

Course Number and Title: VAS 111 Vascular Techniques I

Campus Location:

Wilmington

Effective Date:

2022-51

Prerequisite:

BIO 120, DMS 106, SSC 100 or concurrent

Co-Requisites:

none

Course Credits and Hours:

3.00 credits

3.00 lecture hours/week

1.00 lab hours/week

Course Description:

This course introduces the student to basic vascular physical principles and instrumentation, vascular physiology and hemodynamics, and vascular anatomy. Emphasis is on the fundamental skills and principles needed to perform peripheral arterial evaluation of the upper and lower extremities.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

Diagnostic Medical Sonography Program Student Manual

Schedule Type:

Classroom Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Explain the basic vascular physical principles and instrumentation. (CCC 1, 2, 5, 6; PGC CVS 2, 3, 5; PGC DMS 1, 2, 4)
2. Describe normal and abnormal vascular physiology and hemodynamics. (CCC 1, 2, 5, 6; PGC CVS 2, 3, 5; PGC DMS 1, 2, 4)
3. Differentiate normal and abnormal vascular anatomy. (CCC 1, 2, 5, 6; PGC CVS 2, 3, 4, 5; PGC DMS 1, 2, 3, 4)
4. Describe vascular pathology and pathophysiology of arterial disease of the upper and lower extremities. (CCC 1, 2, 5, 6; PGC CVS 2, 3, 5; PGC DMS 1, 2, 4)
5. Explain plethysmography and transcutaneous oximetry in extremity arterial studies emphasizing indications, utilities, and limitations of these procedures. (CCC 1, 2, 5, 6; PGC CVS 2, 3, 5; PGC DMS 1, 2, 4)
6. Perform with competency basic skills of noninvasive arterial extremities testing. (CCC 1, 2, 3, 4, 5, 6; PGC CVS 2, 3, 4, 5; PGC DMS 1, 2, 3, 4)
7. Discuss the importance and impact of other diagnostic and therapeutic arterial vascular procedures. (CCC 1, 2, 5, 6; PGC CVS 3, 5; PGC DMS 2, 4)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Explain the basic vascular physical principles and instrumentation.
 1. Define and explain general physical principles regarding Ohm's law and its relationship to the vascular field in terms of pressure gradient, flow, and vascular resistance.
 2. Define and explain ultrasound physics, including but not limited to definition of sound and propagation of sound in tissue.
 3. Define and explain imaging principles and artifacts, transducer, and Doppler signal processing and instruments as they pertain to ultrasound imaging and instrumentation.
 4. Perform basic skills in ultrasound instrument usage and proper knobology setting for optimal images.
2. Describe normal and abnormal vascular physiology and hemodynamics.
 1. Explain normal and abnormal vascular physiology and hemodynamics, including but not limited to:
 1. Arterial physiology and hemodynamics
 2. Venous physiology and hemodynamics
 3. Exercise physiology
 4. Effect of collateralization on hemodynamics
3. Differentiate normal and abnormal vascular anatomy.
 1. Describe normal vascular anatomy including:
 1. Central and peripheral arterial system
 2. Cerebral arterial system
 3. Central and peripheral venous system
 4. Microscopic anatomy
 2. Differentiate normal and abnormal vascular anatomy of extremity arteries.
4. Describe vascular pathology and pathophysiology of arterial disease of the upper and lower extremities.
 1. Describe arterial disease of the extremities and indications for arterial extremities testing, including but not limited to the patient history and the physical exam.
 2. Discuss treatments for extremity arterial diseases, including prophylaxis, medical treatment, surgical treatment, and other interventional procedures.
5. Explain plethysmography and transcutaneous oximetry in extremity arterial studies emphasizing indications, utilities, and limitations of these procedures.
 1. Explain the indications, types, limitations, and usages of various plethysmographies.
 2. Explain the indications, limitations, and usages of transcutaneous oximetry.
 3. Describe the applications of plethysmography and transcutaneous oximetry.
 4. Explain clinical sonographic procedures in the evaluation of extremity arteries, including stress testing and other non-invasive tests.
6. Perform with competency basic skills of noninvasive arterial extremities testing.
 1. Prepare and evaluate patient's medical history in a scenario.
 2. Select appropriate instrumentation and optimal machine settings.
 3. Use proper patient preparation and positioning.
 4. Perform with competency noninvasive arterial extremities testing, including but not limited to:
 1. Duplex imaging and Doppler evaluation of extremity arteries.
 1. Describe sonographic appearance of normal extremity arteries.
 2. Demonstrate, identify, and evaluate upper and lower extremity arteries, including but not limited to subclavian artery, axillary artery, brachial artery, ulnar artery, radial artery, common femoral artery, superficial femoral artery, deep femoral artery, popliteal artery, and calf arteries.
 3. Produce Doppler waveforms and measure peak systolic velocity (PSV) and end diastolic velocity (EDV).
 2. Pulse volume recording (PVR) and segmental limb pressure (SLP) evaluation of extremity arteries.
 1. Explain the protocol for lower extremity PVR/SLP examination and perform the following procedures:
 1. Identify normal waveform and waveform morphology
 2. Produce bilateral PVR waveforms
 3. Measure multilevel segmental pressures and calculate ankle-brachial indices (ABI)
 4. Explain segmental pressure and determine need for exercise testing if applicable
 5. Discuss the need to perform duplex imaging where appropriate
 6. Recognize levels suggesting stenosis and degree of flow reduction
7. Discuss the importance and impact of other diagnostic and therapeutic arterial vascular procedures.
 1. Discuss the importance and impact of invasive arterial extremities testing, including angiography, magnetic resonance angiography, computed tomography, and nuclear medicine vascular procedures.
 2. Explain the therapeutic intervention of extremity arteries, including but not limited to transluminal angioplasty, atherectomy, endarterectomy, patch graft endarterectomy, intravascular ultrasound, angioplasty, embolectomy, thrombectomy, vascular stent, and bypass graft.

Evaluation Criteria/Policies:

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
4 Quizzes (5 % each) (formative)	20%
Midterm Exam (formative)	20%
Final Exam (summative)	30%
PVR/SLP Competency (summative)	15%
Extremity Arterial Duplex Competency (summative)	15%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

CVS Program Graduate Competencies: (PGCs are the competencies every graduate will develop specific to his or her major)

1. Perform competently a full range of echocardiography procedures.
2. Perform competently a full range of vascular sonographic procedures.
3. Utilize professional verbal, nonverbal, and written communication skills in patient care, procedure intervention, and professional relationships.
4. Act in a professional and ethical manner and comply with professional scope of practice.
5. Integrate critical thinking and problem solving skills as expected of a healthcare professional.

DMS Program Graduate Competencies: (PGCs are the competencies every graduate will develop specific to his or her major)

1. Perform competently a full range of diagnostic medical sonographic procedures pertaining to their learning concentration.
2. Utilize professional verbal, nonverbal, and written communication skills in patient care, procedure intervention, and professional relationships.
3. Act in a professional and ethical manner and comply with professional scope of practice.
4. Integrate critical thinking and problem solving skills as expected of a healthcare professional.

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.