently as possible (little or no assistance from the supervising sonographer). The student should attempt any and all exams to improve his/her techniques, scanning speed and skills.

For vascular sonograms/testing, the student should work to improve his/her scanning speed to complete entire exams. The student is expected to demonstrate advanced scanning skills and perform as independently as possible and should attempt any and all exams to improve his/her techniques, scanning speed, and skills.

- Per Mandl's Affiliation Agreement with all clinical sites, the student is strictly prohibited from performing sonograms without the sonographer in the room or immediately nearby and from submitting acquired images/clips for interpretation and inclusion in the patient record. The supervising sonographer must observe the student scanning and must submit appropriate images/clips for interpretation.

The student's rate of progress and ability to gain additional scanning time in the clinical setting is directly dependent upon the student's ability to perform the scanning tasks assigned by the Program and/or Clinical Instructor/sonographer.

The student's rate of progress and ability to gain additional scanning time is directly dependent upon the student's ability to perform the tasks assigned by the Program and/or Clinical Instructor. At the discretion of the on-site sonographer and/or Mandl faculty and to ensure the student maintains learned skills and continues to improve, any procedure previously evaluated may be reassessed at random.

The student is required to complete Clinical Skills and Challenges listed on the Semester Assignment Sheet. Evaluations for this semester are conducted primarily in the clinical site setting but students may be required to perform Challenges in the Sonography Lab setting as well. Sonography faculty will discuss the student's progress with the on-site Clinical Instructor(s) and will provide feedback to the student throughout the semester. The Affective Domain evaluation is utilized in this semester.

Clinical II / Program Semester 6

Didactic Instruction

The didactic courses from the previous semesters continue to address specific pathophysiology, specific abnormal sonographic appearances, critical thinking skills, scanning techniques and procedures including adaptive scanning techniques, Doppler physics and instrumentation, and hemodynamics.

Limited Supervision Clinical Performance

The student is assigned to off-campus clinical hours at clinical sites affiliated with the Program. The Clinical Instructor determines when the student is permitted to perform exams with the sonographer in the

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room or immediately nearby at all times (clinical affiliate student supervision rules will be followed).

For Medical and Cardiac sonograms, the student is expected to demonstrate advanced scanning skills and perform as independently as possible (little or no assistance from the supervising sonographer). The student should attempt any and all exams to improve his/her techniques, scanning speed and skills.

For Vascular sonograms/testing, the student should perform as independently as possible (little or no assistance from the supervising sonographer) and work to improve his/her scanning speed to complete entire exams. The student is expected to demonstrate advanced scanning skills and perform as independently as possible and should attempt any and all exams to improve his/her techniques, scanning speed and skills.

- Per Mandl's Affiliation Agreement with all clinical sites, the student is strictly prohibited from performing sonograms without the sonographer in the room or immediately nearby, and from submitting acquired images/clips for interpretation and inclusion in the patient record. The supervising sonographer must observe the student scanning and must submit appropriate images/clips for interpretation.

The student's rate of progress and ability to gain additional scanning time in the clinical setting is directly dependent upon the student's ability to perform the scanning tasks assigned by the Program and/or Clinical Instructor/sonographer.

The student's rate of progress and ability to gain additional scanning time is directly dependent upon the student's ability to perform the tasks assigned by the Program and/or Clinical Instructor. At the discretion of the on-site sonographer and/or Mandl faculty and to ensure the student maintains learned skills and continues to improve, any procedure previously evaluated may be reassessed at random.

The student is required to complete Clinical Skills and Challenges listed on the Semester Assignment Sheet. Evaluations for this semester are conducted primarily in the clinical site setting but students may be required to perform Challenges in the Sonography Lab setting as well. Sonography faculty will discuss the student's progress with the on-site Clinical Instructor(s) and will provide feedback to the student throughout the semester. The Affective Domain evaluation is utilized in this semester.

PRE-CLINICAL COMPETENCY EXAMINATIONS

Students in the DMS program must learn skills proficiently in the ultrasound scanning laboratories before students are allowed to enter the clinical rotations. Failure to meet the minimum required skills needed to enter the clinical stage of the program will result in the student not being allowed to continue in the program and into their clinical rotation. The students must demonstrate proficiency in the following:

Understanding of the knobology of the ultrasound machine, including:

Name Field M Mode
Applications Calculation package
Transducer Biopsy Guide
Freeze Persistence
Cine Log Compression
Print Post processing
Measurements Preprocessing
Text Spectral Waveforms
Depth Zoom

Facial zone Res
Overall gain Power Doppler
TGC Color Doppler

Multi Hertz

Scanning Techniques:

Many different scanning techniques are taught during the duration of the program. These are found in the Ultrasound Scanning Principle and Protocols textbook and also on hand outs that are given throughout the program. These include:

Transducer selection
Application selection
Patient preparation
Patient positioning
Breathing techniques
Scanning windows

Understanding and Memorization of Basic Scanning Protocols

These are the basics that are used to complete the examinations that are taught during the program. These protocols must be recalled, stated, and followed by the student during the scanning sessions and examinations. They must be in logical sequence that is easily followed by the Sonography instructor or clinical coordinator who is watching, reviewing, or observing the scanning of a student or testing the student.

Clinical Write-up of Diagnostic Information

It is the goal of this program to produce quality diagnosticians. In order to do this, it is necessary that all candidates for clinical rotations understand both the scanning skills necessary to produce diagnostic quality images and the professional standards that are used in reports. This includes, but is not limited to: Abdomen, small parts, OB/GYN, and vascular sonography.

Patient Care and Interaction:

This aspect of the profession is wide and encompasses many facets. Key ones include:

- Ability to obtain accurate medical history which is relevant to the exam being performed
- Ability to communicate effectively and efficiently
- Ability to report medical findings to appropriate medical staff in a logical, professional manner
- Ability to assist the patient in the necessary areas to get on and off the exam table properly, dressed or undressed, as needed, and meet their non ultrasound related needs, such as toiletry, oxygen, etc.

Cross Sectional Relational Anatomy:

This is an area where the classroom knowledge must be brought over into the clinical setting and used to obtain diagnostic quality images. It will be necessary for all candidates to be able to relate the textbook work and knowledge that they have learned in the classroom pertaining to cross sectional anatomy into the actual scanning of the patient. The student will be asked to scan patients and to be able to identify the anatomy seen in the images, both in real time or on a still image. Students must be able to describe what they are looking at using accurate ultrasound terminology.

Requirements of Pre-Clinical Competencies:

- Be able to demonstrate appropriate relational and structural anatomy in a logical order, including

- Be able to set up the machine and get it ready to perform the examination (i.e., correct transducer frequency, application, and name field).
- Be able to apply proper scanning and imaging techniques (depth, Focus Overall Gain, TGC) to obtain diagnostic quality images
- Be able to correctly label the required images and answer any questions related to the competency and the organ in question.
- Be able to appropriately interact with the patient during the exam. This includes breathing techniques and verbal cues needed to have the patient in an optimal position for the exam. • Be able to complete clinical competencies in the allotted time
- A grade of B or higher is needed to pass pre-clinical competency examinations.

Final Clinical Competency Format:

Each competency examination is divided into the following sections:

Pre-Examination section

Patient Care and Preparation Section

Technical Performance Section

Imaging Section

Post Scanning Section

Case Presentation Section.

The Clinical Instructor must sign off on the final clinical competency. Each item of the final competency should be checked off and any non-applicable items should be marked as so. Clinical competency checklists, including the patient clinical history form, should be returned to the Clinical Coordinator.

Pre-Requisites for entrance to the Clinical Rotations:

- Maintaining GPA of 2.5
- Course completion
- Completion of Pre-Rotation Competency requirements and Health Form Updates, including required drug tests.
- No Disciplinary issues including disciplinary probation status

Clinical Evaluations:

Clinical Rotation Evaluations will include a variety of metrics, including:

1. Clinical Competencies
2. Clinical and instructional objectives of each competency
3. Student evaluations
4. Attendance Records: Students must report promptly to classes and clinicals. Work hours are assigned by the clinical sites. An accurate weekly attendance record for absences during each rotation has to be signed by the Clinical instructor.
5. Patient Log sheets: These must be legible. Students should enter every patient they see –

on the transducer. These log sheets prove that the students have had patient contact.

These log sheets include patient information re: age, sex, and ID number; patient history and current symptoms including lab values and explanatory notes; type of exam ordered (abdomen, Ob/Gyn); Exam indication (what are they trying to rule out or determine from the examination.); follow-up information, if obtainable.

6. Tally Sheets: must be completed at the end of each day by writing the appropriate number in each box. Tally sheets are required in order to prove to the accrediting and certifying agencies the number of exams that students are exposed to. It is also a registry requirement.
7. Case Studies: Students are required to present or submit case studies throughout the clinical rotations. Case studies must be in power point format. Information that must be included in the Case Study is History (age, sex, gender, medical condition); physical findings; laboratory data; clinical impression; ultrasound findings; follow-up information; discussion of pathology; scanning techniques employed with rationale; and discussion of current techniques and interpretations as obtained from at least three current articles or chapters in the books. References must be cited.
8. Self-appraisals: students will be required to complete and submit a self-appraisal form. The intention is to have students evaluate their own competency/comfort level in the clinical setting.

Clinical Environment:

You will notice many differences between the academic environment to which you have accustomed and the clinical environment that you are entering. Most of the differences will be exciting and stimulating but some will pre to be frustrating and aggravating. How successfully you function and learn in the clinical setting depends on how you approach and deal with these differences or opportunities. Efficient, effective operation of the department to deliver optimal patient services and care is the top priority. **This means that the patient's welfare is considered first.** This is consistent with the goals and needs of clinical education. You must take a more active and responsible role for integrating the academic preparation you had with the individual examinations you are observing and performing.

The Clinical Affiliates' rights and Responsibilities :

Mandl is committed to establish standards and regulations which are designed to ensure the quality education of DMS students at all levels of their training. Each clinical affiliate has an existing agreement with the DMS program and assumes the responsibility to assist in its mission to prepare students based on CAAHEP standards.

Clinical Affiliates Rights:

Each clinical affiliate in the DMS program has a right to:

1. Be informed of program procedures, policies, an accreditation requirement.
2. Representation at each regularly held advisory Board and clinical instructor meetings.

3. Open and objective communication from the Program Chair, Clinical Director, or VP of

Academics

4. Have students respect patients, property, staff, technologists, and other personnel while at their facility.
5. Expect College faculty to adequately prepare students for clinical experiences.

Clinical Affiliate Responsibilities:

Each clinical affiliate has a responsibility to:

1. Inquire about program procedures and requirements, if the staff does not have the information or does not understand it.
2. Send a representative (s) to regularly schedule advisory board and clinical instructor meetings.
3. Provide students with adequate department orientation and up-to-date procedure manuals.
4. Provide an environment which promotes learning and embodies the professional attitude that students are striving to emulate.
5. Provide the students with adequate opportunities to apply his or her learning.

RESPONSIBILITIES OF CLINICAL INSTRUCTORS :

The clinical education hinges on the help of clinical instructors. Clinical instructors are those at hospitals and clinics who directly supervise, instruct, and evaluate the clinical performance of students. Specifically, they:

- Orient new students to the division, its policies, and procedures
- Regularly instruct students on procedures
- Regularly critique the student's ultrasound images with them.
- Evaluate and assign a grade to all required clinical competency objectives.
- Fairly and objectively evaluate each student's progress when filling out student performance evaluations forms.
- Periodically discuss student's progress with them
- Coordinate the above activities with college staff.
- Mediate problems and promote good relations between students and hospital personnel.
- Regularly attend the DMS advisory Board

Program Coordinator:

The Mandl Clinical Director is responsible for general policy, curriculum, overall design, function, and effectiveness of the program and is responsible for function and effectiveness of the clinical education system of the program. The responsibilities are:

- Work with students in hospitals and clinics on a limited rotational basis
- Work with students in hospitals and clinics as an extension of the clinical education system of the program
- Develop student clinical schedules and monitor adequate breadth and depth of student clinical experience.
- Ensure adequate image critique experience for students.
- Maintain master files on all student clinical records.
- Interpret all clinical evaluations of students and determine final clinical grades. ➤ Provide clinical instructor with program policy and procedures manual and accreditation requirements.
- Assign specific students to specific clinical locations.
- Organize the total number of proficiencies required for graduation into a reasonable rate of progress through the time periods allotted.

- Provide each student with a clear written description of clinical course requirements including

attendance, make-up time, grading criteria, clinical log requirements and other paperwork that must be turned in.

- Maintain open communication with the student and the supervising sonographer during the rotation.
- Review the mid-rotation evaluation form or optimally meet with the student halfway through the rotation to discuss self-assessment and progress in mastering the proficiencies assigned. ➤ Provide specific due dates for all clinical education paperwork.

Professional Conduct:

1. You are expected to treat the patients with kindness, courtesy and respect. When you get patients from their rooms or patient waiting areas, introduce yourself and try to establish rapport. Once a patient is in the ultrasound room, keep the door closed and make sure that undressed patients are properly gowned or covered up.
2. Professional behavior is not limited to your contact with patients. It is reflected in your attitude and in the way you communicate with physicians, supervisors, and co-workers.
3. Smoking, eating, and drinking are permitted only in the lounge or designated areas.
4. Students will not leave their assigned area at any time without permission.
5. Students will not remain in the ultrasound department after regular working hours except when on duty.
6. When not actively engaged in work or other duties pertaining to ultrasound, students will not congregate in offices, halls, or other rooms
7. Personal Telephone calls are not encouraged. No one will leave a patient to talk on the telephone. Cell phones should be turned off during clinical assignments.
8. Students may not study during slow periods unless authorized by the clinical instructor. 9. Students should not engage in undue conversation with sonographers, physicians, or patients, make excessive noise, tell dirty jokes, gossip etc. while at the clinical site.

Student Responsibilities in the clinic or hospital:

The primary function of the clinic or hospital is patient care. Under no circumstances should the presence of students downgrade the quality of patient care. Therefore, it is the student's responsibility to:

1. Follow the administrative policies established by the Mandl DMS department and the hospital/clinic.
2. Check your assigned work center and report there on time.
3. Notify the clinical instructor prior to your scheduled time in case of illness or absences which are beyond your control.
4. Check with supervisor or representative before leaving the assigned work center.
5. Follow directions provided by the registered sonographer.
6. Meet with DMS clinical coordinator prior to beginning of a clinical rotation to determine which proficiencies are assigned.
7. Review the Performance objectives associated with the proficiencies assigned to you. 8. Meet with the supervising sonographer and review the progress documented on the Proficiency evaluation form. Discuss the specific proficiencies assigned or chosen which will be the focus during the rotation.
9. Regularly review and self-assess your ability to meet all performance objectives. 10. Discuss your self-assessments with the supervising sonographer and ask for assistance in mastering objectives with which you are having difficulty.

11. Ask for advice when indicated. Do not experiment with patients Be industrious and ask questions and directions.

12. Do not discuss clinical information with patients, relatives, or anyone outside the ultrasound department. Abide by the HIPAA regulations.
13. You will be responsible for:
 - a. Performing all examinations assigned to you by a staff sonographer.
 - b. Checking all supplies in the area to which you are assigned and stocking supplies when needed.
 - c. Keeping the assigned areas neat and clean
 - d. Maintaining professional attitude

General Objectives of Clinical Rotation:

The final objective or goal of students enrolled in this program is to become a competent sonographer and registered by ARDMS. Their ability to meet the objective will be evaluated on an ongoing basis throughout the entire clinical experience.

The student will be able to:

1. Demonstrate self-esteem and respect for the profession by always conforming to the established dress code as published in the DMS student handbook, taking care that attire, physical appearance, and personal hygiene ensure good grooming and cleanliness at all times.
2. Show enthusiasm, initiative, and motivation by seeking out additional responsibilities and utilizing any extra time in meaningful learning experiences. (attitude)
3. Be in attendance and punctual in the clinical environment at all designated times, assuming responsibility for communicating any absence from assigned areas and following instructions efficiently. (Dependability)
4. Demonstrate qualities of ethical thought process and behavior becoming to a health care professional when responding in stressful situations. Demonstrate courteous and attentive manner, a concern for patient's safety, comfort, modest, and ability to communicate with confidence and poise. (Professional behavior)
5. Develop precision and accuracy in performing ultrasound procedures, demonstrating knowledge and confidence in technical skills while minimizing and correcting errors. (Quality work).

PROFESSIONALISM/ETHICS/CONFIDENTIALITY

The Faculty of Mandl School have an academic, legal and ethical responsibility to protect members of the public and the health care community from unsafe or unprofessional practices. Students, while representing the College at any clinical agency, must conduct themselves in an ethical, professional, and safe manner. Students are expected to assume responsibility for their actions and will be held accountable for them. Students will abide by Mandl and clinical agency policies during each clinical experience.

Failure to adhere to program specific policies related to professional behavior or safe clinical practice may result in the use of the Discipline Policy outlined in the Student Handbook.

Students must remember that all information concerning patients is confidential. Students are required to adhere to legal and ethical standards as established by regulatory agencies and professional standards. Failure to comply with the above is cause for immediate dismissal from the program.

