

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Diagnostic Medical Sonography</u>
COURSE RUBRIC AND NUMBER	<u>DMSO 2353</u>
COURSE TITLE	<u>Sonography of Superficial Structures</u>
COURSE CREDIT HOURS	<u>3 3 : 1</u> Credits Lec Lab

I. Catalog Description

Provides a detailed study of normal and pathological superficial structures as related to scanning techniques, patient history and laboratory data, transducer selection and scanning protocols. A grade of “C” or better is required in this course to take the next course. **Prerequisite: DSVT 1200. (3:1).**

II. Course Objectives

Upon satisfactory completion of this course, the student will be able to perform:

A. Unit I. Breast Scanning

Identify the following anatomy and physiology and sonographic appearance of the breast.

Anatomy

1. The breast parenchyma elements are lobes, ducts, lobules, and acini.
2. Most posterior aspect is connected to the pectoral musculature.
3. Most anterior aspect is connected to the skin.

Physiology

1. Mammary function is to secrete milk during lactation.
2. Sonographic appearance
3. The skin line, nipple, and the retromammary layer are highly echogenic.
4. The areolar area is slightly less echogenic than the nipple and skin.
5. Internal nipple appearance is quite variable.
6. The mammary layer (active glandular tissue) is the core of the breast and has a mixed parenchymal appearance depending on the amount of fat that is present.
Note: Appearance with the presence of little fat is high echogenic because of collagen and fibrotic tissue. When fat is present, the appearance is of areas of low-level echoes mixed with areas of high echogenicity.
7. Cooper’s ligament and other connective tissue can be seen as highly echogenic linear areas within the fat tissue.
8. The sonographic appearance of the breast changes with age. Older patients’ breasts tend to have more fatty tissue.

B. Unit II. Thyroid

Small Part Anatomy and Pathology

1. Define the anatomy of the thyroid.
2. Identify the muscles located near the thyroid within the neck (i.e., Longue Colli, etc.).
3. Describe the relationship of the jugular vein to the carotid artery within the neck.
4. Define the location and appearance of the parathyroid gland.
5. Identify the three (3) strap muscles.
6. Identify the sternocleidomastoid muscle.
7. Define and describe the following:
 - a. Grave's Disease
 - b. Thyroid adenoma
 - c. Adenomatous hyperplasia
 - d. Goiter
8. Define the most common thyroid carcinoma.
9. Describe the patient positioning for a thyroid examination and the optimum transducer frequency.
10. Identify the following breast anatomical areas:
 - a. Pectoralis Major
 - b. Lactiferous Ducts
 - c. Cooper's Ligament
 - d. Retromammary Layer
11. Describe ultrasound's role in examination of the breast compared to conventional radiographic mammography.
12. Explain why it is important to completely penetrate the breast to the pectoralis muscle. What are some drawbacks to compression?
13. Describe some of the advantages/disadvantages of breast ultrasonography.

C. Unit III. Neonatal Head Anatomy and Pathology

1. Identify the following areas in sagittal and/or coronal views:
 - a. Cavum Septum Pellucidum
 - b. Bodies of the lateral ventricles
 - c. Third Ventricle
 - d. Choroid Plexus
 - e. Caudate Nucleus
 - f. Falx Cerebri
 - g. Ependym
 - h. Germinal Matrix
 - i. Subependyma
 - j. Thalamus
 - k. Ventricle
 - 1) Frontal Horn
 - 2) Temporal Horn
 - 3) Occipital Horn
 - 4) Trigone
 - 5) Foramen of Monroe
 - 6) Aqueduct of Sylvius
 - 7) Foramen of Magendie
 - 8) Third Ventricle
 - 9) Fourth Ventricle
2. Define the following: **4.12**
 - a. Cavum Septum Pellucidum

