



Edward Via College of Osteopathic Medicine

Comprehensive Ultrasound

COURSE SYLLABUS

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I. Course Description

The Comprehensive Ultrasound medical selective begins by teaching physics, haptics and optimization of ultrasound image acquisition, and it serves as an accompaniment to the OMS-1 and OMS-2 integrative ultrasound curriculum and OMS-3 ultrasound experiences 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 and demonstrate Entrustable Professional Activities (EPA). The EPAs covered in this course include, but are not limited to gathering a history and performing a physical examination, prioritizing a differential diagnosis in a clinical encounter, recommending and interpreting common diagnostic and screening tests, forming clinical questions and retrieving evidence to advance patient care, recognizing a patient requiring urgent or emergent care and initiating evaluation and management, obtaining informed consent, performing general procedures of a physician and patient-physician communication. This is achieved through participation in a series of faculty

and staff led hands-on sessions, review of supplemental video educational materials, clinical ultrasound experiences, teaching and participation in an online assignment. Students are evaluated via the completion of a digital portfolio as their capstone project to illustrate competency and proficiency in ultrasound image acquisition.

II. Course Goals

A. Goals of the Course

1. 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 or how to choose the proper preset for the given study, how to adjust gain and depth to optimize the image and how to archive appropriate images.
2. Demonstrate how to appropriately drape patients and be respectful of patient comfort and privacy while performing exams.
3. Learn to identify the key anatomic landmarks for the following studies: FAST, Extended FAST (AAA), cardiac, abdominal, renal/bladder, head/neck, and lung.
4. Learn to identify the key ultra-sonographic findings used to diagnose the following pathologic conditions: cholecystitis, B-lines, hydronephrosis, ascites, and deep vein thrombosis.
5. Learn to identify free fluid (ascites or blood) on an abdominal ultrasound.
6. Learn the indications for core ultrasound applications.
7. Learn the types of ultrasound artifacts and their role in image acquisition

III. Course Design

The course spans four weeks and is intended for students planning to enter residency programs that rely on ultrasound imaging. This course follows a hybridized model of instruction. As such, there are no class meetings in advance of lab sessions. Instructional strategies to be used in this course include reading, watching instructional videos, lecture/class discussion, simulation experiences, peer teaching, and clinical experience. In addition to receiving credit for this course on the student's transcript, students who successfully meet all course requirements will receive a completion certificate and recognition of the training on their MSPE.

A. Educational Modules and Laboratories

There are four weeklong modules. Inside each module, there are four participation elements: (1) Readings; (2) Online Learning Assignments; (3) Experiential Learning Lab; (4) and Clinical Experiences.

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 VCOM email. It is the student's responsibility to check their email in a timely manner to stay up to date with important course information and to communicate with the Simulation Center coordinator and/or the course director regarding schedule conflicts.

B. Clinical Experience

This course includes a required clinical component designed to provide students with hands-on ultrasound experience in a real-world setting. Students will complete a minimum of 72 clinical hours at an approved clinical core site, working directly with a credentialed sonographer. These clinical hours are intended to reinforce course content, develop practical scanning skills, and enhance understanding of

ultrasound applications in clinical practice.

C. Ultrasound Instruction

This course incorporates a peer-assisted teaching component that reinforces ultrasound knowledge through instructional engagement. Students are expected to assist with the delivery of ultrasound-focused content to OMS I and OMS II students, as assigned by the course director. This design supports mastery of ultrasound concepts while fostering teaching skills, professional communication, and collaborative learning.

D. Capstone Project

The course culminates in a Capstone Project. Students will create a narrated presentation on an ultrasound case study or pathology. The presentation should be 8–10 slides in length and include a voice-over. This presentation will be completed on the last day of class and stored for future directions or residency programs for consideration of credits.

IV. Credits

4 credit hours applied to a 4-week medical selective.

Total hours required:

- **Total Module Hours:** 24 hours
- **Total Student Lab Hours:** 48 hours
- **Total Student Clinical Hours:** At least 72 hours at clinical core site with sonographer
- **Minimum of 16 hours** at VCOM campus teaching.
- **Total Hours:** 160 hours per selective rotation (four weeks)

V. Course Texts

A. Recommended Textbook

- Soriano, R.P. *Bates' Guide to Physical Examination and History Taking*, 14th ed. Baltimore, MD: Lippincott, Williams & Wilkins, 2026. ISBN: 978-1975218348 (retail price \$152.63) – Available in VCOM's eLibrary in LWW Premium Basic Sciences
 - Chapter 9 Basic: Principles and Techniques: Point-of-Care. pp 150-162.