The following examples serve as guides to avoid these unsafe behaviors but are not to be

Physical Safety: Unsafe behaviors include but are not limited to:

- inappropriate use of side rails, wheelchairs, other equipment
- lack of proper protection of the patient which potentiates falls, lacerations, burns, new or further injury
- failure to correctly identify patient(s) prior to initiating care
- failure to perform pre-procedure safety checks of equipment, invasive devices or patient status

Biological Safety: Unsafe behaviors include but are not limited to:

- failure to recognize violations in aseptic technique
- improper medication administration techniques/choices
- performing actions without appropriate supervision
- failure to seek help when needed
- attending clinical while ill
- failure to properly identify patient(s) prior to treatments

Emotional Safety: Unsafe behaviors include but are not limited to:

- threatening or making a patient, caregiver, or bystander fearful
- providing inappropriate or incorrect information
- performing actions without appropriate supervision
- failure to seek help when needed, unstable emotional behaviors

Unprofessional Practice: Unprofessional behaviors include but are not limited to:

- Verbal or non-verbal language, actions (including but not limited to postings on social media sites), or voice inflections which compromise rapport and working relations with patients, family members, staff, or physicians, may potentially compromise contractual agreements and/or working relations with clinical affiliates, or constitute violations of legal/ethical standards
- Behavior which interferes with or disrupts teaching/learning experiences
- Using or being under the influence of any drug or alcohol that may alter judgment and interfere with safe performance in the clinical or classroom setting
- Breach of confidentiality in any form
- Falsifying data in a patient health record
- Misrepresenting care given, clinical errors, or any action related to the clinical experience
- Recording, taping, taking pictures in the clinical setting without expressed consent
- Leaving the clinical area without notification of faculty and clinical staff or supervisor

Mandl will not place a student in a rotation at a clinical site where the student is currently employed by the facility in the same department and/or under the same supervisor.

Professional Behavior

Faculty of the Sonography Programs have an academic, legal and ethical responsibility to protect members of the public and of the health care community from unsafe or unprofessional practices. Sonography students, while representing Mandl at any clinical agency, must conduct themselves in an ethical, professional, and safe manner. Sonography students should recognize that high standards are set for those working in Health Care professions.

Professionalism in health care is based on values that include, but are not limited to, moral values (honesty, integrity, and trustworthiness), values specific to Sonography (clinical performance standards, appropriate communication), societal values (commitment to excellence), personal values (self-reflection, maintenance of credentials, interpersonal skills), and humanistic values (empathy, compassion). Patients are confronting illness, disruption of their normal routines in life, and life-changing events, therefore they are anxious about their current condition and future health. Patients rely on health care professionals to address their needs expertly and professionally.

Students are expected to assume responsibility for their actions and will be held accountable for them. Students will abide by Mandl Sonography Program's and clinical agency's policies during each lecture, lab session, and clinical experience (rotation assignment). Failure to adhere to program specific policies related to Conduct, professional behavior and/or safe clinical practices (patterns of behavior that obstruct or disrupt the learning environment of the classroom or other educational facilities) will be immediately addressed by the implementation of the Discipline Policy outlined in Policies and Procedures of this Handbook.

- The instructor is in charge of the course; course policies and procedures are stated in course syllabus.
- The instructor is in charge of the classroom environment including timing and level of discussion, types of questions allowed, respectful communication, and specific behaviors that are not allowed.
- The instructor is entitled and obligated to maintain order within the classroom. An instructor may require the student to leave the classroom and/or call an Administrator if a student does not comply with requests for the student to stop his/her behavior.

Sonography Programs Code of Conduct

- Students will comply with all Mandl, Sonography Programs and Clinical Affiliate policies, procedures, and rules at all times and in all settings.
- Students will demonstrate professional and respectful verbal and non-verbal communication and interactions with classmates and instructors in all lectures, lab, and clinical course. • Disruptive behavior of any type and in any setting will result in the initiation of the Discipline Process, Step 2 Conference Report.
- Students will communicate privately with the instructor regarding their individual performance and/or any clinical concerns.
- Students will appeal scoring of specific test questions by submitting their appeal and rationale with supporting reference citation to the instructor in writing within one week of the test. The instructor will respond in writing within one week and will include the final decisions and referenced rationale. All decisions of the instructor to appealed questions are final.
- Students are prohibited from after-hours socializing with Sonography faculty, clinical instructors, sonographers, and staff members during the length of the Program.
- Students are not allowed personal use of the computers in the Sonography labs. • Students must keep all their coursework (including scans and tests) and evaluations private. • In accordance with the Mandl Academic Dishonesty Policy, viewing the work of another student in any didactic, lab, or clinical course (both on-campus and off-campus) unless such viewing is part of a group assignment or activity will result in the initiation of the Discipline Process at Step 2 Conference Report.
- Students must keep accurate clinical records (Attendance, Case Logs, etc.).
- In accordance with the Mandl Academic Dishonesty Policy, falsifying any clinical records will result in the initiation of the Discipline Process at Step 3 Probation OR may result in immediate withdrawal of the student from the Program.

CODE OF ETHICS FOR THE PROFESSION OF DMS

The goal of this code of ethics is to promote excellence in patient care by fostering responsibility and

accountability among diagnostic medical sonographers. In doing so, the integrity of the profession of the

diagnostic medical sonography will be maintained.

Objectives:

- To create and encourage an environment where professional and ethical issues are discussed and addressed.
- To help the individual diagnostic medical sonographer identify ethical issues • To provide guidelines for individual diagnostic medical sonographers regarding ethical behavior.

PRINCIPLES:

1. IN ORDER TO PROMOTE PATIENT WELL BEING, THE DIAGNOSTIC MEDICAL SONOGRAPHER

- Provide information to the patient about the purpose of the sonography procedure and respond to the patient's questions and concerns
- Respect the patient's autonomy and the right to refuse the procedure
- Recognize the patient's individuality and provide care in a non-judgmental and non discriminatory manner
- Promote the privacy, dignity, and comfort of the patient by thoroughly explaining the examination, patient positioning and implementing proper draping techniques
- Maintain confidentiality of acquired patient information and follow the HIPAA regulations.
- Promote patient safety during the provision of sonography procedures and while the patient is in the care of the sonographer.

2. TO PROMOTE THE HIGHEST LEVEL OF COMPETENT PRACTICE, THE MEDICAL SONOGRAPHER will:

- Obtain appropriate diagnostic medical sonography education and clinical skills to ensure competence
- Achieve and maintain specialty specific sonography credentials.
- Uphold professional standards by adhering to defined technical protocols and diagnostic criteria established by peer review
- Acknowledge personal and legal limits, practice within the defined scope of practice, and assume responsibility for his/her actions
- Maintain continued competence through lifelong learning, which includes continuing education, acquisition of specialty specific credentials and recertification
- Perform medically indicated ultrasound studies, ordered by a licensed physician or their designated health care provider
 - Protect patients and/or study subjects by adhering to oversight and approval of investigational procedures, including documented informed consent
- Refrain from the use of any substances that may alter judgement or skill and thereby compromise patient care
- Be accountable and participate in regular assessment and review of equipment procedures, protocols, and results.

3. TO PROMOTE PROFESSIONAL INTEGRITY AND PUBLIC TRUST, THE SONOGRAPHER WILL

- Be truthful and promote appropriate communications with patients and colleagues •
Respect the rights of patients, colleagues, and himself/herself

- Accurately represent his/her experience, education, and credentialing

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- Promote equitable access to care
- Collaborate with professional colleagues to create an environment that promotes communication and respect
- Communicate and collaborate with others to promote ethical practice
- Engage in ethical billing practices
- Engage only in legal arrangements in the medical industry
- Report deviations from the code of ethics to institutional leadership for internal sanctions, local intervention and/or criminal prosecution.

Academic Due Process

Faculty is committed to assisting students to be successful in the program. To afford students due process, Sonography students who are not meeting course objectives in class, clinical/practicum, or lab will be apprised of their performance status using the discipline process.

Step 1: Warning

The instructor provides the student with a verbal warning or written feedback as to their status. The instructor counsels the student regarding criteria for successful completion of the course and makes recommendations for improvement. Recommendations may include but are not limited to - utilization of peer study groups, tutors, computer- assisted instruction, seeking assistance from Mandl counselors.

At the discretion of the instructor and depending on the situation, this step may be skipped, and a conference done.

Step 2: Conference

The student meets with the instructor in a formal conference with either the Department Chairs or the Dean of Student & Academic Services to review the performance deficit. A written Conference Report will identify specific course/program objectives not met and a remediation plan/contract, including deadlines for completion, to assist the student to correct the deficit and remain in the program and be successful.

If at any time the student does not comply with all terms outlined in the conference report, the student may be placed on probation or withdrawn from the program

Step 3: Probation

Probation action is implemented for:

- Unsatisfactory clinical performance
- Unsatisfactory clinical attendance and punctuality
- Inability to maintain physical and mental health necessary to function in the program • Unethical, unprofessional behavior, and/or unsafe clinical practice
- Refusal to participate with/in a procedure
- Unsafe or unprofessional clinical practice that compromises patient or staff safety • Behavior which compromises clinical affiliations

- Failure to comply with all terms outlined in the conference report

Probation is a specified time frame in which the student must improve or be withdrawn from the program.

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The student meets with the instructor and department chair. An advisor may be asked to assist in representing the student. The student and faculty will review and sign a Probation Report explicitly stating expectations that must be followed during the probationary period.

Step 4: Withdrawal

If at any time during the probation period, the student fails to meet any of the conditions of the probation contract, the student may be withdrawn from the program. Accordingly, if at the end of the probation period the student has not met the criteria for satisfactory performance outlined in the probation contract, the student will be withdrawn from the program.

A student who is placed on probation for unsafe or unprofessional conduct will be withdrawn from the program for subsequent safety or professional conduct violations at any time during the remainder of the program. (If the occurrence is past the official college date for withdrawal from a course, the student will receive a performance grade of “F” or “WU” as applicable.)

Some situations do not allow for the discipline process due to the severity or the nature or the timing of their occurrence. Incidents of this nature may require the student to be immediately placed on probation or withdrawn from the program. Examples of these include, but are not limited to: •

Violations of patient confidentiality

- *Academic dishonesty*
- *Falsification of documentation*
- *Unprofessional behavior/unsafe behavior that seriously jeopardizes patient, student, staff, or preceptorsafety*
- *Unprofessional behavior that seriously jeopardizes clinicalaffiliations.*

NOTE: If the occurrence is past the official college date for withdrawal from a course, the student will receive a performance grade of “F” or “WU” as applicable.

Interactions with patients in the health care system carry inherent risks to both the patient and caregiver, including, but not limited to, communicable diseases. In the curriculum, students will be given information regarding known risks for various diseases and measures to decrease those risks.

All students are expected to provide appropriate care to all assigned patients in any setting. These assignments may include patients with medical diagnoses of tuberculosis; hepatitis A, B, or C; AIDS; or other infectious diseases. Students are expected to implement standard precautions and appropriate barrier protection in the care of all assigned patients.

The College does not provide personal health insurance coverage for students. All students are required to carry some type of personal health insurance.

To protect patients and provide a safe environment for students, staff, and the public, all students participating in clinical/practicum experiences/courses in any facility may be required to provide documentation of the **seasonal flu vaccine**. Failure to have the immunization may have implications for clinical attendance. Students will be provided additional information when indicated.

Students must complete CPR certification from American Red Cross prior to going on Clinical

Rotations. **Latex Gloves**

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Approximately 3 million people in the U.S. are allergic to latex. Latex is used in more than 40,000 industrial, household, and medical products. Exposures to latex may result in skin rashes, hives, flushing, itching; nasal, eye, or sinus symptoms, asthma, and (rarely) shock. Reports of such allergic reactions to latex have increased in recent years—especially among healthcare workers—NIOSH. This statement is provided to notify students of the possible risk of latex allergies. It is important to notify the program if you are or become allergic/sensitive to latex products.

Substance Abuse

The well-being of patients and clients cared for by our students is of primary concern in all programs and a carefully designed and administered drug and alcohol misuse procedure can reduce accidents. Therefore, the Department has adopted a substance abuse testing program wherein a student who is participating in clinical courses will be asked to be tested for drugs when there is reasonable suspicion that the student is under the influence of alcohol and/or illegal drugs, i.e., drugs which are controlled substances under federal law which are not being used under the supervision of a licensed health care professional, or otherwise in accordance with the law.

Students will be asked to submit to drug screening by their clinical instructor at the expense of the student in the following circumstances:

1. Observable indication of actual use or impairment such as slurred speech, lack of coordination, incoherency, marijuana or alcohol odors.
2. Possession of drugs, apparent paraphernalia or alcoholic beverages.
3. Detailed, factual, and persistent reports of misuse by multiple colleagues.
4. Abnormal or erratic behaviors such as sudden outbursts, mood swings, hostility or unusual anxiety that suggests possible drug use or alcohol misuse.
5. Involvement in suspicious accidents.
6. Apparent lapses in judgment or memory.
7. Unusual lethargy.

Health care providers are entrusted with the health, safety, and welfare of patients/clients. The safety and welfare of patients/clients cared for by our students is of primary concern in all Mandl programs and the clinical agencies that provide essential clinical experiences for the students. The clinical agencies may require a drug screen prior to the first clinical course to ensure that their facility is in compliance with The Joint Commission (TJC) standards.

Successful completion of the ten (10) panel drug screen may be required within **thirty days of beginning the first clinical course.** Drug screens will be honored for the duration of the student's enrollment in the clinical program if the participating student has not had a break in the enrollment of the program. A break in enrollment is defined as nonattendance of one full semester or more.

Successful completion of a criminal background check may also be required for admission and continuation in the Sonography Program. Background checks will be honored for the duration of the student's enrollment in the clinical program if the participating student has not had a break in enrollment at the college/school. A break in enrollment is defined as nonattendance of one full semester or more.

Once accepted into the program, it is the student's responsibility to immediately notify the Department Chair or the Dean in writing of any subsequent changes in criminal history that occur after the admission

background check has been completed. Failure to do so may result in immediate withdrawal from the program.

SCANS Competencies

In 1991, the Secretary of the U.S. Department of Labor established the Secretary's Commission on Achieving Necessary Skills (SCANS). The Commission found that, "Current and future employees will have to read well enough to understand and interpret diagrams, directories, correspondence, manuals, records, charts, graphs, tables, and specifications."

Integration of the SCANS competencies within the program will help to prepare students to function more effectively for the workplace. The know-how identified by SCANS is made up of five competencies and a three-part foundation of skills and personal qualities that are needed for solid academic or job performance. SCANS competencies and examples applicable to the Sonography Programs are shown in the following table:

SCAN	Competencies	Examples
S 1.0 Resources	1.1 Manages Time	Completes all assignments within specified time frame; maintains appropriate attendance in all courses.
	1.2 Manages Material and Facility Resources	Uses appropriate amounts of supplies in performing sonographic studies.
2.0 Interpersonal	2.1 Participates as a Member of a Team	Participates with the on-site clinical instructor and other members of the health care team to provide optimum patient care.
	2.2 Teaches Others	Provides pre- and post-procedure instructions to patient, explains procedure process to patient, participates in peer-teaching
	2.3 Serves Clients/Customers	The sonography student communicates appropriately and effectively at all times with patients, families, staff, sonographers, and physicians in the clinical setting.
	2.4 Works with Cultural Diversity	
3.0 Information	3.1 Acquires and Evaluates Information	Correlates patient history, laboratory data, related studies and surgical procedures to the performance of the ultrasound exam; recognizes incorrect exam orders and alerts staff sonographer.
	3.2 Organizes and Maintains Information	Produces a written technical report of sonographic findings, appearances and/or measurements as required.
4.0 Systems	4.1 Understands Systems	Applies technical settings using ultrasound machine controls to produce diagnostic quality images.
	4.2 Monitors and Corrects performance	Self-critiques images and views; adjusts imaging parameters as needed to produce diagnostic quality exams.
5.0 Technology	5.1 Selects Technology	Selects appropriate transducer and software settings for required sonographic exam.
	5.2 Applies Technology to Talk	Uses appropriate technical and medical terms.
	5.3 Maintains/Troubleshoots Technology	Assesses ultrasound unit performance and compensates

		for technical difficulties during procedure.
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<p>6.0 Basic Skills</p>	<p>6.1 Reading 6.2 Writing 6.3 Mathematics 6.4 Listening 6.5 Speaking</p>	<p>Completes writing assignments and Internet searches of assigned topics.</p> <p>Able to perform calculations required in ultrasound physics and specialty courses.</p> <p>Able to interview patient to obtain information and history as related to the sonographic examination.</p> <p>Able to provide verbal reports on sonographic findings using clear and concise English language.</p>
<p>7.0 Thinking Skills</p>	<p>7.1 Decision Making 7.2 Problem Solving 7.3 Mental Visualization 7.4 Knowing How to Learn 7.5 Reasoning</p>	<p>Correlates patient information and patient condition with the requirements for the diagnostic ultrasound exam; adjusts scanning techniques as needed.</p> <p>Correctly identifies pathological conditions demonstrated on sonographic images and adapts exam as needed.</p> <p>Creates a study plan and seeks assistance with educational goals as needed.</p> <p>Decides which formulas to apply given various parameters.</p> <p>Maintains focus and performs duties in emergency and stressful conditions</p>
<p>8 Personal Qualities</p>	<p>8.1 Responsibility 8.2 Self-esteem 8.3 Sociability 8.4 Self-Management 8.5 Integrity/Honesty</p>	<p>Manages personal time and activities as not to interfere with lecture or lab class sessions, clinical attendance, and/or assignments or activities.</p> <p>Identifies and acknowledges scanning strengths and weaknesses.</p> <p>Displays enthusiasm for profession; displays a pleasant demeanor in all settings.</p> <p>Maintains confidentiality of personal and clinical information.</p> <p>Complies will all ACC, Program and Clinical Affiliate policies, procedures and rules.</p>

Technical Standards and Essential Functions

Sonography programs establish technical standards and essential functions to ensure that students have the abilities required to participate and potentially be successful in all aspects of their respective program. Students are required to meet technical standards and essential functions for the Sonography Program outlined below with or without accommodations. If an applicant or student is unable to meet all of the outlined technical standards with or without accommodations, he/she may be withdrawn from the program.