- b. Bodies of the lateral ventricle
 - c. Third Ventricle
 - d. Choroid Plexus
 - e. Caudate Nucleus
 - f. Falx Cerebri
 - g. Ependyma
 - h. Germinal Matrix
 - i. Subependyma
 - j. Thalamus
 - k. Ventricles
 - 1) Frontal Horn
 - 2) Temporal Horn
 - 3) Occipital Horn
 - 4) Trigone
 - 5) Foramen of Monroe
 - 6) Aqueduct of Sylvius
 - 7) Foramen of Magendie
 - 8) Third Ventricle
 - 9) Fourth Ventricle
3. Identify which laboratory value (if any) will provide additional information when examining a newborn with probable Intra-Cranial Hemorrhage (ICH).
4. Describe how the following scan planes are performed:
- a. Coronal
 - b. Sagittal
 - c. Axial
5. Define the location where the transducer should be placed when performing echoencephalograms
6. Define the following pathological conditions and their sonographic appearance:
- a. Arnold-Chiari Malformation
 - b. Asphyxia
 - c. Dandy-Walker Syndrome
 - d. Encephalocele
 - e. Holoprosencephaly
 - f. Hydranencephaly
 - g. Hydrocephalus
 - h. Porencephalic Cyst
 - i. Vein of Galen Aneurysm
7. Identify the four (4) clinical symptoms of Intracranial Hemorrhage (ICH).
8. Explain the grading system utilized to describe the amount of intracranial bleeding and location.
9. Identify at least two (2) types of bleeds.
10. Define Ischemic Hypoxic lesion and its sonographic appearance.
11. Define the following and describe the sonographic appearance:
- a. Periventricular Leukomalacia
 - b. Subarachnoid Cysts
 - c. Ventriculitis

D. Unit IV. Male Pelvis

Define the following for testicular sonograms:

- a. Epididymis Head
- b. Epididymis Tail
- c. Teatis
- d. Teratoma
- e. Hydrocele

Endorectal Sonography

1. Transabdominal male pelvis examinations are rarely performed anymore. The prostate gland is the primary interest of the male pelvis and is better evaluated by endorectal sonography.
2. Male pelvis transabdominal studies are systematically evaluated and documented in the same manner as the female pelvis transabdominal studies. Longitudinal surveys extend from one side of the pelvic cavity to the other. Transverse surveys extend from the symphysis pubis to the umbilicus. The prostate gland is examined from an inferior transducer angle at the level of the symphysis pubis. Patient prep, patient position, and transducer are the same as those for the female pelvis. See Chapter 12 for specifics. (Bates/Tempkin) pages: 265-274.

Location Anatomy

1. The primary bladder is posterior to the symphysis pubis.
2. The prostate gland is retroperitoneal. It lies anterior to the rectum and inferior to the urinary bladder.
3. The prostate gland is about the size of a chestnut and conical in shape. It is approximately 3.5 cm long, 4.0 cm wide, and 2.5 cm anterior to posterior. The base, its broadest aspect, is superior to its apex.
4. The prostate consists of fibromuscular and glandular tissue that surrounds the neck of the bladder and urethra.
5. The seminal vesicles are two sac-like structures that lie superior to the prostate and posterior to the bladder. Size is variable.
6. The seminal vesicles join the vas deferens to form the ejaculatory ducts.
7. The ejaculatory ducts enter the base of the prostate and pass through to the prostatic urethra at the verumontanum.
8. The urethra runs back from the neck of the bladder through the prostate to the base of the penis. The proximal portion of the prostatic urethra extends from the bladder neck to the verumontanum and the distal portion extends from the verumontanum to the apex of the prostate.
9. The verumontanum is the area where the ejaculatory ducts join the urethra.
10. The glandular portion of the prostate is divided into zones:
 - a. Peripheral zone: located posterior and lateral to the distal prostatic urethra. Normally, it is the largest zone.
 - b. Central zone: extends from the base of the prostate to the verumontanum and surrounds the ejaculatory ducts.
 - c. Transition zone: located on both sides of the proximal urethra. Normally, it is the smallest zone

Physiology

The function of the male reproductive organs is reproduction.

