Edward Via College of Osteopathic Medicine

Comprehensive Ultrasound Elective

COURSE MODULE

Primary Teaching Faculty	Office	Contact Information
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I. **Module Description**

The Comprehensive Ultrasound elective begins by teaching the physics and optimization of ultrasound image acquisition and it serves as an accompaniment to live ultrasound anatomy and physiology seen during clinical rotations. This helps students connect what they learn in basic science courses, anatomy laboratory, and basic clinical foundations and provides additional opportunities to practice physician patient communication and draping techniques. This is achieved through participation in a series of hands on sessions led by faculty and participation in an online community of inquiry. Students are evaluated via the completion of a digital portfolio as their capstone project to illustrate competency and proficiency ultrasound image acquisition.

Instructional strategies to be used in this course include reading, lecture/class discussion, simulation experiences, peer teaching, as well as clinical experience. Students who successfully meet all course requirements will be awarded one elective college academic credit, participation certificate in the course, and recognition on their MSPE.

II. **Module Goals**

  A. Goals of the Module
   a. Develop competence in basic image acquisition. They will be able to operate an ultrasound machine in its basic form, understanding how to select the proper probe for the given study, how to adjust gain and depth to optimize the image and how to archive appropriate images.
   b. Demonstrate how to appropriately drape patients, and be respectful of patient comfort and privacy while performing exams.
   c. Learn to identify the key anatomic landmarks for the following studies: FAST, AAA, cardiac, biliary, renal, thoracic, and soft tissue/abscess.

d. Learn to identify the key ultrasonographic findings used to diagnose the following pathologic conditions: cholecystitis, pneumothorax, hydronephrosis, ascites, AAA, and abscess.
e. Learn to identify free fluid (ascites or blood) on an abdominal ultrasound.
f. Learn to identify fluid (pleural effusion or hemothorax) on a thoracic ultrasound
g. Learn the indications for core ultrasound applications.
h. Learn the types of ultrasound artifacts and their role in image acquisition.

III. Module Design

The course spans one month and is intended for students planning to enter residency programs that rely on ultrasound imaging. This course follows an asynchronous model of instruction. As such, there are class meetings in advance of lab sessions. There are four week long modules. Inside of each module, there are four participation elements: (1) Readings and Readings Quiz; (2) Online Learning Assignment (3); Experiential Learning Lab; (4) and Clinical Experience. Students are required to complete all online coursework independently before their scheduled lab time. Also, because this model is used, students should expect that all important course related communication will occur over 9 & 2 0   H P D L O , W L V W K H responsibility to check their email in a timely manner to stay up to date with important course information.

IV. Credits
Total hours required:
   Total Student Independent Study Hours 16 hours
   Total Student Lab Hours 112 hours
   Total Student Clinical Hours: 32

   Student time commitment 160 hours per elective rotation (One month)

V. Module Texts
A. Required Textbooks
   Allan PL, Baxter GM, Weston MJ. Clinical Ultrasound. 2011.

VI. Module Grading
In accordance with VCOM's grading policy, the faculty defines satisfactory performance as 70% or above. A grade of less than 70% will require remed-3(. med-3(med-3(med-3(e)-5(a) 3(s)5(70% or)4(a) 3(

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Interactive Lab Session – Cardiopulmonary I
Learning Objectives:
a. Demonstrate the features of the cardiac ultrasound functions and probes
b. Obtain parasternal long and apical 4-chamber views of the heart.
c. Trace the pericardium in both views of the heart
d. Identify the mitral valve, tricuspid valve, and aortic valve
e. Identify the descending aorta in parasternal long axis.

Online Learning Assignment – Cardiopulmonary II
Learning Objectives:
a. Demonstrate the windows necessary to view the lung fields in their entirety.
b. Identify the pleural line in its location between each rib level.
c. Appreciate the diaphragmatic excursion using coronal planes.
d. Locate the cupula of the lung and the proximity the subclavian vein.

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3. Week 3

Online Learning Assignment – Abdominal I
Learning Objectives:
a. Discuss the components of the FAST exam
b. Evaluate the utility of the FAST Exam
c. Discuss how to interpret the images of the FAST exam
d. Discuss the strengths and weaknesses of the FAST exam

Interactive Lab Session – Abdominal I
Learning Objectives:
a. Demonstrate ultrasound imaging included in a FAST exam
   o Cardiac:
      ƒ Pericardium
      ƒ Heart chambers
   o Right Upper Quadrant (RUQ):
      ƒ Morrison's Pouch (hepatorenal recess)
      ƒ Liver tip (right paracolic gutter) and
      ƒ Lower right thorax
   o Left Upper Quadrant (LUQ):
      ƒ Subphrenic space
      ƒ Splenorenal recess
      ƒ Spleen tip (left paracolic gutter)
      ƒ Lower left thorax
   o Pelvic:
      ƒ Rectovesical pouch (Male)
      ƒ Rectouterine / pouch of Douglas (Female)

Online Learning Assignment – Abdominal II
Learning Objectives:
  a. Trace the liver as it lies under the skin.
  b. Appreciate the gallbladder in its position within the main interlobar fissure of the liver.
  c. Understand the anatomy of the portal triad and utilize color Doppler to enhance visualization.
  d. Trace the spleen in its location under the skin.
  e. View the proximal esophagus adjacent to the trachea and observe saliva and air during swallowing.
  f. Perform "mowing the lawn" compression technique to observe intestinal loops.

Interactive Lab Session – Abdominal II
Learning Objectives:
  a. Demonstrate the gallbladder in long and short axis
  b. Demonstrate the portal vein, hepatic veins, and IVC
  c. Measure the common bile duct
  d. Measure the long and short axis of the spleen
  e. Demonstrate the esophagus and observe saliva being swallowed
  f. Demonstrate compression of the abdominal musculature down to psoas muscle in an effort to visualize the appendix

4. Week 4
Online Learning Assignment – Renal
Learning Objectives:
  a. Appreciate anatomical position of the kidneys by demonstrating long and short axes.
  b. Differentiate the renal pyramids from the renal cortex and renal pelvis.
  c. Demonstrate position of the prostate in relation to the bladder.
  d. Estimate the bladder volume by taking the height, width and length measurements.
Interactive Lab Session – Renal
Learning Objectives:
  a. Demonstrate a long axis and short axis of each kidney
  b. Differentiate the renal capsule, cortex, and pelvis
  c. Measure the three planes of the bladder and estimate the bladder volume

Capstone Project
Learning Objectives:
  a. Provided an ultrasound machine, acquire the following images within a digital portfolio for submission:
      o Shoulder or knee joint
      o Cardiac Parasternal Long Axis
      o Lungs
      o Complete FAST exam
      o Gallbladder
      o Kidneys or Bladder

  b. All image acquisition will be evaluated based on the following criteria:
      o Can the organ and anatomy of interest be identified?
      o Is the proper transducer being used with the correct indicator orientation?
      o Was the image obtained at the proper depth, gain, and frequency?
      o Were the correct measurements taken?
      o Were the correct applications used?