The technical standards and essential functions, outlined below, represent reasonable expectations of a student in the Sonography Program for the performance of common sonographic imaging functions. The sonography student must be able to apply the knowledge and skills necessary to function in a variety of classroom, lab, and/or clinical situations while acquiring the essential competencies of sonographic imaging. These requirements apply for the purpose of admission and continuation in the program.

The DMS student must possess the following capabilities and skills:

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Observation: The ability to observe is required for demonstrations, visual presentations in lectures, laboratories, laboratory evidence and microbiological cultures, microscopic studies of microorganisms and tissue in normal and pathologic states. The ability to discriminate among blacks, grays, and whites, and various color combinations that indicate blood flow on both display devices and recorded images (film and paper) is required for scan interpretation. A student must be able to observe patients accurately and completely, both at a distance and closely.

Communications: A student must be able to communicate effectively via speech, reading, and writing. He or she should be able to hear and observe clinical staff and patients in order to elicit information, perceive nonverbal communications, describe changes in mood, activity, posture, and recognize and respond to an emergency or urgent situation. In addition to patient and clinical staff communication, the student must be able to communicate orally and in writing with physicians and other health care professionals.

Motor: The student should possess the ability for gross and fine motor function, manual dexterity, and physical strength to:

- Apply general care and emergency treatment to patients
- Help lift patients who may be unable to move themselves from wheelchairs or beds to the examination table
 - Manipulate ultrasound equipment, computers, and peripherals
- Distinguish audible sounds
 - Have use of both hands, wrists, and shoulders involving the coordination of muscular movements, equilibrium, and sensation.
- Work standing on his or her feet 80% of the time
- Lift and move objects.

Intellectual: Conceptual, integrative, and quantitative abilities are required. Problem-solving is a critical skill of sonographers and this requires all these abilities. The student must be able to comprehend multi dimensional relationships and spatial relationships of anatomic structures.

Behavioral and Social Attributes: A student must be emotionally healthy. He or she must be able to ability and exercise good judgment to complete all responsibilities essential to obtaining a quality ultrasound study and providing care to patients. A student must be able to develop mature, sensitive, and effective relationships with patients and colleagues. An ultrasound student must be able to tolerate physical and emotional stress and continue to function effectively. A student must possess qualities of adaptability, flexibility, and be able to function in the face of uncertainty. He or she must have a high level of compassion for others, motivation to serve, integrity, and consciousness of social values.

Categories of Essential Functions	Definitions	Example of Sonography Technical Standard
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Observation	Ability to participate actively in all demonstrations, laboratory exercise, and clinical experiences in the professional program component and to assess and comprehend the condition of all clients assigned to him/her for examination. Such observation and information usually requires functional use of visual, auditory, and somatic sensations.	<p>Adequately view sonograms (live, simulated, and/or recorded), including color distinctions</p> <p>Adequately view sonographic imaging and the ultrasound unit control panel simultaneously while performing the scan/exam in the low light settings required for sonographic imaging</p> <p>Adequately view recorded sonographic images/videos in the low light settings used to acquire sonographic images/videos</p> <p>Recognize and interpret facial expressions and body language</p> <p>Distinguish audible sounds from both the patient and the ultrasound equipment (Doppler)</p>
Categories of Essential Functions	Definitions	Example of Sonography Technical Standard Recognize and respond to soft voices or voices under protective garb
Communication	Ability to communicate effectively in English using verbal, non-verbal and written formats with faculty, other students, clients, families and all members of the healthcare team.	<p>Able to elicit information and assess non-verbal information from patients, staff, fellow students, instructors, and other members of the health care team</p> <p>Transmit information to patients, staff, fellow students, instructors, and other members of the health care team</p> <p>Receive/comprehend, write, and interpret verbal and written communication in both academic and clinical settings</p>
Motor	Sufficient motor ability to execute the movement and skills required for safe and effective care and emergency treatment	<p>Strength sufficient to lift some patients, move heavy equipment on wheels (up to approximately 500 lbs.), and to move patients in wheelchairs and stretchers.</p> <p>Push and pull, bend and stoop routinely</p> <p>Have full use of both hands, wrists and shoulders</p> <p>Dexterity to manipulate the ultrasound transducer and control panel simultaneously</p> <p>Work 80% of the time standing or sitting depending on the clinical setting.</p> <p>Exert up to 40 lbs. of sustained/continuous transducer pressure while scanning</p>
Intellectual	Ability to collect, interpret and integrate information and make decisions.	<p>Able to maintain prolonged arm positions necessary for scanning</p> <p>Read and comprehend relevant information in textbooks, medical records, and professional literature</p> <p>Retain and apply information in all settings. Measure, calculate, reason, analyze, and synthesize</p> <p>Organize and accurately perform the individual steps in a sonographic procedure in the proper sequence and within required time frame and in all clinical settings</p> <p>Apply knowledge and learning to new situations and problem-solving scenarios</p>
Categories of Essential Functions	Definitions	Example of Sonography Technical Standard

<p>Behavioral and Social Attributes</p>	<p>Possess the emotional health and stability required for full utilization of the student's intellectual abilities, the exercise of good judgment, the prompt completion of all academic and patient care responsibilities and the development of mature, sensitive, and effective relationships with clients and other members of the health care team.</p> <p>Possess the ability to tolerate taxing workloads, function effectively under stress, adapt to changing environments, display flexibility, and learn to function in the face of uncertainties inherent in clinical settings with patients.</p>	<p>Manage fast-paced and heavy didactic and clinical schedules and deadlines</p> <p>Maintain focus and remain on task to function effectively during instruction for, and performance of, sonograms and/or under stressful conditions</p> <p>Perform in fast paced clinical settings and during clinical situations including emergency situations</p> <p>Exercise appropriate judgment decisions in all settings</p> <p>Display flexibility and adaptability in all settings including rapidly changing, distracting and unpredictable environments</p> <p>Demonstrate integrity, concern for others/compassion, appropriate interpersonal skills, interest and motivation</p> <p>Comply with the Sonographer Code of Ethics, Clinical Practice Standards, and Scope of Practice (Society of Diagnostic Medical Sonography: www.sdms.org)</p>
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Possess compassion, integrity, concern for others, and

Sonography Physical & Psychomotor Abilities The following list was developed by the Sonography Programs as a resource for potential applicants and to enhance understanding of the physical and psychomotor abilities and skills required for learning and performing sonographic scans/exams. demonstrate professional behaviors and a strong work ethic.

motivation. Possess the ability to

psychomotor abilities and skills required for learning and performing sonographic

scans/exams. demonstrate professional

behaviors and a strong work

Definition of Psychomotor Learning: demonstrating physical skills such as movement, coordination, ethic.

manipulation, dexterity, grace, strength, speed; actions which demonstrate fine motor skills such as use of precision instruments or tools. *Examples of Sonography functions are in italics.*

Strength and Endurance

a. Dynamic Strength – The ability to exert muscle force repeatedly or continuously over time (including walking, standing or being upright continuously for 8-12 hours). For Sonographers, this also means exerting up to 40 pounds of sustained transducer pressure during the scan/exam.

b. Stamina – The ability to exert yourself physically over long periods of time without getting

winded or out of breath. *Students and sonographers will spend 45 minutes or more of continuous scanning during a practice or performance of a sonographic scan/exam.*

- c. Static Strength – The ability to exert maximum muscle force to lift, push, pull, or carry objects. *Sonographers must be able to lift patients, push and pull equipment into place, push the transducer across the body or on a single location as needed for the specific type of sonographic scan/exam, and carry equipment needed for the scan/exam.*
- d. Trunk Strength – The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without “giving out” or fatiguing. *Sonograms are performed with the sonographer standing or sitting for the duration of a scan/exam.*

Movement/Control (before, during, and after a sonographic scan/exam)

- a. Arm-Hand Steadiness – The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position. *Echocardiography scans and certain Medical and Vascular sonography scans/exams require the transducer to be applied to a single location for several minutes at a time.*
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- b. Control Precision – The ability to adjust the controls of a machine or a vehicle quickly and repeatedly to exact positions. *This includes positioning the transducer at a correct location during a scan/exam.*
 - c. Dynamic Flexibility – The ability to bend, stretch, twist or reach out with your body, arms, and/or legs; use proper scanning ergonomics but be able to adapt scanning to patient condition and/or type of scan/exam or procedure performed quickly and repeatedly.
 - d. Extent Flexibility – The ability to bend, stretch, twist, or reach with your body, arms, and/or legs: *use proper scanning ergonomics but be able to adapt scanning to patient condition and/or type of scan/exam or procedure performed.*
 - e. Finger Dexterity – The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects. *During a sonogram, the sonographer must manipulate the transducer with one hand while the other hand simultaneously adjusts controls on the ultrasound unit.*
 - f. Manual Dexterity – The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects. *During a sonogram, the sonographer must manipulate the transducer with one hand while the other hand simultaneously adjusts controls on the ultrasound unit.*
 - g. Multi-limb Coordination – The ability to coordinate two or more limbs while sitting, standing or lying down.
 - h. Reaction Time – The ability to quickly respond to a signal when it appears *such as patient complications during a scan/exam and/or procedure.*
 - i. Speed of Limb Movement – The ability to quickly move arms and legs

Auditory

- a. Auditory Attention – The ability to focus on a single source of sound in the presence of other distracting sounds: *use of Doppler ultrasound and attention to patient communication during a scan/exam or procedure.*

- b. Hearing Sensitivity – The ability to detect or tell the differences between sounds that vary in pitch and loudness: **use of spectral Doppler during ascan/exam.**
- c. Sound Localization – The ability to tell the direction from which a sound originated: **patient communication and Doppler ultrasound.**

Visual

- b. Near and Far Vision – The ability to see objects at both close range and at a distance: **adequately visualize sonographic appearances of the anatomy on the monitor while simultaneously viewing and using the control panel of an ultrasound unit; able to read and view images on glossy paper used in sonography texts**
- c. Ability to work in low light settings **the sonographer must be able to view all features and functions of the ultrasound unit, observe patient condition during the scan, and assess still and dynamic images of scans during case reviews (all sonographic scans/exams are performed in very low light settings)**
- d. Visual Color Discrimination – The ability to match or detect differences between colors, including shades of color and brightness: **use of color Doppler during a scan/exam.**

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Physical Skills Summary

- The ability to safely bend, twist, and lift to assist a patient moving from one surface to another. • The ability to apply manual resistance to a patient’s arm, leg or trunk during exercise. • The ability to perform chest compressions necessary for CPR.
- The coordination, balance, and strength to safely guard and protect a patient negotiating stairs with an assistive device.
- The ability to crouch, kneel, reach, push/pull, and crawl to perform exercises with patients. • The ability to climb when instructing or assisting a patient on the stairs.
- The agility to move quickly to ensure patient safety.
- The physical capacity to work a 40-hour week during clinical affiliations.
- Sufficient manual dexterity to safely grasp and manipulate small objects and dials. • The ability to identify color changes on the skin.
- The ability to visually observe and assess a patient 10 feet away.
- The visual acuity to set and read scales, dials and digital displays on equipment, and to read from the medical record.
- The ability to respond quickly to a visual or auditory timer.
- The ability to respond quickly to a patient call button (visual or auditory).
- The ability to hear heart and lung sounds.
- The ability to hear and respond to monitors, calls for assistance, timers, and verbal directions. • The ability to detect odors such as equipment burning, smoke, spills, environmental hazards, and pathophysiological conditions.
- The ability to feel pulse, muscle tone, and bony landmarks.
- The ability to hold and use a writing instrument for documentation.

Cognitive/Behavioral Skills Summary

- The ability to collect and integrate data about patients to problem solve safely and effectively as a Sonography student.
- The ability to handle the emotional stress of working with patients in need of compassionate health care.
- The ability to read and comprehend patient information.

- The ability to prioritize and manage multiple tasks simultaneously.
- The ability to interact effectively with patients, families, supervisors, and co-workers regardless of their race, sex, color, religion, national origin, ancestry, age, sexual orientation, or disability.
- The ability to maintain personal hygiene consistent with the close personal contact associated with patient care.
- To render assistance to individuals of all cultures from across the lifespan without prejudice.
- To comprehend and effectively communicate in the English language (orally and in writing), using appropriate grammar and vocabulary.
- The ability to portray professional behavior in all areas, including professional presentation, academic and professional responsibility, ethics, and commitment to learning.

Health Data and Physical Exam Requirements

Sonography students must possess the physical abilities and characteristics required to meet the technical standards for the program. Therefore, all students in the program are required to have a health assessment performed by a physician or other approved licensed health professional prior to the start of the first semester. The Health Data and Physical Exam Form must be used for this purpose and is available with the program Director.

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Electronic Devices

The use of any electronic device (any non-stationary electronic apparatus with singular or multiple capabilities of recording, storing, processing, and/or transmitting data, video/photo images, and/or voice emanations) is strictly prohibited during lecture and lecture/lab unless the student obtains an accommodation letter from the Dean or the VP of Academic Affairs.

The student is prohibited from having a portable electronic device on his/her person while in the clinical site and/or the Sonography lab.

Dress Code: Lecture and Lecture/Lab Courses

Students must wear DMS program uniform at all times.

Good grooming and designated uniform is expected while on campus and during any off campus activities where the student is identified as a Sonography student. A professional appearance is essential to a favorable impression with patients, family members, colleagues and future employers.

Additionally, basic elements for appropriate and professional attire include clothing that is in neat and clean condition. Basic guidelines for appropriate dress do not include tight or short pants, tank tops, halter tops, low-cut blouses or sweaters. All clothing will be free of profanity, slanderous or inflammatory language, logos, or drawings.

In case of uniform policy violation, The DMS Sonography Department will apply a reasonable and professional standard to individuals on a case-by-case basis. Faculty may exercise reasonable discretion to determine appropriateness in student dress and appearance. If faculty decides that a student's dress or appearance is not appropriate as outlined in this policy, he or she may be asked to leave class.

Dress Code: Clinical Courses

Student's grooming practices shall make ample provision for sanitation, safety, and comfort and shall not draw unnecessary attention to the student so that all can focus their attention on their work and our

collective efforts to serve patients. All students shall be required to present a clean, neat, and professional appearance and to dress in a manner appropriate for a professional and safe health care environment. Extreme styles, recreational clothing (in place of or worn with required scrubs), excessive jewelry, and perfumes/colognes or excessive make-up are not acceptable attire (see below).

Failure to adhere to program specific policies related to professional behavior or safe clinical practice may result in the use of the Discipline Policy outlined in this syllabus and in the Student Handbook

Clinical uniform and grooming requirements and rules include:

- 1) Wearing appropriately fitting solid DMS Mandl scrub color designated by hospital clinical partners) for all and off-campus clinical rotation assignments
 - scrub pant in any style
 - long-sleeved scrub jacket
 - the warm-up jacket must be worn when leaving the on-campus or off-campus Sonography department/lab to prevent the spread of disease
 - if the student wears the warm-up jacket while scanning, he/she must remove the jacket when leaving the on-campus or off-campus Sonography department/lab to prevent the spread of disease
 - Head scarves worn for religious reasons must be all white.
- 2) Wearing appropriate undergarments that cannot be visible at any time.

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- 3) Wearing standard Mandl photo ID at all times in the Sonography Lab and in all clinical areas. If required, the student must wear a clinical affiliate's ID badge and the Mandl Sonography Programs badge; both the Mandl and clinical affiliate badges must be visible at all times (cannot overlap).
- 4) Wearing clean all white leather professional nursing shoes with white socks; no cloth shoes or shoes with air holes on the top (such as "Crocs").
- 5) Wearing jewelry such as engagement rings, wedding rings, graduation rings, small post or hoop earrings, and wristwatches. No other jewelry or body piercing materials may be visible while in any clinical setting. Lanyards are not permitted due to hygiene and safety issues.
- 6) Wearing natural-appearing make-up; natural-to-pale nail polish, and keeping fingernails clean, trimmed, and short. Nail polish must be free of chips and students are not allowed to wear fingernail extensions.
- 7) Styling hair neatly so that it does not interfere with appropriate hygienic practices and medical asepsis, patient care or the performance of job:
 - Hair cannot be in the face, in or over the eyes; hair-colored or white clips, pins or head bands may be worn to secure the hair away from the face.
 - Hair longer than shoulder length should be styled or arranged off the shoulders and pulled up in a clip; a "pony-tail" cannot touch the shoulders, fall across the shoulders, or fall into the face.
 - Beards and mustaches must be kept clean as well as closely and neatly trimmed.
 - No fad hair designs, or colors are allowed; only natural hair colors should be worn.
- 8) Covering body tattoos at all times when in the clinical and clinical lab settings.
- 9) Wearing appropriate surgical caps and masks to completely cover head and facial hair if working

in Surgery or any other area where a surgical procedure is taking place.

- 10) Wearing a form of personal insignia such as armbands, buttons, hats, etc. is strictly prohibited in all clinical settings.