Sonographic Appearance:

1. The majority of the parenchyma of the prostate gland appears as homogeneous, mid-gray, medium-level echoes. The peri-urethral glandular stroma that surrounds the urethra is slightly hypoechoic compared with surrounding tissue. The contour of the gland should appear smooth and the margins well defined. Calcifications may be seen throughout the gland in older patients. The normal prostate should appear symmetrical.
2. The seminal vesicles appear as symmetrical midgray or medium to low-level echo textures, superior to the prostate. They are easier to visualize when the urinary bladder is

partially filled. They are seen in long axis on transverse scans. The prosthetic urethra walls appear echogenic at the midline of the gland.

3. The vas deferens and ejaculatory ducts may be difficult to distinguish from surrounding structures. However, when seen, the vas deferens are medial to, and have an echo texture similar to, the seminal vesicles. The ejaculatory ducts will appear as echogenic double lines.
4. Normally, the central and transition zones are not sonographically distinctive. The peripheral zone appears homogeneous and slightly hyperechoic to adjacent parenchyma.

Patient Prep:

1. Self-administered enema prior to the exam. If for some reason the patient cannot have the enema, still attempt the exam.
2. Explain the examination to the patient. Verbal or written consent is required, and the exam should be witnessed by another health care professional. The initials of the witness should be part of the film labeling.
3. The transducer may be inserted by the sonographer or the physician.

Patient Position:

Left lateral decubitus with knees bent toward the chest.

>>> Lithotomy position.

E. Unit V. Musculoskeletal Sonography

A. Anatomy

1. Muscles
 - a. Pennate patterns
2. Tendons
 - a. Synovial sheath
3. Ligaments
4. Bursae
5. Nerves
 - a. Lower limb
 - i) Sciatic
 - ii) Popliteal
 - b. Upper limb
 - i) Suprascapular
 - ii) Median
 - iii) Radial
 - iv) Ulnar
6. Joints
7. Bones
8. Shoulder
 - a. Biceps tendon/sheath
 - b. Subscapularis tendon
 - c. Supraspinatus tendon
 - d. Infraspinatus tendon
 - e. Acromioclavicular joint
 - f. Subdeltoid bursa
 - g. Supraspinatus, infraspinatus, and teres minor muscles

9. Wrist
 - a. Carpal tunnel
 - i) Flexor retinaculum space
 - Flexus pollicis longus
 - Flexor digitorum tendons
 - ii) Ulnar artery and veins
 - iii) Scaphoid tubercle
 - iv) Trapezium ridge
 - v) Pisiform ridge
 - vi) Pisiform bone
 - vii) Hamate
 - viii) Median nerve
 - b. Wrist - Guyon's canal
 - i) Hamate and pisiform bones
 - ii) Ulnar nerve
 10. Ankle/leg/foot
 - a. Achilles' tendon
 - i) Gastrocnemius muscle
 - ii) Soleus muscle
 - iii) Calcaneus
 - iv) Paratendon
 - v) Tibialis posterior
 - vi) Peroneal tendons
 - vii) Plantar fascia
 - b. Popliteal fossa
 - i) Femoral condyles and tibia
 - ii) Popliteal bursa
 - Synovial fluid
 - iii) Popliteal artery and vein
- B. Indications
1. Shoulder
 - a. Shoulder pain or swelling
 - b. Weakness with arm elevation
 - c. Trauma
 - d. Decreased range of motion
 - e. Evaluation of soft tissue masses
 2. Wrist
 - a. Palpable lesion
 - b. Loss or decrease of digital flexion/extension
 - c. Pain
 - d. Swelling
 - e. Trauma
 - f. Numbness of the middle and index fingers
 - g. Weakness or clumsiness of the hand
 - h. Tingling with nerve percussion
 - i) Tinel's sign
 - ii) Phalen's sign
 3. Achilles' Tendon
 - a. Abnormal Thompson's test
 - b. Trauma
 - c. Displacement of Kager's fat pad on radiograph
 - d. Knob or bulge over proximal tendon