VI. Course Grading and Requirements for Successful Completion

A. Requirements

- Attendance according to VCOM and preceptor requirements as defined in this syllabus and the [College Catalog and Student Handbook](#).
- Review of the syllabus topics, learning objectives, and reading assignments.
- Completion of all modules.
- Completion of a minimum of 16 hours of peer-to-peer instruction with OMS I and OMS II students as assigned.
- Completion of the Capstone Project.
- Rotation Evaluations:
The following evaluations must be completed and submitted for successful completion of the

rotation:

- Mid-Rotation Evaluation: The mid-rotation evaluation form is not required but highly recommended. See the VCOM website at: <https://www.vcom.edu/academics/clinical-education-third-year/forms> to access the mid-rotation evaluation form.
- Fourth-Year Preceptor Evaluation: Student competency-based rating forms are used by the preceptor to evaluate each student's clinical skills and the application of medical knowledge in the clinical setting. These forms are only completed by the clinical faculty member or preceptor. It is the student's responsibility to ensure that all clinical evaluation forms are completed and submitted online or turned into the Site Coordinator or the Clinical Affairs Office at the completion of each rotation. Students should inform the Clinical Affairs Office of any difficulty in obtaining an evaluation by the preceptor at the end of that rotation. Preceptors must complete the evaluation at: <https://intranet.vcom.edu/clinical>
- Student Evaluation of the Preceptor: Students must complete and submit an evaluation of their preceptor at the end of the rotation. The form must be completed at: <https://intranet.vcom.edu/clinical>

B. Grading

Students must pass all components outlined in this syllabus in order to pass the course.

Clinical Grading Scale and GPAs						
OMS 3 End-of-Rotation Exam Grades			OMS 3 AND OMS 4 Clinical Rotation Grades		Other Grades	
A	90-	4.0	H	Honors	IP	In Progress
B+	85-89	3.5	HP	High Pass	INC	Incomplete
B	80-84	3.0	P	Pass	CP	Conditional Pass
C+	75-79	2.5	F	Fail	R	Repeat
C	70-74	2.0			Au	Audit
F	<70	0.0				

A. Remediation

Students who fail a clinical rotation will be referred to the Promotion Board. If a student fails the professionalism and ethics portion of the evaluation he or she may be removed from the rotation and referred to the Professional and Ethical Standards Board. No grade will be changed unless the Office of Clinical Affairs certifies to the Registrar, in writing, that an error occurred or that the remediation results in a grade change.

- **Failure of a Rotation**

If a student fails the clinical rotation evaluation the student will receive an "F" grade for the rotation and will be brought before the Promotion Board. If the student is allowed to repeat the rotation, all components of the rotation must be repeated, and the repeated rotation must be with a different preceptor than the one from the original rotation that the student failed. Once repeated, the transcript will show the initial clinical rotation competency evaluation course, as well as the repeated clinical rotation competency evaluation course. The repeated course will have the letter "R" at the end of the course number to reflect that it is repeated. Both the grade earned for the initial courses and the repeated course will be recorded on the transcript, but only the repeated course will be GPA accountable, regardless of whether the initial or repeated course grade is higher.

- **Failure to Make Academic Progress**

In general, students should show a progression of improvement in clinical performance throughout rotations. Repeated poor or failing performance in a specific competency area on the evaluation form across more than one rotation may also be a reason for a required remediation at the discretion of the Associate Dean for Clinical Affairs in consultation with the clinical chair, the preceptor, and the Promotion Board. Those students who receive a mere "Pass" on multiple rotations will be counseled about overall performance and may be required to complete an additional rotation at the end of the year. Any additional curriculum or required remediation will be based on the performance measure. Those students who continually score in the "unsatisfactory" category or repeated "performs some of the time, but needs improvement" consistently and do not improve over time or who fail one or more rotations may be deemed as not making academic progress and, as a result, may be referred to the Promotion Board and be required to complete additional curriculum. Multiple rotation failures may result in dismissal.

Poor ratings on the clinical rotation evaluation in the professional and ethical areas of the assessment are addressed by the Associate Dean for Clinical Affairs. The Associate Dean may design a remediation appropriate to correct the behavior or if needed, may refer the student to the Professional and Ethical Standards Board. In the case of repeated concerns in a professional and/or ethical area, the Associate Dean for Clinical Affairs may refer the student to the Campus Dean for a referral to the Professional and Ethical Standards Board or Promotion Board. The Campus Dean will act upon this referral depending on the severity and the area of the performance measure. Poor ratings in this area will include comments as to the exact nature of the rating.

VII. Academic Expectations

Grading policies, academic progress, and graduation requirements may be found in the [College Catalog and Student Handbook](#).