Sonography Chain of Command

Students who have questions or disputes regarding lecture, lab or clinical course objectives including evaluations, must first discuss their concerns with the assigned course instructor. If the instructor is unable to resolve the student's questions and concerns, the student should request an appointment with the Sonography Department Chair who will follow up with the assigned course instructor and investigate the issue. The Department Chair may request a meeting with the student and the instructor as part of the resolution process. If the issue continues unresolved, the student should follow The Student Complaint Procedure found in the Student Handbook.

Any issues that arise during the clinical day, such as but not limited to a difference between the scanning methods, techniques, protocols, etc. utilized at the clinical and those taught in the classroom or lab sessions must be handled with extreme diplomacy. The student is never allowed to critique or question the sonographer's scanning abilities, choice of images or protocol used to complete an exam. The student may ask the sonographer for clarification of his/her techniques, etc., but any questions regarding the appropriateness of what is observed or discussed in the clinical setting must be addressed to the Sonography faculty and/or Department Chair or DCE.

Failure to follow the Chain of Command may result in the initiation of the Discipline Process, Step 2

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Conference Report.

The Sonography Programs curricula are not lists of courses that must be completed but are programs of study in which all Sonography courses within a semester are co-requisites. All Sonography courses in each semester are prerequisites for the next semester courses, therefore, a grade of "C" or lower in any Sonography degree plan course prohibits the student from progressing to the next semester of the Program. Students who are unsuccessful in one or more courses in a semester of the Sonography degree plan are withdrawn from the Sonography Program.

The Sonography Programs utilize a variety of metrics and documents to evaluate the student's performance in didactic courses, lab sessions, and clinical courses. These include, but are not limited to, Progress Analysis Form, Affective Domain Performance Notification form, and an Early Warning form. Issuance of three (3) Affective Domain Performance Notifications (pattern of behavior) may result in the initiation of the Discipline Process.

Re-Admission Policy

- A student is eligible to apply for re-admission or re-entry to a Sonography Program one time only.

A student who withdraws or is withdrawn from a Program for any reason (personal reasons; failure of one or more Sonography curriculum courses in any semester; health reasons; etc.) is required to complete an Exit Review with the Sonography Department Chair. Examples of withdrawal include, but are not limited to:

- *A student successfully completes all but one Sonography course in a given semester. Regardless of the grades in the Sonography courses that are passed, the student is withdrawn from the Program.*

- *A student has a serious personal, financial, health problem, cannot meet the Technical Standards and Essential Functions of the Program, or is otherwise unable to meet the learning objectives of his/her course/courses. Regardless of grades up to that point in the Program, the student withdraws or is withdrawn from the Program.*
- *A student commits a severe infraction/violation of Mandl's Sonography Policy which results in immediate withdrawal.*

Students who leave the Program and desire re-entry must sign an agreement detailing the terms under which they will be allowed re-entry into the Program. Unless other arrangements are made in writing by the department, a student must re-enter the program in the next semester in which the appropriate courses are offered. Re-entry is based on space available in the requested semester of re-entry and Verification of Competency. Students requesting re-entry will be ranked using their GPA from their completed Sonography Curriculum courses.

A withdrawn student may seek re-entry into their previously attempted Program (see above) or may seek to apply for admission to the other Sonography Program during a future application period. If applying for the same or other Sonography Program, all requirements that are in place to apply for that application period must be completed. The re-applicant should schedule a meeting with his/her Department Chair for appropriate advising prior to re-applying.

If re-admitted, the student must re-take and pass with a grade of "C +" or better all Sonography courses in the semester of re-admission regardless of previous successful completion of those courses. If the student earns a grade of "C" or lower in any Sonography course taken after re-admission or re-entry to the Program, he/she will be withdrawn from the Program.

Re-Verification of Competency

As previously stated, all sonography courses within the curriculum are sequenced. Each clinical Semester has designated content and assignments; mastery of all Semester required skills must be demonstrated for the student to progress to the next Semester. A student who is withdrawn from a Sonography Program will not attend any clinical course until the semester of re-admission. Therefore, Verification of Competency evaluations will be completed prior to the start of the re-entry semester to ensure that the student is scanning appropriately for that Semester of the Program.

Re-verification of Competency scanning evaluations will consist of completing competency taken from the Semester Assignment Sheet of the last successfully completed clinical course. The student must earn 85% for each competency Challenge.

The student seeking re-entry may request access to the Sonography Lab for practice. Access to the Sonography Lab during a semester is determined by Lab availability; therefore, a schedule for Lab use must be developed. At least one Sonography faculty member must be on-campus for the student to utilize the lab. The student will arrange for a scan volunteer in accordance with Sonography Lab Volunteer procedures. The student must abide by all Sonography Lab Rules while using the Lab for practice.

Withdrawal

Please refer to the Student Handbook for the College policy on student or instructor-initiated withdrawal. Please see the above information regarding Program Progression for Sonography students.

Incomplete

A student in good standing in a sonography course may request an Incomplete for that course if one of more of the following is determined by Department Chair to be present: serious illness or injury that prevents the student from completing coursework by the end of the semester. All coursework must be satisfactorily completed prior to the beginning of the next semester as all courses in the Sonography curricula each semester are prerequisites for the next semester's courses.

Not Eligible for Re-Admission/Re-entry

During the Exit Review a student may not be eligible for re-entry if a severe infraction/violation occurs. These infractions/violations include, but are not limited

- to:
- Academic dishonesty
 - Falsification of documentation
 - Confirmed substance abuse
 - Change in criminal history

Sonography Programs Attendance

Lecture, lab, and clinical schedules are provided to the student prior to the beginning of each semester. Due to the intense nature of sonography education, missed class or clinical hours may seriously affect a student's ability to complete the requirements of his/her course(s). Three consecutive and unexcused absences may trigger disciplinary probation and or dismissal from the program.

Each course syllabus contains information regarding attendance requirements and procedures. *Student Work and Educational Schedule*

Working full-time while in a Sonography Program is difficult and not recommended since work schedules

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generally conflict with class and/or clinical rotations. Any activity that impairs the student's ability to attend class, participate actively in all classrooms, lab and clinical sessions, and/or meet the requirements of each course should be avoided. Students are encouraged to visit with academic advisor regarding time management and study skills improvement.

Clinical Attendance

See each course syllabus for detailed information regarding Attendance requirements and Absence, Late, Tardy, Early Departure, and Call-In procedures. Due to the intense nature of sonography education, missed clinical hours may seriously affect a student's ability to complete the requirements of his/her course(s).

The student will record his/her exact start and end times for the on-campus or off-campus clinical day. Each week the total number of hours is recorded on the Attendance record and on the Attendance Total Hours page. The faculty/instructor must initial all start and end times after the student has recorded each of those times.

The off-campus clinical day is 8 hours in length with a minimum ½ hour lunch break; on-campus lab session hours are as assigned Monday-Friday including Saturday and Sunday depending on sites availability. The Clinical Assignment form states the specific time the student is required to report to his/her clinical site.

Any adjustments or changes to the student's regular clinical schedule must be submitted on the

appropriate form to the applicable Program Clinical Coordinator in advance of the adjustment.

Reporting of Serious Illness/Injury or Communicable Disease

A student having an injury or communicable disease must report the condition to the Program Clinical Coordinator or Program Director. The fact that a student has an injury or communicable disease may prevent the student from performing safely in the clinical area; however, the student is not relieved of the course requirements, including completing the assigned clinical hours. All reasonable efforts will be made to protect the student's right to confidentiality.

The student must submit an Absence/Missed Clinical Time form if unable to attend clinical due to this type of illness. The student may submit a Request for Make-Up Hours for absences due to this type of illness; however, there is no guarantee that the student will be allowed Make-Up Hours.

After a diagnosis of serious injury and/or communicable disease, the student must submit the Medical Clearance "Return to Clinical Form" to return to clinical rotations. This form must be completed by the student's physician or health care professional and delivered to the Program prior to the student returning to his/her clinical site.

All students are to follow Standard Precautions in the clinical area for the protection of patients and themselves as outlined in the current Centers for Disease Control and Prevention guidelines.

INFECTION CONTROL POLICIES

The premise of infection control is that precautions minimize the risk of exposure to pathogens, thereby protecting health care professionals from occupationally acquired infections. Infection control should be the environment in which client care occurs.

The goal of infection control in all programs is to prevent transmission of disease during training. Using standard precautions for all clients prevents cross-infection among professionals and clients.

OBJECTIVES:

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- Protect yourself from occupationally acquired infections
- Reduce the numbers of cross-infecting pathogens
- Break the chain of cross infection
- Apply standard precautions
- Treat every case as if the client had a positive diagnosis for Hepatitis B infection, or Aids, Tuberculosis and other serious infectious disease.
- Protect clients from cross-infection
- Protect professionals from liability for negligence and or non-compliance with federal and state laws.

Components of Infection Control:

1. Medical screening
2. Personal protection including prevention
3. Instrument sterilization
4. Surface and equipment disinfection
5. Xray asepsis
6. Laboratory asepsis
7. Liability

Safety & Security:

The overarching goal of Mandl is the safety and security of the campus, faculty, staff, and its students. In general:

- It is the responsibility of the student to reveal any conditions which might be contraindicated or require special precautions to the course instructor. Information given in confidence will be kept confidential. The student shall not participate in any procedure that would be considered contraindicated for their particular condition.
- Students will practice procedures with safety being of greatest concern.
- Students will utilize equipment in a manner in which it was intended and will report any malfunctioning equipment to the instructor immediately so that it can be removed from student access.
- Students should be familiar with the college's safety procedures as outlined in the college's student handbook and follow the guidelines as indicated in the catalog or student handbook.

Health and Safety: Classroom Policies

While a student is in the program, students understand that they will be practicing techniques on each other in order to become competent in those skills. Students should refrain from coming to class when an illness may be contagious or endanger the health or safety of the student or other students. Students may be asked to get a doctor's release prior to participation in classroom activities if the health and safety of the student or other students is in question and for the absence to be excused a credible documentation has to be provided.

Equipment safety is checked by an outside vendor on an annual basis, however, if students note that a piece of equipment is functioning improperly, it should be immediately set aside, labeled, and the instructor notified.

Students will be instructed on safe application of all equipment, contraindications, precautions and methods of reducing transmission risks of communicable diseases and will be expected to adhere to this knowledge during lab procedures.

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A student should advise the instructor of any conditions that may need special consideration during lab participation, in order to assure student safety. Such information given in confidence will be kept confidential.

Students will practice procedures with safety being of greatest concern.

Students should not be practicing techniques or using program equipment with students that are not enrolled in the program.

POLICY FOR HEALTH CARE PERSONNEL INFECTED WITH BLOODBORNE PATHOGENS:

More than a decade into the AIDS epidemic, all available evidence indicates that human immunodeficiency virus (HIV) transmission from an infected worker to a patient is a highly unlikely and rare event. Nevertheless, Mandl recognizes that minimizing the transmission of bloodborne and other nosocomial pathogens from infected providers to their patients is of paramount concern. After careful analysis of the risks of transmitting bloodborne infections, including hepatitis B virus and HIV, from infected workers to patients during the performance of invasive procedures or other patient care activities, Mandl concludes that enforcing a high standard of infection control applicable to all health care personnel

is the best strategy for protecting patients from accidental infections.

Mandl has determined that:

- (1) the risk posed by infected health care personnel who comply with mandated infection control policies and practice standards is minimal, and does not warrant exclusion from patient care activities; and
- (2) routine screening of health care personnel for the presence of bloodborne infections is not recommended. In reaching this decision, the following factors were considered: the safety and concerns of the general public, relevant NY state laws regarding privacy of patients in regard to HIV testing; policy decisions made by other organizations; the fact that the blood test to determine exposure to HIV may not be conclusive; epidemiologic evidence estimating the magnitude of transmission risks; the potential impact on access to care among patients at risk for bloodborne infections; and the relative risks posed by other hazards associated with patient care activities.

II. Premises:

- A. A bloodborne infection is defined as an infection caused by any pathogen present in blood or other body fluids transmissible via the parenteral, mucosal, or non-intact skin route.
- B. For the purpose of this policy, an exposure is defined as an incident in which an individual is exposed to the blood or blood contaminated body fluid of another individual by the parenteral, mucosal, or non-intact skin route.
- C. It is the ethical and professional responsibility of health care providers whose blood is the source of a patient exposure to report the exposure and to undergo testing for bloodborne pathogens.
- D. Health care personnel include but are not limited to hospital employees, clinicians, laboratory workers, researchers, house staff, students, and volunteers.
- E. Invasive procedures are defined as procedures in which the integrity of the skin, mucous membrane, or tissue is interrupted by needles, instruments, or other devices, and where the potential for bleeding exists.
- F. Health care workers at risk for bloodborne infections should be encouraged to seek diagnostic testing and medical care when indicated.
- G. Health care personnel are entitled to privacy and are not obligated to disclose their bloodborne infection status to patients, colleagues, or administrators.

It is the policy of Mandl to protect the privacy and confidentiality of any faculty members, students or staff

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members who have tested positive for an infectious disease. All personnel who pose a risk of transmitting an infectious disease must consult with appropriate health-care professionals to determine whether continuing to provide professional services represents a material risk to the patient.

If a faculty member, student, or staff member learns that continuing to provide professional services represents a material risk to patients, the person should so inform the director. If so informed, the director will take steps consistent with the advice of appropriate healthcare professionals and with current federal, state, and/or local guidelines to ensure that such individuals not engage in any professional activity that would create a risk of transmission of the infection to others. The director will facilitate the availability of testing of faculty, staff, and students for those infectious diseases presenting a documented risk to dental personnel and patients. Hepatitis vaccine and appropriate vaccine follow-up to employees such as faculty and staff will be available in accordance with Occupational Safety and Health Administration (OSHA) regulations.

Also, in accordance with Centers for Disease Control and Prevention (CDC) guidelines, all students should (1) demonstrate proof of immunity, (2) be immunized against the hepatitis B virus as part of their preparation for clinical training, or (3) formally decline vaccination. Students who decline to be

vaccinated will be required to sign a formal declination waiver form, consistent with procedures promulgated by OSHA for employees. Appropriate faculty, staff, and students are strongly encouraged to be immunized against not only hepatitis B, but other infectious diseases such as mumps, measles, and rubella, using standard medical practices.

To ensure compliance and promote safety, Mandl will implement the following:

- Sharp items (needles, scalpel blades and other sharp instruments) shall be considered as potentially infective and should be handled with extraordinary care to prevent accidental injuries. Proper disposal of sharp items according to OSHA (Occupational Safety and Hazard Administration), guidelines shall be followed.
- Disposable syringes and needles, scalpel blades and other sharp items should be placed in puncture resistant containers located as close as practical to the area in which they are used. To prevent needle stick injuries. Needles shall not be recapped, purposely bent, broken, removed from disposable syringes, or otherwise manipulated by hand.
- When the possibility of exposure to blood or other body fluids exists, routinely recommended universal precautions should be followed. The anticipated exposure may require gloves alone, as in handling items soiled with blood or other body fluids or may also require gowns (PPE – Personal Protective Equipment), mask and eye coverings, when performing procedures where splashing is possible. Hands should be washed thoroughly and immediately washed if they accidentally become contaminated with blood or body fluids.
- To minimize the need for emergency mouth-to-mouth resuscitation, mouthpieces, resuscitation bags or other ventilation devices should be located and available for use in areas where the need for resuscitation is predictable.

For students, additional measures will be explained during the lab orientations, in particular the following:

- Hand washing is an extremely effective procedure for the prevention of many infections that are acquired from the transmission of organisms on the hands. Cool water prevents cornstarch from penetrating the skin pores and minimizes the shedding of microorganisms from the subsurface layers of the skin.
- Personal Protection Routine use of barrier devices such as gloves, masks, and protective eyewear significantly reduces the possibilities for blood and salivary exposure between patients and dental health care workers).
- Impressions and prostheses must be rinsed under cold gently running water to remove debris, saliva, and blood. Do not splash water excessively because droplet spatter can carry

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microorganisms. (Appliances with a buildup of calculus/plaque must be ultrasonically cleaned before being disinfected. Place temporary crowns/dentures etc., in zip lock bag with cleaning agent, prior to placement in ultrasonic cleaner.). If the impression is an alginate, it must remain wrapped with a damp paper towel at all times.

- Following the disinfecting procedure, impressions and prostheses must be immediately rinsed under copious amounts of cold running water to avoid surface damage.
- Impression Trays • Metal trays must be sterilized by autoclaving prior to each use. They are stored in individual sterilization bags until use. Cleaning the tray immediately after separating the impression from the cast will simplify the procedure.
- Plastic trays should not be reused. Discard after use. Custom trays must be disinfected prior to use. They should be washed with a detergent and water and then immersed in a disinfectant solution. The trays must be completely dry before application of adhesive

EXPOSURE

A number of studies suggest that during the first three months of gestation, the embryo/fetus may be more sensitive to ionizing radiation than an adult. The National Council on Radiation Protection and Measurements (NCRP) recommends that the maximum permissible dose due to the fetus from occupational exposure of the expectant mother should not exceed 100 millirems. This is approximately one-tenth of the maximum permissible occupational dose limit. Pregnant students are, therefore, allowed to work in and frequent radiation areas. Pregnant students may also operate radiography equipment.

Sonography Student Pregnancy Policy

Because there is no ionizing radiation involved in ultrasound, a student can participate in all program activities contingent upon the student physician's approval. The Program will require the student to inform the Department Chair if pregnancy is confirmed. Additionally, it will be required that the student provide a letter from her physician indicating she can participate in program activities.

