Course Description

SON 1113L | Sonographic Cross-Sectional Anatomy | 2 credits

A thorough course aimed at teaching the student to understand anatomical relationships and recognize structures on cross-sectional and sagittal diagrams, photographs of gross anatomy and Sonography. The laboratory conducted in conjunction with the classroom lectures is designed to identify all normal anatomical landmarks in multiple planes in actual scanning situations.

Course Competencies

Competency 1:

The student will demonstrate knowledge and comprehension of the female reproductive anatomy by:

a. identifying the essential organs of reproduction.
b. listing the accessory organs of reproduction.
c. identifying which organs are part of the true pelvis and false pelvis.
d. labeling a diagram of the female pelvis, including the organs of reproduction, vasculature, ligaments, musculature, and cul de sac.
e. identifying the divisions of the uterus and fallopian tubes
f. labeling the structures and layers of the uterus, fallopian tubes, and ovaries.
g. describing the layers of the endometrium: stratum basalis and stratum functionalis
h. naming the vessels which supply blood for the uterus and ovaries.
i. identifying the normal and variant position: flexions and versions of the uterus.
j. labeling the structure of the cervix, vagina, and fornix.
k. labeling all the anatomy stated above in diagrams and on ultrasound images.

Learning Outcomes

- Communicate effectively using listening, speaking, reading, and writing skills
- Use quantitative analytical skills to evaluate and process numerical data

Competency 2:

The student will demonstrate knowledge and comprehension of the physiology of the female reproductive system by:

a. describing the function of the uterus, ovaries, and tubes.
b. defining menarche, menstruation, and menopause.
c. describing the menstrual cycle and explaining the phases, both secretory and proliferative.
d. describing the changes of the ovary seen on ultrasound during the phases of the menstrual cycle.

e.	describing the changes of the endometrial cavity, seen on ultrasound during the phases of the menstrual cycle.
f.	describing the changes in the anatomy and size of the uterus and ovaries, that are seen on ultrasound through stages of life.
g.	listing the normal ranges of size of the uterus dependent on age.
h.	listing the normal ranges of size of the ovaries dependent on age.
i.	listing the normal range of size of the endometrium through the menstrual cycle and life cycle.
j.	Identifying normal endometrial thickness dependent on age, hormonal cycle, and medications.
k.	listing the hormone cycle and defining the negative feedback mechanism.
l.	listing the hormones secreted by each reproductive organ.
m.	defining the symptoms of menarche, menstruation, perimenopause, menopausal, and post-menopausal patients.
n.	explaining the process of ovulation, fertilization, and implantation.
o.	Identifying and discussing congenital anomalies of the uterus on diagrams and ultrasound images.
p.	discussing what images are needed in a gynecological ultrasound.
q.	compare and contrast the transabdominal and transvaginal images.
r.	Discuss the use of sonohysterography, hysteroscope, radiologic exams of the pelvis and
s.	discuss other diagnostic exams used in obstetrics and gynecology.
t.	describe pertinent history needed prior to performing pelvic ultrasound.
u.	describe patient preparation for pelvic ultrasound.

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Competency 3:

The student will demonstrate knowledge, comprehension, and application of the process of fertilization to implantation by:

a. listing where fertilization occurs
b. listing the events in the first four weeks of gestation
c. describes hormone changes.
d. Identifying sonographic changes in early pregnancy
e. list which hormones are being secreted and by which organ it is being secreted from.
f. list the function of each hormone at this stage of gestation.
g. identifying changes of the ovary.
h. identifying changes of the endometrium.
i. explaining t implantation bleeding.
j. describing the role of the corpus luteum.

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Competency 4:

The student will demonstrate knowledge, comprehension, and application of embryology by:

a. recognizing the decidual reaction on sonograms.
b. recognizing the gestational sac and yolk sac on sonogram.
c. recognizing the fetal pole, CRL, and fetal heart activity on early sonograms.
d. recognizing the amnion and chorion on diagrams and sonograms.
e. describe the double sac sign.
f. stating the unique features of fetal circulation.
g. naming what the embryologic component of the fetal circulation in the adult.
h. labeling a diagram of fetal circulation.
i. labeling diagram of placental structure and circulation.