A. Attendance

Attendance at all labs and all clinical rotation days is mandatory.

- 4-week rotations may not be less than 20, eight-hour days for a total of a minimum of 160 hours and often average 180 hours or greater.
 - Students may be required to work up to 24 days in a 4-week period or 25 days in a 1- month rotation, including call and weekends at the discretion of the clinical site.
 - If the clinical site requires longer daily hours or shift work, the student may complete the required hours in less than 20 days with the following specifications:
 - Students should not work greater than an average of 12 out of every 14 days.
 - Students should not work more than 12 hours daily, exclusive of on-call assignments.
 - If on-call hours are required, the student should not be on duty for greater than 30 continuous hours.
 - Students may be required to work weekends but in general should have 2 weekends per month free and an average of 2 of 7 days per week free.

It should be noted that preceptors will have final determination of the distribution of hours, which may vary from this policy but should not in general be less than 160 hours for a 4-week rotation. The institution's DSME and assigned clinical faculty determine clinical duty hours. Students are responsible to the assigned clinical faculty and are expected to comply with the

general rules and regulations established by the assigned clinical faculty, and/or the core hospital(s), or facility associated with the rotation.

The average student clinical day begins at 7 am and ends at 7 pm. Students are expected to work if their assigned clinical faculty is working. Some rotations assign students to shifts and in such cases the student may be required to work evening or night hours. If on-call hours are required, the student must take the call; however, the student should not be on duty for greater than 30 continuous hours.

Students may be required to work weekends, but in general should have two weekends per month free and two of seven days per week free. Student holidays are determined by the clinical site and follow those of other students and/or residents from the clinical site. Students must be prompt and on time for the clinical rotation.

Students are expected to arrive on time for all clinical rotations. Tardiness is defined as not arriving at the designated start time of a mandatory learning activity, exam, or clinical rotation or not being ready to participate at the scheduled start time. If a student is late, he/she must notify the Site Coordinator and the preceptor prior to the time they are scheduled to arrive. Students must have a reason for being late such as illness or vehicle issues, and it is not anticipated that this would occur on more than one occasion. Repeated tardiness is considered as unprofessional behavior and is a reason for dismissal from a rotation. Students with repeated tardiness will be referred to the Honor Code Council.

As a student in a professional degree program, students are expected to arrive early for all scheduled events. Timely arrival is 10 minutes prior to the scheduled academic activity. Punctuality is considered an important tenet of professionalism and is an expectation for all VCOM students. Depending on the requirements of the activity, a student who arrives late may be refused participation and/or receive an incomplete on an assignment. A student who arrives late may be denied participation depending on the requirements of the activity. For examinations, doors will close at the designated start time. Any student who arrives after the designated start time will be considered tardy and must report to the exam proctor to determine whether testing may begin. If the proctor determines that testing may not begin, the proctor will refer the student to the Associate Dean for Clinical Affairs who will establish a make-up exam time/date. Students who are not permitted to complete the exam during the scheduled time must submit a request for an unplanned excused absence; submission of such a request does not guarantee approval, and the absence may be documented as unexcused. Repeated tardiness will be referred to the Honor Code Council.

Repeated tardiness in regard to mandatory learning activities and exams will be defined as:

- Two or more tardy incidences in a rotation
- Three or more tardy incidences in consecutive rotations

The Office of Clinical Affairs requires that the medical student complete and submit an Excused Absence Clinical Rotations Approval form for any time "away" from clinical rotations. Forms are available at: <https://www.vcom.edu/academics/clinical-education-third-year/forms>. The student must have this form signed by their preceptor and others designated on the form to obtain an excused absence and must be provided to the DSME and the Office of Clinical Affairs through the site coordinator. The form must be completed prior to the beginning of the leave. If an emergency does not allow the student to submit this prior to the absence, the "Excused Absence Clinical Rotations Approval" form must be submitted as soon as the student is physically able to complete the form. In addition to completion of the form, students must contact the Department of Clinical Affairs, the Site Coordinator, and the preceptor's office by 8:30 AM on the day they will be absent due to an illness or emergency. No excused absence will be granted

after the fact, except in emergencies as verified by the Associate Dean for Clinical Affairs.

Regardless of an excused absence, students must still complete a minimum of 160 hours for a 4-week rotation in order to pass the rotation. Any time missed must be remediated during the course of the rotation for credit to be issued. Students may remediate up to four missed days or 48 hours missed during any rotation period by working on normal days off. OMS 3 students who have any unexcused absences will be referred to the PESB.