Although pregnancy is not an illness, the student's ability to meet all course requirements during her pregnancy may be affected. The student is not excused from any course requirements including attendance requirements. When a student informs the Department Chair of her pregnancy and expected due date, the Department Chair or designee will apprise the student of all the remaining requirements of the degree plan courses. Missed clinical hours and/or lecture/lab courses may be made up during the Semester in which the student has missed clinical time or lecture/lab activities; if the absences equal more than 1 week for clinical hours or two lecture/lab class sessions it may not be possible for the student to make up the lost time. Should the pregnancy come to term while the student is in Semester V, the student may be given an "Incomplete" and allowed to make up the missed activities/classes during the intersession or the next semester. At any point during the Program, if the pregnant student's previous performance in the Program has been acceptable, she may elect to withdraw in good standing from the program and she will be allowed to return to the Program the following year on a space available basis.

Procedures:

A student who becomes pregnant while enrolled in the Dental Assisting or DMS/Ultrasound programs may elect to divulge her condition or may choose to keep her condition undisclosed to program faculty. A student who initially disclosed a condition of pregnancy may, at any time, resend this disclosure. This statement of resending must be made in writing and given to the Department Chair.

The student will meet with the clinical program coordinator for counseling and advisement regarding

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radiation safety. At this time the student will be informed of all of the available options for program completion. If the student chooses to continue in the regular program sequence the clinical assignments may be adjusted, if necessary, to reflect specific contingencies required by individual hospital pregnancy policies. Supplemental radiation monitoring of the embryo / fetus and additional counseling will be required for the duration of the pregnancy. If a student chooses not to complete the program while pregnant, they will have the option to complete the program the following year.

The program encourages each student to reflect on the demands of this rigorous academic and clinical program in the event that she should become pregnant while enrolled in the program. All students are required to complete specific clinical competencies in their clinical courses. Due to the physical nature of these competencies and the associated potential for radiation exposure, the pregnant student is advised to consult their physician about the advisability of continued participation in the program.

Students who disclose their pregnancy are required to:

1. Disclose their estimated due date. Failure to inform the course coordinator and program director/lead instructor in writing as soon as the pregnancy is confirmed may result in potential harm to the fetus; therefore, it is the responsibility of the student to inform the department and the department will assume no liability.
2. Provide to the program coordinator a letter, signed by their obstetrician, stating that they have no medical restrictions and are cleared to continue their participation in the program. This letter needs to be sent to the program coordinator in a timely manner as soon as pregnancy is disclosed.
3. Wear a second dosimeter provided by the program to monitor fetal radiation exposure monthly.
4. Maintain a radiation exposure fetal dose at or below 0.1 Rem.

Pregnant student continuing in the program would require to:

- A. Turn in letter from her obstetrician (as mentioned above), disclose their due date.
- B. Demonstrate all competencies necessary for graduation the same as is expected of every student.
- C. Meet regular attendance requirements for all courses. Exceeding the absence policy or excessive tardiness cannot be excused due to a pregnancy.
- D. To accept personal responsibility for protection of the embryo/fetus during the pregnancy. An operator's lead apron and dosimeters are available for the student to wear during radiographic exposures should she so choose to do so.
- E. A requirement that liability is waived thereby releasing Mandl, faculty, staff, administration, clinical affiliates, and all other individuals involved with the Dental Assisting Program from all liability related to the use of ionizing radiation while the student is enrolled in the Dental Assisting Program.
- F. Acknowledge that Dental Assistants/ultrasound technicians are classified as occupationally exposed dental health care workers to ionizing radiation.

Sonography Clinical Rules & Guidelines

1. Students must comply with all Mandl's Sonography Programs and Clinical Affiliate policies, procedures, and requirements at all times.
2. Students must demonstrate professional conduct at all times. Any non-professional conduct or disruptive behavior may cause the student to be dismissed from the clinical site and will result in a disciplinary action (Discipline Process, Step 3 Probation).
3. The student must always introduce his/herself to staff and patients as Mandl Sonography student.

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4. The Sonography Student Clinical Binder records must be completed accurately, legibly and appropriately. All records must be up to date each and every clinical day.
5. Students must comply with the Appropriate Clinical Attire requirements during all clinical rotations (on-campus and off-campus sites).
6. Students are allowed to use the on-campus Sonography department/lab computers for sonography activities only. Students are allowed to use the clinical site computers for clinical activities only and under the direction of the clinical instructor. Personal use of these computers is strictly prohibited.
7. No food or drink is allowed in the Sonography Labs and at the off-campus clinical site

departments.

8. The student should inform the sonographer if leaving the department for any reason and should return as quickly as possible.
9. Portable electronic devices are prohibited.
10. The student must arrive on time and be present, attentive and eager to participate as much as possible in all exams during the clinical rotation.
11. The student should ask questions and have discussions with the sonographer at appropriate times, maintain HIPAA confidentiality at all times, and discuss any concerns with his/her instructors in private.
12. Whenever the student attends a Sonography lab or off-campus clinical site, he/she is responsible for:
 - a. preparation of the scan room/station
 - b. careful, safe and ergonomic use of the furniture and equipment in the scan room/lab/department; dimming lighting as necessary
 - c. providing appropriate patient care before, during, and after the scan
 - d. accurately entering the patient data/information into the ultrasound unit
 - e. obtaining all images/clips required of the exam/scan being performed
 - f. requesting feedback on his/her scanning and patient interaction skills
 - g. cleaning the transducer, ultrasound unit, scan table and ancillary equipment after scanning and at the end of the lab session
 - h. ensuring all transducers, transducer, electrical, bed control, and PACs cords are properly stored (all cords must be off the floor and away from the wheels of the ultrasound unit and/or bed)
 - i. returning the scan table and chair to the lowest settings
 - j. completing all self-assessment of scanning as required
 - k. all duties assigned by the faculty member and/or clinical instructor
13. When a patient (all persons scanned by the student in any setting are considered to be patients) is to be scanned, the student will:
 - a. wash hands at appropriate time
 - b. introduce themselves appropriately to the patient
 - c. take the patient to the scan room and confirm the patient's name
 - d. remain outside of the curtain/room while patient removes clothing and puts on the patient gown
 - e. explain the exam/scan process and procedure
 - f. obtain appropriate patient history for the exam/scan to be performed
 - g. conclude the exam/scan appropriately
 - h. maintain HIPAA compliance at all times
14. Students do not perform sonographic scans/exams without the staff sonographer present; the staff sonographer must scan the patient and submit the required documentary images/clips. If asked to perform an exam independently and submit your images for interpretation, the student is expected to decline and explain that he/she is not allowed to perform as a staff sonographer. If needed, contact the Sonography Program DCE or Department Chair for assistance and/or clarification of this restriction.

The Sonography Student Clinical Binder Records

The Sonography student is required to maintain his/her Student Clinical Binder appropriately: 1.

Students will receive instruction in the correct use and record keeping for the Clinical Binder.

2. All documentation must be recorded accurately and legibly using black or blue ink; the student's name must be on each page where required.
3. The student is not allowed to re-arrange the sections of the binder and must not store unrelated paperwork or items in the binder; the binder must be kept confidential and professional in appearance at all times.
4. Questions regarding Clinical Binder documentation and record keeping will be addressed by the applicable DCE or the course instructor. The student should not rely on the opinions or directions given by other students in completing his/her documentation.
5. Attendance and Case Logs must be accurately recorded daily; recording cases observed and/or scanned must be HIPAA compliant.
6. The student marks the Pathology record sheet when pathology is observed and/or scanned in each semester.
7. The student is required to place the required Clinical Skills evaluation forms for each evaluation segment immediately after the Semester Assignment Sheet.
8. The Semester Assignment Sheet lists the evaluation requirements for the clinical course and documents the student's completion of the evaluations. This document remains in the student's Clinical Binder until the completion of the semester.
9. Students are required to complete a Clinical Site Evaluation Form and total their Case Logs at the end of each rotation/semester.
10. All clinical course evaluations and notations are private and should be treated as such by the student. Sharing and/or comparing evaluations or scores demonstrates a lack of professionalism on the part of the student and may be deemed Academic Dishonesty.

Case Logs

The student is expected to document all exams/scans (live and SIM) observed or scanned during all scanning sessions. The student will document the type of experience, whether the exam was observed or scanned (either Limited or Independent) in the Lab (L; on-campus) or Clinic (C; off-campus), and for some courses, the number of images taken, and the specific organs scanned.

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Only one mark per row per column is made:

Observed: The student only observes a sonographic exam/procedure and does not scan the patient.

Limited: Assistance while scanning AND/OR partial exam scanning (the student does not acquire all of the images required for the exam).

Independent: No assistance during the exam/scan; all images/views for the exam/scan are acquired by the student. A student performing an independent scan may have direct (sonographer in the room at all times) or indirect (sonographer nearby and immediately available during the scan) supervision. Independent scanning does not mean that the student is allowed to perform sonographic exams as a staff member.

Independent scanning **must** occur in the sixth clinical course. All evaluations performed in the on-campus and off-campus clinical sites should be marked in the independent column.

Case Log pages must be totaled when each page is completed, and the entire Case Logs section must be totaled at the end of the semester.

All records in the Case Logs must be HIPAA compliant. Any notes made by the student during the clinical day must be destroyed before leaving the clinical site.

All images/exams recorded by the student using live ultrasound equipment in the Sonography Lab must remain within the lab setting or in the student's clinical course records to maintain compliance with HIPAA.

Required Scanning Experiences

Students will be required to record all exams/scans (live and Sim) that they have participated in or performed during all scanning sessions. It is very important that all exams are recorded as this document will be used to track the total number of exams completed while in the Program.

All Sonography students are required to obtain a minimum number of hands-on scanning experiences throughout the length of a Sonography Program; this number is correlated to each semester of the Program. Please see individual clinical course syllabi for the required number of hands-on scanning experiences required for that course. Five (5) points will be deducted from the final course grade if a student does not achieve the minimum number of scanning experiences for the course.

Students obtain their hands-on scanning experiences in the on-campus and off-campus clinical settings and during Open Lab practice sessions. If a student cannot meet the required number of scanning experiences assigned for each week or otherwise specified time period, he/she is required to confer with the course instructor for guidance.

Scanning experiences are central to demonstrating expected progression and attainment of sonographic skills that allow for increased hands-on scanning experiences throughout the length of a Sonography Program, and for mastery of the technical skills required of Sonography Program students and graduates. Therefore, it is incumbent upon the student to obtain as many hands-on scanning experiences as possible using all resources that are available to Sonography students in both the clinical and lab settings. A student may be allowed additional access to a Sonography lab to meet the requirements of the clinical course.

Clinical Evaluations

The Affective Domain, Clinical Skills, Benchmarks, and Challenge assignments vary according to semester. Accompanying due dates are provided to the student at the beginning of each semester.

Students are responsible for completing all clinical course requirements by the due dates stated on the Semester Assignment Sheet; the Case Log Totals, Attendance Total, and Clinical Site Evaluation forms are completed at the end of each rotation/semester.

Evaluation Tools

Clinical evaluation tools including, but not limited to: Affective Domain, Clinical Skills, Benchmarks, and Challenges are utilized by the Sonography Programs and are found in the student's Clinical Binder, in the Sonography Clinical Coordinator's office and, for select forms, in the Sonography Lab and the clinical site (Sonography Programs Clinical Site Binder). The Affective Domain Performance Notification, Progress Analysis, and Early Warning forms may also be utilized. The student is responsible for familiarizing himself/herself with all Evaluation Tools.

Clinical Skills

Clinical Skills assignments are designed to evaluate student sonographic skills in multiple areas and at different points in time during the semester/Program. Clinical Skills must be completed according to the due dates stated on the Semester Assignment Sheet.

Benchmark

Benchmarks are detailed and timed evaluations of specific skills that must be completed according to the due dates stated on the Semester Assignment Sheet. The student should review and be familiar with the criteria of each Benchmark.

Challenge

Challenge competency evaluations are designated sonographic exams that must be completed by the due dates stated on the Semester Assignment Sheet.

The completed Challenge evaluation documents the student's ability to perform/acquire specific sonographic images, views and/or exams in a clinical setting and within a designated time frame. The evaluation criteria address all the skills required of a sonographer in the performance of sonographic studies (see the Program and Semester specific forms). The Challenge evaluation grade average is a significant part of the grading distribution for the clinical course. The student is expected to demonstrate a thorough understanding of each of the criteria in the Challenge, how those criteria relate to the required Challenge assignment, and the due dates for the Challenge assignments.

See the individual clinical course syllabi for information on Competency requirements.

Off-campus Clinical Challenges: The off-campus Clinical Instructor completes the Challenge evaluation, signs the Challenge form and seals the form in the envelope provided by the Program. Completed Challenge forms are returned to the Program in the student's Clinical Binder, or a Program faculty member may retrieve the Challenge form from the off-campus clinical site (as needed). An incomplete Challenge evaluation form will be returned to the on-site clinical instructor for completion before the grade is entered for the student. Tampering with or falsification of the Challenge form in any way is considered Academic Dishonesty and will result in the student's immediate dismissal from the Program.

Affective Domain

Affective Domain evaluations of the student's professional qualities must be completed by the due dates stated on the Semester Assignment Sheet. The evaluation criteria address the professional qualities that must be demonstrated by a sonographer. The Affective Domain grade is a part of the grading distribution for the clinical course.

Clinical Skills Professional Qualities provide a formative evaluation of the student's professional behavior prior to the completion of the Affective Domain.

Sonography On-Campus Clinical Session

Students are expected to participate fully in all scheduled clinical activities as assigned by the instructor. All volunteers and classmates are considered "patients" and will be treated as such by the student who is scanning. Appropriate patient interaction is utilized in all scanning sessions and for all "patients", including classmate's student volunteers.

During the assigned on-campus clinical session, a student may request a short restroom break. Students should not leave the lab for long periods of time or without informing a faculty member; eating and drinking are not allowed in the lab.

Due to time constraints, evaluations in the On-Campus Lab may be scheduled outside of the regular assigned clinical session. A student's evaluation will be scheduled by his/her lab instructor.

Sonography students are strongly encouraged to take advantage of every opportunity to utilize the Sonography Lab and its resources. Open Lab sessions may be scheduled; an Open Lab is a designated time for students to practice the techniques and skills taught during the regular Lab Session. Students may request access to the Sonography Lab before, between and after on-campus lecture courses. Due to variability in operating hours, access to a Sonography Lab may not be possible on certain days and times. Please see Department Chair regarding lab availability.

Open Lab Sessions

Open Lab sessions may be offered at a designated time for students to practice the techniques and skills taught during the regular Lab Session. A Program specific Sonography faculty member must be present to provide supervision of the lab.

The student will follow the instructions and procedure given by their Program faculty and/or course instructor for requesting a scan time/session reservation during an Open Lab session. If a student is 10 minutes late for his/her reservation, he/she forfeits the scan time.

The student must arrange for his/her volunteer for practice scanning. All volunteers must sign the Volunteer Waiver form which must be witnessed and signed by the faculty member present during the Open Lab session. The student will sign in and out and record which scan room he/she utilized during the scanning session.

- It is recommended that students seek volunteers for scanning outside of their classmates in order to obtain a wider variety of scanning experiences.

Open Lab is optional but strongly encouraged as the Sonography Open Lab is where students can acquire scanning experience outside of the off-campus clinical setting. Scanning during Open Lab does not replace lab instruction and/or clinical hours. Due to variability in campus operating hours, access to a Sonography

Lab may not be possible on certain days and times. Students must ask permission of faculty to utilize a Sonography Lab; the decision to allow a student to use a Sonography Lab at those times, rests with the Program Department Chair.

Sonography Student Peer Scanning

Policy for human use of subjects for educational purposes

Mandl College allows students to volunteer to practice Ultrasound skills in each other only under the direct supervision of the qualified clinical instructor. Guest models (in lieu of patients) are to be cleared by the Department Chair or Clinical Director prior to any student scanning. Volunteers for scanning models must sign a waiver indicating that they understand that although there is no indication that serious bioeffects have occurred because of exposure to acoustic energy the bioeffects do still exist but can be controlled with proper training. Any scanning performed by a student in the scan lab must be supervised by a Mandl DMS faculty member. Should any anomaly be identified during a scanning session with a model, proper referral will be made to the model's physician and should be taken as a diagnosis. The model will not hold any student or DMS faculty member responsible for any missed pathology or identification of pathology that is not identified in any other medical examination. First trimester OB scans will not be performed on any model for any reason. Prior to any OB exam being performed on a volunteer basis, OB patient must provide proof of a previous anatomical survey performed or ordered by their attending physician and a doctor's order (signed permission on prescription pad of attending physician) must accompany patient for each volunteer scan. All requests and signed waivers will be kept on file in the DMS Program Chair's office.

The Sonography student is encouraged to volunteer to be scanned by other program students during the course of the Sonography program. The Sonography faculty believes it is important for each and every student to experience the role of a patient in the sonography department. Student scan labs are the primary location for student to obtain hands-on instruction throughout the length of the program. Scanning of peers or volunteers is not allowed unless a Sonography faculty member is physically present to monitor the use of the Sonography Lab.

Each student that wishes to volunteer for peer scanning is required to sign the Student Waiver Form. The procedure for student peer scanning is detailed on the waiver form. The signed form will be kept in the student's file and will be in effect throughout the length of the program unless the student signs a Peer Scanning Declination Form. Students that decline to volunteer for peer scanning throughout the length of the program will sign the Peer Scanning Declination Form. The Sonography Program faculty recognizes and respects the student's decision not to participate in peer scanning. A declination of peer scanning will not impact the student's grades or standing in the program.