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Competency 5:

The student will demonstrate knowledge, comprehension, and application of the Cardiac structures by:

a. recognizing and labeling normal cardiac anatomy on diagrams and echocardiography.
b. recognizing and labeling the cardiac blood supply.
c. identifying the wall segments and the coronary artery that supplies each segment.
d. identifying and discussing the conduction system.
e. recognizing and labeling the basic echocardiographic views.
f. describing the cardiac cycle in diagrams, EKG, and echocardiography.
g. describing the heart sound and where they are in the cardiac cycle.
h. defining Ejection Fraction, Stroke Volume, Cardiac Output.
i. labeling an M-mode at the level of the aorta, mitral valve, and left ventricle.
j. Demonstrate appropriate echocardiography measurements on 2D, M Mode, and Doppler.
k. describing blood flow through the heart.
l. recognizing flow patterns on Doppler echocardiograms.
m. distinguishing from normal and abnormal blood flows on Doppler.
n. describing the hemodynamics of the heart.
o. defining Frank-Starling Law.
p. labeling a diagram of the cardiac cycle and the divisions of systole and diastole
q. identifying and describing components of the circulatory system.
r. locating and identifying basic components of the thorax and basic topographical markers.
s. discussing basic terms of respiratory and circulatory physiology.

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Competency 6:

The student will demonstrate knowledge, comprehension, and application of the hemodynamics of the heart by:

a. describing normal dynamics of cardiac blood flow and define measures of cardiac performance.
b. identifying the components of the cardiac cycle
c. labeling and discussing Wigger's Diagram
d. correlating Wigger's diagram with doppler signals.
e. discussing the Gorlin Equation

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Competency 7:

The student will demonstrate knowledge, comprehension, and application of the scanning techniques used in Echocardiography by:

a. describing the transducer positions and equipment adjustments required to create high quality diagnostic echocardiograms.
b. identifying, and describing the relationships of the cardiac valves, chambers, and related structures.
c. illustrating the appropriate method of measurement and the normal limits of these measurements on an echocardiogram.
d. Labelling diagrams of cardiac views
e. Identifying anatomical structures in all cardiac views used in transthoracic and transesophageal echocardiography.

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Competency 8:

The student will demonstrate knowledge, comprehension, and application of scanning techniques in abdominal ultrasound by:

a. understanding the basic concepts of ultrasound and defining the medical terms for directions in reference to the human body.
b. naming the anatomical landmarks of the abdomen.
c. Identifying the divisions of the abdomen.
d. identifying the organs of the abdomen in cross-section on diagrams and ultrasound images.
e. identifying the vessels of the abdomen in cross-section on diagrams and ultrasound images.
f. discussing the orientation/location of each abdominal structure to the other structures that are in proximity.
g. labeling cross-sectional and sagittal diagrams of the abdomen.
h. labeling a sonogram in longitudinal and transverse of the abdominal organs.
i. discussing patient position for each image.
j. discussing pertinent patient history and preparation for the abdominal ultrasound exam.
k. discussing scanning techniques used in abdominal ultrasound.
l. Identifying the organs of the abdomen in cross-section.
m. Identifying the vessels of the abdomen in cross-section.
n. Understanding the orientation of each abdominal structure to the other structures that are in close proximity.
o. Identifying the peritoneal cavity and the structures found within
p. Identifying the retroperitoneal cavity and the structures found within.
q. Identifying organs part of the Gastrointestinal system.
r. Identifying organs part of the Genitourinary system.
s. Identifying muscle of the abdomen.
t. Identifying normal sonographic appearance and echogenicity of abdominal organs.
u. Discussing normal Doppler patterns for abdominal structures.

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