- e. Audible pop or snap followed by sharp pain
- f. Inability to stand on toes
- g. Heel pain
- h. Decreased strength or mobility
- i. Postoperative
- 4. Baker's Cyst
 - a. Swelling in the popliteal fossa
 - b. Knee pain

F. Unit VI. Invasive Procedures

- 1. Verify patient identity.
- 2. Gather exam supplies.
- 3. Describe the precautions that must be undertaken during an invasive procedure.
- 4. Explain the physical difference between normal needle and needle designed specifically for ultrasound aspiration.
- 5. Assist Radiologist with obtaining consent for invasive procedures.
- 6. Define the following invasive procedures:
 - a. Amniocentesis
 - b. Paracentesis
 - c. Thoracentesis
 - d. Renal Biopsy
 - e. Liver Biopsy
- 7. Explain whether transvaginal and transrectal ultrasound could be considered invasive.
- 8. Describe the setup procedure for intracavitary ultrasound examination.
- 9. Describe the transducer used for each of the previously mentioned exams (transvaginal and transrectal). Specifically, what scan planes can each produce.?

III. THECB Learning Outcomes (WECM)

- 1. Identify sonographic appearance of normal and abnormal superficial structures.
- 2. Identify appropriate scanning technique using standard protocol guidelines.
- 3. Evaluate patient history and laboratory data as it relates to sonography.

IV. Evaluation

A. Preassessment

There is no preassessment for this course

B. Postassessment

Postassessment follows the completion of two (2) units. Written examination are used, including multiple choice, completion, matching, true/false, and brief essay questions.

C. Challenge Exam

There is no challenge exam for this course.

D. Grading Scale

100 – 92	= A
91 – 83	= B
82 – 75	= C
74 – 67	= D
66 – 0	= F

No **grade of less** than “C” will be considered as successful completion of a professionally related course. **Grades of .5 or higher** will be rounded of the next whole number grade.

E. Final Grade Determination

Take Home Exams and Pop Quizzes	20% of final grade
Unit Exams	35% of final grade
Worksheets/Homework	10% of final grade
Comprehensive Final	<u>35%</u> of final grade
	100%

F. Exams

All exams are written and consist of the following formats: multiple-choice, true-false, matching, essay, or a combination of any of the preceding.

NO RE-TEST ARE GIVEN:

An exam missed because of an excused absence must be made up on the day that the student returns to class. An exam missed because of an unexcused absence may not be made up, and the student will receive a grade of zero (0) for this exam.

Frequent unannounced pop quizzes are given at the beginning of the class period. Tardiness or absence on these days results in a zero (0) on that particular pop quiz. No pop quizzes, under any circumstances, may be made up.

G. Cheating

Any student caught cheating will have his/her exam withdrawn and given a zero (0) for that exam.

H. Attendance

An absence is considered excused if the student informs the instructor of his/her absence before that class period begins.

AN ACCUMULATION OF THREE UNEXCUSED ABSENCES WARRANTS THE STUDENT BEING DROPPED FROM THE CLASS FOR EXCESSIVE ABSENCES.

I. Tardiness

Tardiness is defined as being 1 minute or more late to class. Students tardy in excess of 10 minutes are considered absent.

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with

a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.

VII. Title IX and Sex Discrimination

Title 9 (20 U.S.C. 1681 & 34 C.F.R. Part 106) states the following "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance." The Violence Against Women Act (VAWA) prohibits stalking, date violence, sexual violence, and domestic violence for all students, employees and visitors (male and female). If you have any concerns related to discrimination, harassment, or assault (of any type) you can contact the Assistant to the Vice President for Student and Enrollment Services at 915-831-2655. Employees can call the Manager of Employee Relations at 915-831-6458. Reports of sexual assault/violence may also be reported to EPCC Police at 915-831-2200.