Sonography students that are or become pregnant during the course of a Program MAY NOT be scanned by any student or faculty member unless the pregnant student meets the requirements stipulated for all obstetric volunteers (see Student Lab – Volunteer Scheduling Procedure).

Sonography On-Campus Volunteer Scheduling

The Sonography Programs accept volunteers wishing to assist Sonography students with attaining hands on scanning skills and competencies. Volunteers are accepted for the DMS Labs (abdominal organs and vessels, pelvic organs and structures, thyroid, and obstetrical), DCS Labs (heart), and ESC-VT Labs

(blood

vessels throughout the body). These individuals must contact the Sonography Clinical Coordinator to obtain information about volunteer requirements and to schedule appointment(s).

All student on-campus scan sessions are 100% supervised by an ARDMS credentialed Sonography Faculty member. All volunteers must be in good health; those individuals seeking medical care or diagnosis are not accepted as volunteers and are directed to contact their health care provider for assistance.

The minimum age required for a Sonography Lab volunteer is 18 years.

The Clinical Coordinator and/or faculty inform all potential volunteers of the criteria to volunteer for a Sonography lab session. All volunteers must sign the Volunteer Waiver Form. Volunteers for obstetrical scans must obtain written permission from their health care provider and must meet the criteria of the DMS Program for gestational age and pregnancy status. No results or images are provided to the volunteer; a volunteer may be given a note to contact his/her medical care giver if unusual sonographic appearances are noted. This note will be completed by the supervising faculty member.

All OB volunteers must be scheduled by the DMS Program Director for scheduled On-Campus Clinical and Open Lab sessions. The Discipline Process, Step 2 will be initiated for any student who circumvents the scheduling procedure. OB volunteers must contact the DMS Clinical Coordinator for OB volunteer scheduling criteria and process.

Diagnostic Medical Sonography Students Performing Obstetrical Scans

A. Sonography On-Campus Clinical: Special Procedures for Obstetric Scan Volunteers: 1.

Volunteers for on-campus OB scanning must be at least 20 weeks of gestation and preferably no more than 28 weeks of gestation and have had routine pre-natal care from a licensed caregiver. Volunteers must have singleton pregnancies without any maternal or fetal complications.

2. The instructor will ensure that the volunteer understands the sequence of events during the scanning session, the limitations of ultrasound for seeing the fetal anatomy and that the monitor will not be positioned for the volunteer to view until the student has completed his/her scanning session.
3. No images, pictures, or video recordings are given to the volunteer or others.
4. No photos or videos of the scan or monitor may be obtained by anyone in the scan room while the scan is performed.
5. The instructor will scan the volunteer before allowing the student to perform any scanning.
6. During the pregnancy scan, no discussion of fetal normalcy or diagnosis is allowed; only senior students will be allowed to interact with volunteers as the fetal anatomy is shown.
7. After the student has completed his/her scanning assignment, the volunteer will be repositioned so that she can see the monitor as the fetal anatomy is scanned.
8. The volunteer will be provided with a copy of a completed student OB worksheet and instructed to share the OB worksheet with her healthcare provider.
9. If a significant atypical finding is discovered by the student and/or instructor(s), the scan session will be terminated, the volunteer's healthcare provider will be contacted immediately and apprised of the finding; that individual will provide instruction for the Sonography instructor regarding the volunteer (i.e. call the office immediately, come to the office immediately, keep her next appointment, etc.).

B. Sonography On-Campus Clinical: Special Procedures for Obstetric Scan Volunteers

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1. DMS students may not scan pregnant staff and/or sonographers at the clinical site unless a scan is ordered by a licensed health care provider OR the pregnant staff member and/or sonographer provides the Program Director or DCE with written permission from the health care provider for a practice scan.
2. All volunteers for practice OB scans must meet the requirements stated in A.1. above.

Sonography Student Working as Staff

Students in the Sonography program will not be substituted for regular staff even though they may be competent in certain aspects of sonography. Students are not allowed to perform without the Clinical Instructor or staff sonographer present for the entire exam.

HIPAA

The Health Insurance Portability Accountability Act (HIPAA) Act requires that all health information is protected. Any violations of HIPAA regulations will result in disciplinary actions up to and including withdrawal from the program depending on the severity of the violation.

HIPAA Compliance - Recorded Images/Exams - Sonography On-Campus Clinical

Students will record images/exams for instructional purposes during scheduled and Open Lab sessions. Images/exams, regardless of recording method utilized, and any accompanying documents must remain within the Mandl Sonography Department to maintain compliance with ACC HIPAA policies and rules.

HIPAA Compliance – Breach

If a breach occurs, the Event Notification Form must be completed within three working days and distributed as follows:

- Covered Entity (clinicalsite/facility)
- HIPAA Privacy Officer
- Program/Department HIPAA File

Violations and sanctions can be applicable to program and to the individual involved. The involved Program/Department follows the discipline policy in the Student Handbook that addresses student confidentiality violations.

HIPAA Compliance – Donated Case Study from Off-Campus Clinical Site

If a clinical affiliate site wishes to donate sonographic images or video clips, the sonographer at the site must contact the DMS Department Chair directly to initiate the donation. The Sonography student is prohibited from initiating the donation process and may not accept or remove from the site any images/video clips, reports, or copies of the patient records regardless of semester of de-identification of the patient record or information.

In compliance with HIPAA procedures regarding the use of donated de-identified patient information (sonographic teaching case studies), the following procedure must be followed:

- All films, videos, clips must be de-identified prior to the study leaving the clinical site. This may be done electronically (deleting the patient's name and MR number from the study) or physically (cutting the patient's name and MR number out of the films). Films, videos, and clips that cannot be de-identified prior to the case leaving the donating clinical site cannot be used by the program

and will not be accepted.

- Failure to follow the above procedure will result in disciplinary actions for the student and the faculty.

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- De-identified case studies donated to the Sonography Programs will be logged into the appropriate section of the Donated Case Log and the studies will be labeled according to the type (Abdominal, Adult Echo, etc.) and number assigned to the case. For example, an Upper Abdominal study will be labeled A1, A2, etc. Adult Echocardiography studies will be labeled AE1, AE2, etc. The Donated Case Log will also record which course the study will be utilized for teaching during the curriculum.

It is the responsibility of the Sonography faculty to appropriately log and label each donated case. The Donated Case Log will be maintained in the Sonography Clinical Coordinator office and will be available for inspection by the HIPAA Task Force at any time.

HIPAA Compliance – Patient Information

Volunteers may be given a “scenario script” with program-created patient history and symptoms for a student scanning session. No “patient” information is entered into the ultrasound unit or the Sonography PACS. A unique identifier number is assigned to each scan with all scans tracked by the student’s name only. Any written documents completed by the student during his/her scanning session are considered part of the student’s work for the clinical course. Volunteers are not given any images or recordings of the scan.

Sonography Profession Resources

The Society for Diagnostic Medical Sonography (SDMS), www.sdms.org, is a resource for Sonography Code of Ethics, Clinical Practice Standards, the National Minimum Standards for Diagnostic Ultrasound Professionals, Sonography Career information, Model Job Description, sonographer safety and other information. The SDMS Foundation provides scholarships and grants for students and sonographers for educational purposes. Many educational publications (Journal of Diagnostic Medical Sonography), webinars, and conferences are available to all SDMS members. Please contact your Program Director for information on the scholarships and grants offered by the SDMS. Student membership at a reduced rate is available.

American Society of Echocardiography (ASE), www.asecho.org, provides resources for practitioners and students of Cardiac Sonography. The ASE publishes a journal and many other educational products, some of which are online, that members receive as a benefit of membership. The ASE conducts an annual conference that is available for all members. Student membership is available at a reduced rate and the ASE offers scholarships and grants to students for educational purposes. Please see the DCS Program Director for information on student membership, scholarships, and grants offered by ASE.

- 1) Society of Vascular Technology (SVU), www.svunet.org, represents vascular technologists, vascular physicians, vascular lab managers, nurses, and other allied medical ultrasound professionals. Since its founding the SVU has been dedicated to the advancement of noninvasive vascular technology used in the diagnosis of vascular disease, through education programs, publications, and certification. The SVU offers student membership at reduced rates and many online resources for vascular technologists/sonographers and students. Please see the ESC-VT Program Director for information on SVU student membership and other student benefits.

Sonographer Credentialing

American Registry for Diagnostic Medical Sonography (ARDMS), www.ardms.org, offers exams in Abdominal and Superficial Structures, Pediatric Sonography, Obstetrics and Gynecology, Breast, Adult and Pediatric Echocardiography, Vascular Technology, and Musculoskeletal Sonography. The ARDMS

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Sonography Principles and Instrumentation (SPI) exam is required for all credentials; an individual seeking to obtain ARDMS credentials must take the SPI and at least one of the specialty exams to earn the applicable credential.

Mandl Sonography Program graduates will be able to apply to take the ARDMS exams. Students are able to apply to take the ARDMS SPI exam at the end of the third semester.

Other credentialing organizations offer Sonography exams, but the ARDMS remains the “gold standard” for sonographer credentialing. The Mandl Sonography Programs follow the ARDMS exam content outlines so that students and graduates are prepared to sit for the ARDMS exams.

Program Development and Content Resources

Commission on Accreditation of Allied Health Education Programs Standards and Guideline for the Accreditation of Educational Programs in Diagnostic Medical Sonography

(<http://www.caahep.org>)

American Registry for Diagnostic Medical Sonography (exam content outlines) (<http://www.ardms.org>)

Society for Diagnostic Medical Sonography Scope of Practice and Clinical Standards for the Diagnostic Medical Sonographer (April, 2015) (<http://www.sdms.org/positions/scope.asp>)

Joint Review Committee on Education in Diagnostic Medical Sonography (Sonography National Education Curriculum and Programmatic Accreditation Site Visit Summary form)

(<http://www.jrcdms.org>)

Resources

Society of Diagnostic Medical Sonography

- Scope of Practice and Clinical Standards for the Diagnostic Medical Sonographer (April, 2015) (<http://www.sdms.org/positions/scope.asp>)
- Model Job Description (<http://www.sdms.org/resources/careers/job-description>) • SDMS WorkZone (http://www.sdms.org/resources/careers/musculoskeletal_injury) American Society of Echocardiography Quality/Education
- Guidelines for Cardiac Sonographer Education (<http://www.asecho.org/wordpress/wp-content/uploads/2013/05/sonographereducation.pdf>)

Society for Vascular Ultrasound Advocacy Position Papers

- SVU Guidelines for Undergraduate Educational Programs in Vascular Ultrasound (https://higherlogicdownload.s3.amazonaws.com/SVUNET/c9a8d83b-2044-4a4eb3eccd4b2f542939/UploadedImages/Documents/SVU_Guidelines_for_Undergraduate_E

[duc ational_Programs.pdf](#))

- Statement on Quality Vascular Education
(<http://www.svunet.org/svunet/advocacymain/svupositionpapers/qualityvasculareducation>)

Joint Review Committee on Education in Diagnostic Medical Sonography

- Sonography National Education Curriculum(<http://www.jrcdms.org/nec.htm>)
- Commission on Accreditation of Allied Health Education Program Standards and Guidelines for the Accreditation of Educational Programs in Diagnostic

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Medical Sonography (2011)

(<http://www.jrcdms.org/pdf/DMSStandards.pdf>) and

(<http://www.caahep.org/>

- [/file/For-Program-Directors/DMSStandards\(1\).pdf](#))

Sonography Student Qualities for Success

- The Sonography Student accepts responsibility for his/her own learning and seeks assistance to improve his/her grade whenever necessary.
- The Sonography Student complies with all Mandl Sonography Programs, Sonography course requirements, policies, and procedures.
- The Sonography Student takes advantage of Open Lab times and any tutoring and feedback that is given to improve performance/grade standing.
- The Sonography Student appropriately utilizes the Sonography Student Clinical Binder documents, course syllabi, Mandl Student Handbook, Sonography Student Handbook for success in a Sonography Program.
- The Sonography Student exhibits professional conduct and behavior at all times in all settings.
- The Sonography Student initiates activities that promote an in-depth study of sonography practices and principles by active and enthusiastic participation in challenging exams, review of interesting cases, discussions with physician interpreter, research of unusual cases, etc.
- The Sonography Student seeks opportunities to develop his/her clinical skills by scanning a wide variety of body types, ages, and conditions. He/she avoids repeated scanning of the same person(s) for the same exam/views.
- The Sonography Student remains calm under a variety of situations and demonstrates the ability to focus and multi-task, comprehend and follow verbal and written instructions, apply didactic knowledge to clinical practice and retain previously learned information/skills.
- The Sonography Student recognizes that performing sonographic exams/procedures requires development of specialized skills including hand-eye coordination and mental visualization of 3-dimensional anatomy, critical thinking skills and an in-depth knowledge of normal and pathologic conditions and sonographic appearances.
- The Sonography Student recognizes that even if given appropriate instruction in scanning techniques, critical thinking processes, clinical skills and normal/pathologic sonographic appearances, the aptitude to perform sonographic exams rests solely with the student's inherent abilities.

Academic Services

Academic counselors are on staff at the campus to provide assistance to students by appointment and on a

walk-in basis.

The advisors assist with the most frequently expressed student concerns:

- **Academic:** selecting courses, degree planning, and information on transferring credits to other schools
- **Career:** job-search strategies, career exploration, skills identification, resume writing, job interviewing, goal setting, and vocational assessment
- **Personal:** personal adjustment, time management, relationships, and communication, trust building, and stress management

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Students with Disabilities/Student Accessibility Services

Mandl offers support services for students with documented disabilities. Students with disabilities who need classroom, academic or other accommodations must request them through the Academic Student Services office. Students are encouraged to request accommodations when they register for courses or at least three weeks before the start of the semester, otherwise the provision of accommodations may be delayed.

The Assistant Dean of Student Success implements policies and procedures related to students with disabilities. Mandl is committed to the full inclusion of students with disabilities in all curricular and co-curricular activities as mandated by Section 504 of the Rehabilitation Act of 1973. The division of Student Services will assist students with disabilities in receiving the accommodations and services necessary to equalize access to education. The office provides assistance to students with physical, sensory, learning, psychological, neurological, and chronic medical disabilities. Mandl will provide reasonable accommodations to qualified, enrolled students with documented disabilities. After the student need is determined, reasonable accommodations will be provided on an individualized basis.

A reasonable accommodation is a modification, or adjustment, to instructional methods and/or a course, program, service, activity, or facility that enables a qualified student with a disability to have an equal opportunity. An equal opportunity means an opportunity to attain the same level of performance or to enjoy equal benefits and privileges as are available to a similarly situated student without a disability.

The following procedures have been implemented to assure students with a disability will receive reasonable accommodations.

- During the admissions process, the applicant identifies that he/she has a disability. The prospective student is referred to the Assistant Dean for Student Success for an intake by the Director of Admissions/Enrollment Management.
- If formal documentation identifying the student's disability is not provided, depending on the student's perspective of his or her disability, the Assistant Dean may suggest for the student to seek professional diagnostic evaluation. This could include a psychologist, psychiatrist, ophthalmologist, or certified audiologist.
- The Assistant Dean will review any documentation provided and will notify the student if he/she is eligible for accommodations.
- The Assistant Dean consults with the Office of Enrollment Management, and President's office to determine whether the College can provide reasonable accommodations for the student. • All students with a formal documentation of disability will be given reasonable accommodations in and outside of the classroom.
- In order to fully serve the various needs of the students with disabilities, the following provisions are in effect at the campus for all programs:
- No qualified student may be excluded from any course solely on the basis of disability • Degree or course requirements, if determined to be restrictive, will be adapted to meet the requirements of qualified students with disabilities. For post-secondary education purposes, qualified students with

disabilities are defined as those “who meet the academic and technical standards requisite to admission or participation in the recipient’s education program”. • Prohibitive rules, such as those banning tape recordings from classrooms, are waived for qualified disabled students

- Alternative testing and evaluating for measuring achievement will be provided for students with impaired sensory, manual, or speaking skills (except where those specific skills are being measured)
- Classes will be relocated, if necessary, to permit access for students with mobility impairments if such cannot be reasonably achieved otherwise
- Students with disabilities will not be counseled to consider more restrictive careers than careers recommended for non-disabled students unless such counsel is based on strict licensing or certification requirements in a profession,

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- Individuals with disabilities may refuse special accommodation services by filing a form with the Dean of Students
- Persons with disabilities who feel they have been treated unfairly with relation to their disability may file an appeal or grievance under the appropriate policy statement of the College. • The Dean of Student Services is charged with the overall administrative responsibility for coordinating the delivery of these services to the students.

Students who have received approval for accommodations for a course must provide the instructor with the ‘Notice of Approved Accommodations’ from Academics before accommodations will be provided. Arrangements for academic accommodations can only be made after the instructor receives the ‘Notice of Approved Accommodations’ from the student.

Students with approved accommodations are encouraged to submit the ‘Notice of Approved Accommodations’ to the instructor at the beginning of the semester because a reasonable amount of time may be needed to prepare and arrange for the accommodations.

Library Facilities

The library supports the Health Sciences programs. The library is staffed to provide library, media, and computer center services for students and faculty.

The library maintains general college-semester materials in addition to a health sciences collection which covers the fields of allied health, public health, and biological, behavioral, and physical sciences.

Services of Library

The library provides all traditional library services to the students, faculty, and staff. Individual study and viewing areas provide a quiet, comfortable atmosphere.