B. Prohibited Use of External Accelerators

At times, there may be lectures on VCOMTV where completion will be documented as part of passing the course (these will be clearly indicated in the course syllabus). For these lectures, the use of an external accelerator is prohibited, as VCOMTV is unable to track completion through these programs. If a student uses an external accelerator for these assignments, they will be required to re-watch the lecture(s) in VCOMTV within the required timeline. Failure to document a student's completion of these assignments within the required timeline due to use of an external accelerator may result in failure of the course.

VIII. Professionalism and Ethics

It is advised that students review and adhere to all behavioral policies including attendance, plagiarism, dress code, and other aspects of professionalism. Behavioral policies may be found in the [College Catalog and Student Handbook](#).

A. VCOM Honor Code

The VCOM Honor Code is based on the fundamental belief that every student is worthy of trust and that trusting a student is an integral component in making them worthy of trust. Consistent with honor code policy, by beginning this exam, I certify that I have neither given nor received any unauthorized assistance on this assignment, where "unauthorized assistance" is as defined by the Honor Code Committee. By beginning and submitting this exam, I am confirming adherence to the VCOM Honor Code. A full description of the VCOM Honor Code can be found in the [College Catalog and Student Handbook](#).

IX. Syllabus and Rotation Schedule

Please use this syllabus as a guide, paying particular attention to the learning objectives as an outline of what you are expected to know for each topic/module.

The faculty of the course will make every effort to adhere to the syllabus and rotation schedule; however, the Office of Clinical Affairs reserves the right to make changes to the syllabus; including changes to examinations, quizzes, modules, homework or other assignments; and/or the schedule with as much advance notice as possible. These changes will be communicated to the students in writing via Canvas or email.

X. Curriculum Objectives

A. Week 1: Ultrasound Principles and Application Module and Lab

Learning Objectives:

1. Describe the layout of the ultrasound system in terms of button location and functionality.
2. Understand the concepts of frequency, depth, and gain effect on the image.
3. Appreciate the artifacts of low attenuation, high attenuation, refraction, reverberation, and mirror image.
4. Understand which transducer is necessary to image each organ.
5. Describe the orientation of the transducer with respect to the image on the screen.

6. Understand basic Doppler flow.

B. Week 2: Head/Neck, Gallbladder, Bladder Module and Lab

Learning Objectives:

1. Demonstrate each lobe of the thyroid in transverse plane, sweep.
2. Demonstrate each lobe of the thyroid in the longitudinal plane, sweep.
3. Demonstrate the musculature of zone 2 of the neck.
4. Demonstrate the jugular vein with and without body inclination.
5. Demonstrate the carotid artery with and without body inclination.
6. Demonstrate Valsalva effect or light pressure on jugular vein.
7. Demonstrate the gallbladder in long and short axis.
8. Demonstrate the portal vein, hepatic veins, and IVC.
9. Measure the common bile duct.
10. Scan liver and identify the hepatic veins.
11. Measure the long and short axis of the spleen.
12. Demonstrate a long axis and short of urinary bladder.
13. Fan thru urinary bladder for pathology.
14. Measure the three planes of the bladder and estimate the bladder volume.

C. Week 3: Cardiac, DVT, and Doppler Modes Module and Lab

Learning Objectives:

1. Demonstrate the features of the cardiac ultrasound functions and probes.
2. Obtain parasternal long and apical 4-chamber views of the heart.
3. Trace the pericardium in both views of the heart.
4. Identify the mitral valve, tricuspid valve, and aortic valve.
5. Demonstrate PW Doppler with adjustments of gate, angle and Doppler gain.

D. Week 4: Lung, Abdominal Aorta, OB-GYN Module and Lab

Learning Objectives:

1. Demonstrate PW Doppler with adjustments of gate, angle and Doppler gain.
2. Demonstrate compression of venous flow to evaluate for DVT.
3. Identify the descending aorta in parasternal long axis.
4. Trace the liver as it lies under the skin.
5. Appreciate the gallbladder in its position within the main interlobar fissure of the liver.
6. Understand the anatomy of the portal triad and utilize color Doppler to enhance visualization.
7. Trace the spleen in its location under the skin.
8. View the proximal esophagus adjacent to the trachea and observe saliva and air during swallowing.
9. Perform "mowing the lawn" compression technique to observe intestinal loops.
10. Demonstrate the gallbladder in long and short axis
11. Demonstrate the portal vein, hepatic veins, and IVC
12. Measure the common bile duct
13. Measure the long and short axis of the spleen

E. Week 4: Capstone Project

For the Capstone Project, students will create a narrated presentation on an ultrasound case study or pathology. The presentation should be 8–10 slides in length and include a voice-over. This presentation will be completed on the last day of class and stored for future directions or residency programs for

consideration of credits.

Learning Objectives:

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