Resource Service is available during all open hours. In addition to open access indexes, online computerized searches may be run for faculty and students if necessary.

The library provides computers and instructional materials for students, faculty, and staff, along with personnel to assist in the use of these resources. Access to all materials owned by library is available via the library automation system. Books, articles, and audio-visual materials may be placed on reserve in the library by instructors to be used as references or for special assignments.

Curriculum for Educational Programs in Diagnostic Medical Sonography

The curricular requirements are designed to demonstrate and assess knowledge progressively from general education requisite content, common core, and concentration specific theory through clinical competency in preparation to become a competent entry level sonographer. Clinical competency requirements must be assessed in a diagnostic

clinical affiliate.

Demonstration of knowledge may be assessed and documented in a variety of ways. Methods for assessment may include, but not limited to, written exams, assignments, or lab activities. Documentation of proficiency in scan techniques may occur in the simulated lab environment or diagnostic clinical setting.

1. General Education Curriculum

Basic medical science and interpersonal communication education is required as a foundation for the clinical role of the diagnostic medical sonographer. The following

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must be at the post- secondary/college-level education courses:

- a. Communication
- b. Human anatomy and physiology
- c. Mathematics
- d. Physics

The program and sponsor may determine which mathematics and physics, including applied physics, courses will meet its needs and yield the outcomes desired of their graduates.

2. Learning Competencies Common to All Concentrations

a. Demonstrate knowledge and application of ergonomic techniques.

1) Industry standards and OSHA guidelines

- 2) Types of work-related musculoskeletal disorders
- 3) Role of Administration in the prevention of MSI
- 4) Role of Sonographer in the prevention of MSI
- 5) Best practices for prevention
 - a) Daily exercises in the workplace
 - b) Neutral posture
 - c) Patient transfer and assistance
 - d) Patient positioning
 - e) Equipment and accessories
 - f) Supports, tools, and devices
 - g) Transducer grip and pressure
 - h) Schedules/Workload
 - i) Workstation/work area(s)

b. Demonstrate knowledge and application of types and methods of infection control.

- 1) Personal and patient
 - a) Standard precautions
 - b) Isolation procedures
 - c) Aseptic and sterile technique
- 2) Environment
 - a) Equipment
 - b) Transducer cleaning and disinfection
 - c) Accessories

c. Demonstrate knowledge and application of patient care.

- 1) Compliance with program and clinical education facility policies and procedures
- 2) Patient Care Partnership
- 3) Patient directives

- 4) Anticipate and be able to respond to the needs of the patient
 - a) Demonstrate age-related and cultural competency
 - b) Demonstrate appropriate patient care in settings outside of the sonography department.
- 5) Transport and transfer of patients with support equipment
 - a) Oxygen
 - b) Intravenouslines/pumps
 - c) Urinary catheters
 - d) Drainage tubes
- 6) Vital signs
- 7) Color
- 8) Skin integrity
- 9) Clinical history
- 10) Proper patient positioning and draping
- 11) Comfort

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- 12) Privacy
- 13) IV insertion and injection with use of contrast-enhanced imaging
- 14) Basic pharmacology as related to the concentration
- 15) Post interventional procedure care and discharge
- 16) Life-threatening situations and implement emergency care as permitted by institutional policy, including the following:
 - a) Pertinent patient care procedures
 - b) Principles of psychological support
 - c) Emergency conditions and procedures
 - d) First aid and resuscitation techniques
- 17) Reporting and documentation of incidents and/or adverse reactions

d. Demonstrate knowledge of the roles and responsibilities of healthcare professions to effectively communicate and collaborate in the healthcare environment. 1)

- Teamdevelopment
- 2) Conflict resolution
- 3) interprofessional communication and education

e. Demonstrate knowledge of medical ethics and law.

- 1) Patient's right to privacy based on applicable legal and regulatory standards
- 2) HIPAA**
- 3) Electronic documentation and transmission
- 4) Terminology related to ethics, values, and morals
- 5) Types of law
- 6) Risk management
- 7) Medical malpractice liability coverage
- 8) Informed consent
- 9) Documentation of clinical incidents
- 10) Professional scope of practice and clinical standards
- 11) Professional code of ethics

f. Demonstrate knowledge of medical and sonographic terminology.

- 1) Definitions, abbreviations, symbols, terms, and phrases
- 2) Correlating diagnostic and imaging procedures
- 3) Sonographic appearances

g. Obtain, evaluate, document, and communicate relevant information related to sonographic examinations.

- 1) Clinical information and historical facts from the patient and the medical records, which may impact the diagnostic examination.
 - a) Clinical signs and symptoms
 - b) Laboratory tests
 - c) Imaging and diagnostic procedures
 - d) Oral and/or written summary of sonographic findings.
- 2) Deviation from practice parameters for the sonographic examination as required by patient history or initial findings
- 3) Changes from a previous examination
- 4) Examination findings that require an immediate clinical response and notify the interpreting physician.

h. Identify and evaluate anatomic structures.

- 1) Sectional anatomy
- 2) Relational anatomy
- 3) Normal sonographic appearances of organs, muscles, tissue, vascular and skeletal structures

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- 4) Differentiation of normal from abnormal sonographic findings

i. Demonstrate knowledge of disease processes with application to sonographic and Doppler patterns.

- 1) Iatrogenic
- 2) Degenerative
- 3) Inflammatory
- 4) Traumatic
- 5) Neoplastic
- 6) Infectious
- 7) Obstructive
- 8) Congenital
- 9) Metabolic
- 10) Immunologic

j. Demonstrate knowledge and application of image production and optimization.

- 1) Sound production and propagation
- 2) Interaction of sound and matter
- 3) Instrument options and transducer selection
- 4) Principles of ultrasound instruments and modes of operation
- 5) Operator control options
- 6) Physics of Doppler
- 7) Principles of Doppler techniques
- 8) Methods of Doppler flow analysis
- 9) Hemodynamics of blood flow
- 10) Contrast-enhanced imaging
- 11) Acoustic artifacts
- 12) Emerging technologies
- 13) Image storage devices

k. Demonstrate knowledge and application of biological effects.

- 1) In-vitro and in-vivo ultrasound effects
- 2) Exposure/equipment display indices
- 3) Generally accepted maximum safe exposure levels
- 4) ALARA principle

- a) Mechanisms that affect the mechanical and thermal indices
- b) Techniques to decrease the mechanical and thermal indices

I. Demonstrate knowledge of a quality control and improvement program.

- 1) Lab accreditation
- 2) Credentialing organizations
- 3) Equipment operation and maintenance
 - a) Phantom testing
 - b) Records maintenance

m. Demonstrate awareness of resources for professional development.

- 1) Professional organizations and resources
- 2) Professional journals and on-line resources
- 3) Continuing education conferences
- 4) Clinical conferences, lectures, and in-house educational offerings
- 5) Recent developments in sonography
- 6) Research statistics and design

n. Demonstrate achievement of clinical competency through the performance of the requirements to provide quality patient care and optimal examination

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outcome. Clinical competencies must include evaluation and documentation of:

- 1) Use of proper ergonomics
- 2) Safety and infection control
- 3) Obtain clinical history and utilize information appropriately
- 4) Oral and written communication
- 5) Image optimization techniques
- 6) *ALARA*
- 7) Professionalism
- 8) Document sonographic findings for communication with interpreting physician
- 9) Finalize examination for permanent storage
- 10) Process for reporting of critical findings

The above competencies may be embedded within the learning concentration clinical competencies.

3. Learning Competencies for the Abdominal Sonography - Extended Concentration

a. Identify anatomy, relational anatomy, anatomic variants, and sonographic appearances of normal anatomical structures.

- 1) Abdominal
 - a) Abdominal wall
 - b) Adrenal glands
 - c) Aorta and branches
 - d) Biliary system
 - e) Gastrointestinal tract
 - f) Great vessels and branches
 - g) Liver
 - h) Lung/pleura
 - i) Lymphatic system
 - j) Pancreas
 - k) Peritoneal and retroperitoneal cavities
 - l) Spleen

m) Urinary tract

2) Extended

- a) Extremity non-vascular
- b) Infant hips
- c) Neck
- d) Neonatal/infant head
- e) Neonatal/infant spine
- f) Penis
- g) Prostate
- h) Scrotum
- i) Superficial soft-tissue structures

b. Demonstrate knowledge of the physiology, pathophysiology, sonographic technique, measurements, sonographic appearances, and Doppler patterns, where applicable, in both normal and abnormal structures.

1) Abdominal

- a) Abdominal wall
- b) Adrenal glands
- c) Aorta and branches
- d) Biliary system

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- e) Gastrointestinal tract
- f) Great vessels and branches
- g) Liver
- h) Lung/pleura
- i) Lymphatic system
- j) Pancreas
- k) Peritoneal and retroperitoneal cavities
- l) Spleen
- m) Urinary tract

2) Extended

- a) Extremity non-vascular
- b) Infant hips
- c) Neck
- d) Neonatal/infant head
- e) Neonatal/infant spine
- f) Penis
- g) Prostate
- h) Scrotum
- i) Superficial soft-tissue structures

c. Demonstrate knowledge in sonographic guided procedures.

- 1) Role of sonographer
- 2) Clinical information
- 3) Informed consent
- 4) Procedural time out
- 5) Transducer guidance
- 6) Sterile setup
- 7) Pre-and post-procedural documentation

d. Evaluate scanning protocol and modification(s) based on the sonographic

findings and the differential diagnoses.

- 1) Indications and contraindications
- 2) History and physical examination
- 3) Related imaging, laboratory, and functional testing procedures
- 4) Clinical differential diagnosis
- 5) Contrast-enhanced imaging
- 6) Role of sonography in patient management

e. Document proficiency in the scanning technique and application for: 1)

- Abdominal vascular Doppler assessment
 - a) Hepatic
 - b) Mesenteric
 - c) Renal
- 2) Gastrointestinal tract assessment

The above proficiencies may be demonstrated in a clinical setting or in a simulated environment.

f. Demonstrate achievement of clinical competency through the performance of sonographic examinations of the abdomen and superficial structures, according to practice parameters established by national professional organizations and the protocol of the clinical affiliate. Clinical competencies must include evaluation

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and documentation of:

- 1) Identification of anatomical and relational structures
- 2) Differentiation of normal from pathological/disease process
- 3) Image optimization techniques in grayscale
- 4) Image optimization techniques in Doppler (where applicable)
- 5) Measurement techniques
- 6) Abdominal competencies
 - a) Complete abdominal examination
 - b) Limited abdominal examination
 - (1) Aorta/IVC
 - (2) Biliary system
 - (3) Liver
 - (4) Pancreas
 - (5) Spleen
 - (6) Kidneys
 - (7) Bladder
 - (8) Pleural space
 - (9) Sonographic guided procedure (assistance)
- 7) Superficial Structures
 - a) Thyroid
 - b) Scrotum

The above structures listed under limited abdominal examination may be completed as individual clinical competencies or may be incorporated with other structures/techniques as part of a limited or complete examination.

4.Learning Competencies for the Adult Cardiac Sonography Concentration

a. Identify anatomy, anatomic variants, and sonographic appearances of normal cardiac structures.

1) Embryology and fetal cardiac development

- 2) Cardiac chambers and septation
- 3) Coronary artery anatomy and distribution
- 4) Pulmonary artery and venous return
- 5) Relationships of cardiac chambers and great vessels
- 6) Valve anatomy and function

b. Demonstrate knowledge of normal and cardiovascular physiology and hemodynamics.

- 1) Ventricular systolic and diastolic function, including the influence of loading conditions, filling pressures, normal intracardiac pressures, and measurement of cardiac output
- 2) Electrophysiology and exercise physiology

c. Demonstrate knowledge of mechanisms of disease, cardiovascular pathophysiology, and hemodynamics, sonographic technique, measurements, quantitative principles, and Doppler patterns in both the normal heart and with cardiac disease.

- 1) Valvular heart disease
- 2) Prosthetic heart valves
- 3) Ventricular dysfunction
- 4) Diastolic dysfunction
- 5) Ischemic cardiac disease
- 6) Cardiomyopathy
- 7) Pericardial disease
- 8) Congenital heart disease
- 9) Endocarditis, neoplasms, and masses

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- 10) Cardiac trauma
- 11) Pulmonary vascular disease
- 12) Diseases of the aorta and great vessels
- 13) Cardiac assist devices
- 14) Intracardiac devices
- 15) Heart transplant
- 16) Intracardiac shunt
- 17) Intracardiac pressures
- 18) Cardio-oncology
- 19) Systemic diseases Systemic and pulmonary hypertension
- 20) Common arrhythmias and conduction abnormalities

d. Demonstrate knowledge of the indications, utility, limitations, and technical procedures for related echocardiographic studies.

- 1) Transthoracic echocardiography
- 2) Stress echocardiography
- 3) Transesophageal echocardiography
- 4) Intraoperative echocardiography
- 5) Enhanced cardiac ultrasound
- 6) IV administration techniques
- 7) Three-dimensional echocardiography
- 8) Echo-guided procedures
- 9) Strain echocardiography
- 10) Speckle tracking
- 11) Cardiac ultrasound respirogram
- 12) Pharmacology

e. Demonstrate knowledge, application, and proficiency in the use of

quantitation principles applied to echocardiographic images and flow data.

- 1) Standard M-mode, two-dimensional, and Doppler measurements, and calculations
- 2) Knowledge and understanding of normal and abnormal values for M-mode, two dimensional and Doppler echocardiography
- 3) Evaluation of normal and abnormal systolic and diastolic ventricular function
- 4) Evaluation of the severity of valve stenosis and regurgitation
- 5) Evaluation of normal and abnormal prosthetic valves, assist devices and interventional procedures

f. Awareness of scanning protocol and modification(s) based on the sonographic findings and the differential diagnoses.

- 1) Indications and contraindications
- 2) History and physical examination
- 3) Related imaging, laboratory, and functional testing procedures
 - a) Chest X-ray
 - b) Angiography and cardiac catheterization
 - c) Electrocardiography, electrophysiologic studies, Holter monitoring
 - d) Stress testing protocols
 - e) Radionuclide studies
 - f) Cross-sectional imaging procedures
 - g) Adult interventions
- 4) Clinical differential diagnosis
- 5) Role of sonography in patient management
- 6) Effects of pharmacotherapy on echocardiographic findings

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g. Demonstrate proficiency in technique and application of:

- 1) Quantitative principles applied to echocardiographic images and flow data
- 2) Stress echocardiography - exercise
- 3) Stress echocardiography - pharmacologic
- 4) Transthoracic enhanced echocardiogram

The above proficiencies may be demonstrated in a clinical setting or in a simulated environment.

h. Demonstrate achievement of clinical competency through the performance of adult cardiac sonography, according to practice parameters established by national professional organizations and the protocol of the clinical affiliate. Clinical competencies must include evaluation and documentation of:

- 1) Identification of anatomical and relational structures
- 2) Differentiation of normal from pathological/disease process
- 3) Image optimization and measurement techniques with:
 - a) 2D imaging
 - b) M-mode
 - c) Spectral Doppler: PW, CW and Tissue Doppler
 - d) Color flow Doppler
 - e) Use of non-imaging CW Doppler transducer
- 4) Adult cardiac sonography competencies
 - a) Complete transthoracic echocardiogram - Normal
 - b) Systolic dysfunction
 - c) Diastolic dysfunction
 - d) Aortic valve or aortic root pathology
 - e) Mitral valve pathology

- f) Right heart pathology
- g) Cardiomyopathy
- h) Pericardia! pathology
- i) Prosthetic valve
- j) Coronary artery disease
- k) Contrast-enhanced echocardiography (observe)

The above may be completed as individual clinical competencies or may be incorporated with other organs as part of a limited or complete examination.

5.Learning Competencies for the Breast Sonography Concentration

a. Identify anatomy, congenital and developmental variants, and sonographic appearances of normal breast structures.

1) Areolar complex/nipple

- 2) Fibrous planes
 - a) Skin
 - b) Subcutaneous fat
 - c) Mammary zone
 - d) Retromammary space
 - e) Muscle layers
 - f) Rib cage and intercostal muscles
- 3) Cooper's ligaments
- 4) Ductal system
- 5) Lymph nodes
- 6) Vasculature
 - a) Arterial
 - b) Venous

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- 7) Variants
 - a) Amastia
 - b) Amazia
 - c) Athelia
 - d) Polymastia
 - e) Polythelia
 - f) Nipple inversion/flattening
 - g) Early ripening
 - h) Age-related sonographic changes of breast tissue and its components

b. Demonstrate knowledge of physiology and pathophysiology in both normal and abnormal breaststructures.

- 1) Embryologic development
- 2) Age-related development of the breast to involution
- 3) Normal blood flow patterns within the breast and its components
- 4) Lymphatic drainage
- 5) Effect of pregnancy
- 6) Lactation
- 7) Male breast
- 8) Infectious processes
- 9) Neoplasms
 - a) Cystic
 - b) Benign
 - c) Malignant

10) Trauma

c. Demonstrate knowledge of the sonographic technique, measurements, sonographic appearances, integration of data, and Doppler patterns in both normal and abnormal breast structures.

- 1) Scan planes
- 2) Scan techniques
- 3) Patient position
- 4) Imaging techniques
- 5) Image labeling/distance from nipple
- 6) Image optimization
- 7) Artifacts
- 8) Implants
- 9) Lymph node assessment
- 10) Postoperative biopsy site
- 11) BI-RADS assessment categories
- 12) Correlation of other imaging modalities
- 13) Spectral Doppler of the vasculature related to a mass
- 14) Color Doppler of a mass/lesion
- 15) Power Doppler of a mass/lesion

d. Demonstrate knowledge in interventional and intraoperative procedures. 1) Role of sonographer in ultrasound-guided procedures and sentinel lymph node biopsy 2) Clinical information

- 3) Informed consent
- 4) Procedural time out
- 5) Transducer guidance
- 6) Sterile setup
- 7) Pre-and post-procedural documentation
- 8) Sonography assisted procedures

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e. Evaluate scanning protocol and modification(s) based on the sonographic findings and the differential diagnoses.

- 1) Indications and contraindications
- 2) History and physical examination
- 3) Related imaging, laboratory, and functional testing procedures
 - a) Correlation with mammography
 - b) BIRADS
 - c) Correlation with MRI
 - d) Correlation with Nuclear Medicine
- 4) Clinical differential diagnosis
- 5) Role of sonography in patient management
- 6) Elastography
- 7) Role of three-dimensional sonography

f. Demonstrate knowledge of treatment options.

- 1) Medical
- 2) Surgical
- 3) Brachytherapy

g. Demonstrate achievement of clinical competency through the performance of sonographic examinations of the breast, according to practice parameters established by national professional organizations and the protocol of the clinical

affiliate/clinical education centers. Clinical competencies must include evaluation and documentation of:

- 1) Identification of anatomical and relational structures
- 2) Differentiation of normal from pathological/disease process
- 3) Image optimization techniques in grayscale
- 4) Image optimization techniques in Doppler {where applicable}
- 5) Measurement techniques {where applicable}
- 6) Breast competencies
 - a) Targeted exam
 - b) Lymph node evaluation
 - c) Cystic lesion
 - d) Solid lesion
 - e) Doppler evaluation of mass
 - f) Implant
 - g) Breast interventional procedures
- (1) Fine needle aspiration
- (2) Core biopsy
- (3) Needle localization

The above may be completed as individual clinical competencies or may be incorporated with other structures/techniques as part of a limited or complete examination.

6. Learning Competencies for the Musculoskeletal Sonography Concentration

a. Define and describe the sonographic characteristics of the components of the musculoskeletal system.

- 1) Bursae
- 2) Cartilage
- 3) Fascia
- 4) Fat pads
- 5) Ligaments

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- 6) Muscles
- 7) Retinaculum
- 8) Tendons
- 9) Nerves
- 10) Lymph nodes
- 11) Types of joints

b. Demonstrate knowledge of the anisotropic effect and the ability to distinguish this artifact from normal variants and pathology.

c. Identify anatomical structures, nerves and vascular supply, normal sonographic appearances, normal Doppler patterns, measurements {and contralateral comparison when applicable}, and changes with the dynamic assessment.

- 1) Abdominal wall
- 2) Shoulder
- 3) Upper arm
- 4) Elbow
- 5) Forearm
- 6) Wrist
- 7) Hands
- 8) Fingers

- 9) Hip, to include groin and pelvis
- 10) Upper leg
- 11) Knee
- 12) Lower leg
- 13) Ankle
- 14) Foot
- 15) Toes

d. Demonstrate knowledge of the physiology, pathophysiology, sonographic technique, measurements, sonographic appearances, and Doppler patterns in musculoskeletal injuries and disease processes.

- 1) Abdominal wall
- 2) Shoulder
- 3) Upper arm
- 4) Elbow
- 5) Forearm
- 6) Wrist
- 7) Hands
- 8) Fingers
- 9) Hip, to include groin and pelvis
- 10) Upper leg
- 11) Knee
- 12) Lower leg
- 13) Ankle
- 14) Foot
- 15) Toes

e. Identify sonographic and Doppler patterns in clinical diseases, injury, and post surgical changes that may occur in the following categories.

- 1) Bone pathology
- 2) Cartilage
- 3) Crystal deposits
- 4) Cystic structures
- 5) Fluid collections

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- 6) Foreign bodies
- 7) Hernias
- 8) Infections
- 9) Joint effusions
- 10) Joint laxity/altered function
- 11) Ligament pathology and tears
- 12) Masses/neoplastic processes
- 13) Muscle pathology and tears
- 14) Neuromas
- 15) Nerve pathology and entrapment
- 16) Soft tissue pathology
- 17) Subcutaneous abnormalities
- 18) Synovitis
- 19) Synovial proliferation
- 20) Tendon pathology, tears, and calcifications
- 21) Vascular malformations

f. Demonstrate knowledge in sonographic guided procedures

- 1) Role of sonographer

- 2) Clinical information
- 3) Informed consent
- 4) Procedural time out
- 5) Transducer guidance
- 6) Sterile setup
- 7) Pre-and post-procedural documentation
- 8) Procedures
 - a) Ablation
 - b) Aspiration
 - c) Platelet-Rich Plasma {PRP} Injection
 - d) Dry needling
 - e) Biopsy
 - f) Nerve mapping
 - g) Nerve block
 - h) Surgical planning

g. Evaluate scanning protocol and modification(s) based on the sonographic findings and the differential diagnoses

- 1) Indications and contraindications
- 2) History and physical examination
- 3) Related imaging, laboratory, and functional testing procedures
- 4) Clinical differential diagnosis
- 5) Role of sonography in patient management

h. Demonstrate achievement of clinical competency through the performance of sonographic examinations of the musculoskeletal system, according to practice parameters established by national professional organizations and the protocol of the clinical affiliate. Clinical competencies must include evaluation and documentation of:

1. Identification of anatomical and relational structures
2. Differentiation of normal from pathological/disease process
3. Image optimization techniques in grayscale
4. Image optimization techniques in Doppler {where applicable}
5. Dynamic or provocative maneuvers
6. Evaluate bony surface irregularities (where applicable)
 - a) Abdominal wall

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- (1) Valsalva maneuver to assess for ventral hernia
- b) Shoulder
 - (1) Biceps subluxation - Rotate arm in external and internal rotation
 - (2) Supraspinatus impingement - Arm abduction
 - (3) Acromioclavicular joint - Cross-arm maneuver
 - (4) Posterior labrum - Rotate arm in external and internal rotation
- c) Elbow
 - (1) Ulnar nerve subluxation-Flexion and extension
 - (2) Ulnotrochlear joint--Valgus stress
 - (3) Radiocapitellar joint - Varus stress
 - (4) Extensor carpi ulnaris (ECU) subluxation - Pronation to supination
- d) Hands and fingers
 - (1) Trigger finger-Flexion & extension
 - (2) Stenner lesion-Valgus stress of ulnar collateral ligament
- e) Hip, to include groin and pelvis
 - (1) Valsalva maneuver when to assess for inguinal or femoral hernia

- (2) Iliopsoas snapping-hip flexion with external rotation and abduction followed by hip extension and internal rotation
- (3) Iliotibial band snapping-hip flexion and extension or symptom-driven dynamic maneuver
- f) Knee
 - (1) Anterior- Flexion and extension to evaluate the patellar tendon
 - (2) Lateral - Lateral compartment jointspace
 - (3) Ankle
 - (4) Lateral - Peroneal tendon subluxation evaluation during eversion circumduction
 - (5) Medial - Dorsiflexion and inversion to check for tibialis posterior tendon instability
 - (6) Posterior - Dorsiflexion/plantar flexion to evaluate the Achilles tendon
- g) Foot
 - (1) Dorsiflex the 2-4 metatarsophalangeal joint (MTP) to evaluate tendon movement, the integrity of the plantar plate, and for plantar tears
- h) Neuromuscular
 - (1) Peripheral neuropathies
 - (2) Compression disorders

The above may be completed as individual clinical competencies or may be incorporated with other structures/techniques as part of a limited or complete examination.

7. Learning Competencies for the Obstetrics and Gynecology Sonography Concentration

a. Identify anatomy, anatomic variants, and sonographic appearances of normal structures of the female pelvis.

- 1) Pelvic muscles
- 2) Pelvic vasculature
- 3) Peritoneal spaces
- 4) Reproductive organs
- 5) Suspensory ligaments

b. Identify anatomy, anatomic variants, and sonographic appearances of normal maternal, embryonic, and fetal anatomic structures during the first, second, and third trimesters.

1) First-trimester structures

- a) Gestational sac
- b) Embryonic pole

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- c) Yolk sac
- d) Early placenta
- e) Fetal cardiac activity
- f) Uterus
- g) Cervix
- h) Adnexa
- i) Pelvic spaces
- j) Multiple gestations

2) Second- and Third-trimester fetal and maternal structures

- a) Intracranial anatomy
- b) Face
- c) Thoracic cavity

- d) Heart
 - (1) Position and size
 - (2) Four-chamber view
 - (3) LVOT and RVOT views
 - (4) Three-vessel and three-vessel tracheal views
- e) Abdomen and pelvis
- f) Abdominal wall
- g) Spine
- h) Extremities
- i) External genitalia
- j) Amniotic fluid
- k) Placenta
- l) Umbilical cord
- m) Fetal cardiac activity
- n) Maternal cervix
- o) Maternal adnexa
- p) Multiple gestations

c. Demonstrate knowledge of pathology, physiology, pathophysiology, sonographic technique, measurements, sonographic appearances, and Doppler patterns in gynecologic disease processes.

- 1) Inflammatory processes
- 2) Congenital anomalies
- 3) Benign uterine/adnexal masses
- 4) Malignant uterine/adnexal masses
- 5) Contraceptive devices
- 6) Infertility procedures
- 7) Post-partum

d. Demonstrate knowledge of pathology, physiology, pathophysiology, sonographic technique, sonographic appearance, measurements, and Doppler patterns in obstetric abnormalities.

- 1) First trimester complications
- 2) Congenital anomalies
- 3) Genetic syndromes
- 4) Growth abnormalities
- 5) Multiple gestation complications
- 6) Viability
- 7) Amniotic fluid
- 8) Placenta
- 9) Umbilical cord
- 10) Fetal monitoring
- 11) Effects of maternal conditions

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e. Demonstrate knowledge and understanding of the role of the sonographer in performing interventional/invasive/advanced procedures.

- 1) Infertility procedures
- 2) Amniocentesis
- 3) Chorionic villus sampling
- 4) Fetal therapy
- 5) Nuchal translucency
- 6) Sonohysterography
- 7) Three-dimensional obstetric and gynecologic sonography

f. Evaluate scanning protocol and modification(s) based on the sonographic findings and the differential diagnoses.

- 1) Indications and contraindications
- 2) History and physical examination
- 3) Related imaging, laboratory, and functional testing procedures
- 4) Clinical differential diagnosis
- 5) Role of sonography in patient management

g. Demonstrate achievement of clinical competency through the performance of sonographic examinations of the gravid and non-gravid pelvis with both transabdominal and endocavitary transducers, and Doppler/M-mode display modes, according to practice parameters established by national professional organizations and the protocol of the clinical affiliate. Clinical competencies must include evaluation and documentation of:

- 1) Identification of anatomical and related structures
- 2) Differentiation of normal from pathological/disease process
- 3) Image optimization techniques in grayscale
- 4) Image optimization techniques in Doppler and M-mode (where applicable)
- 5) Knowledge and application of ALARA
- 6) Measurements as applicable
- 7) Gynecology competencies
 - a} Complete pelvic sonogram b}
Vagina/cervix/uterus
 - c} Posterior and anterior cul-de-sac
 - d} Adnexa, including ovaries and fallopian tubes
- 8) Obstetrical competencies
 - a} First-trimester obstetric structures: (1) Gestational sac
(2) Embryonic pole
(3) Yolk sac
(4) Fetal cardiac activity
(5) Placenta
(6) Uterus
(7) Cervix
(8) Adnexa
(9) Pelvic spaces
 - b} Second- and Third-trimester fetal and maternal structures
 - (1) intracranial anatomy
 - (2) Face
 - (3) Thoracic cavity
 - (4) Heart
 - (a) Position and size

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- (b) Four-chamber view
- (c) LVOT and RVOT views
- (d) Three-vessel and three-vessel tracheal views
- (5) Abdomen
- (6) Abdominal wall
- (7) Spine
- (8) Extremities
- (9) Amniotic fluid

- (10) Placenta
- (11) Umbilical cord
- (12) Fetal cardiac activity
- (13) Maternal cervical length
- (14) Maternal adnexa
- c) Biophysical profile

The above may be completed as individual clinical competencies or may be incorporated with other structures/techniques as part of a limited or complete examination.

8. Learning Competencies for the Vascular Sonography Concentration

a. Demonstrate knowledge of anatomy and anatomic variants of the cardiovascular system.

- 1) Heart
 - a) Chambers
 - b) Valves
 - c) Vessels
- 2) Pulmonary circulation
- 3) Vessel structure
 - a) Arteries
 - b} Veins
 - c) Capillaries
- 4) Aorta and branches
- 5) Cerebrovascular
- 6) Hepatoportal venous
- 7) Mesenteric arterial system
- 8) Peripheral arterial
- 9) Peripheral venous
- 10) Renal vessels
- 11) Vena cava and iliac veins

b. Demonstrate knowledge of normal and abnormal peripheral vascular physiology and hemodynamics.

- 1) Principles of pressure, flow, and resistance
- 2) Pulsatile flow
- 3) Laminar and non-laminar flow patterns
- 4) Poiseuille's law
- 5) Bernoulli's principle
- 6) Reynold's number
- 7) Cardiac influence on flow
- 8) Occlusive diseases
- 9) Collateral circulation
- 10) Exercise and hyperemia
- 11) Systemic diseases and other conditions
- 12) Venous physiology, valve function, calf pump

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c. Demonstrate knowledge of mechanisms of vascular diseases, vascular pathophysiology, and hemodynamic effects.

- 1) Aneurysm and pseudoaneurysm
- 2) Arterial embolism
- 3) Arteriovenous fistulae and shunts

- 4) Atherosclerosis
- 5) Congenital anomalies
- 6) Fibromuscular dysplasia
- 7) Genetic disorders
- 8) Iatrogenic injury
- 9) Infection
- 10) Intimal hyperplasia
- 11) ischemia
- 12) Neoplasia
- 13) Organ transplantation
- 14) Pharmacologic alterations
- 15) Portal hypertension
- 16) Systemic hypertension
- 17) Trauma
- 18) Vascular entrapment and extrinsic compression
- 19) Vascular malformations
- 20) Vasculitis
- 21) Vasospastic disorders
- 22) Venous thromboembolism
- 23) Venous valvular disorders

d. Demonstrate knowledge of sonographic appearances, sonographic techniques, measurements, and Doppler flow characteristics in both normal and abnormal vascular structures.

- 1) Aorta and branches
- 2) Cerebrovascular
- 3) Hepatoportal venous
- 4) Mesenteric arterial system
- 5) Peripheral arterial
- 6) Peripheral venous
- 7) Renal vessels
- 8) Vena cava and iliac veins

e. Demonstrate knowledge of physiologic vascular testing principles and techniques. 1)

- Continuous-wave and pulse Doppler
- 2) Pressure measurements, including ankle/brachia! index
 - 3) Pneumoplethysmography (pulse volume recording)
 - 4) Segmental pressure and waveform analysis
 - 5) Exercise treadmill testing
 - 6) Photoplethysmography (PPG), arterial and venous
 - 7) Air plethysmography, venous
 - 8) Laser Doppler, including skin perfusion pressure measurements

f. Demonstrate knowledge and application in the use of quantitative principles applied to vascular testing.

- 1) Acceleration time
- 2) Ankle/brachia! pressure ratios
- 3) Aorta/renal ratios
- 4) Area and diameter reduction measurements
- 5) DigiUbrachial indices

- 6) Velocity change across stenosis for grading arterial lesions
- 7) Pulsatility index

- 8) Resistive index
- 9) Segmental pressures, including digits
- 10) Velocity ratios
- 11) Venous reflux time
- 12) Volume flow

g. Demonstrate knowledge in ultrasound-guided procedures.

- 1) Role of sonographer
- 2) Clinical information
- 3) Informed consent
- 4) Procedural time out
- 5) Sterile technique
- 6) Pre- and post-procedure documentation
- 7) Superficial vein ablation
- 8) Use of thrombin injection for pseudoaneurysm treatment

h. Demonstrate knowledge of the role of ultrasound for evaluation of vascular surgical procedures or interventions, including a role in planning, intra procedural guidance/technical evaluation, and/or post-procedure assessment.

- 1) Angioplasty
- 2) Atherectomy
- 3) Coil embolization
- 4) Dialysis fistula/graft
- 5) Embolectomy
- 6) Endarterectomy
- 7) Endovascular aortic aneurysm repair (EVAR)
- 8) Endovenous ablation
- 9) Inferior vena cava filter
- 10) Patch angioplasty
- 11) Stents
- 12) Synthetic grafts
- 13) Thrombolysis and thrombectomy
- 14) Trans-jugular intrahepatic porto-systemic shunt
- 15) Vein bypass grafts

i. Evaluate scanning protocol and modification(s) based on patient-specific factors.

- 1) History, including indication, prior vascular procedures
- 2) Physical examination and assessment of patient-specific factors
- 3) Contraindications
- 4) Related imaging, laboratory, and functional testing procedures
- 5) Clinical differential diagnosis
- 6) Role of ultrasound in patient management
- 7) Pharmacology

j. Demonstrate knowledge and application of quality assurance and statistical tests used in a vascular laboratory.

- 1) Correlations of clinical findings and other imaging examinations
- 2) Accuracy
- 3) Sensitivity
- 4) Specificity
- 5) Positive predictive value
- 6) Negative predictive value
- 7) Quality improvement program components, including test appropriateness, evaluation