

## Course Number and Title: DMS 214 Essentials in Vascular U/S

**Campus Location:**

Georgetown

**Effective Date:**

2021-51

**Prerequisite:**

DMS 215, DMS 231

**Co-Requisites:**

none

**Course Credits and Hours:**

2.00 credits

2.00 lecture hours/week

1.00 lab hours/week

**Course Description:**

This course introduces the fundamentals of vascular sonography. Topics include hemodynamics, cerebrovascular, peripheral arterial and venous anatomy, physiology, pathophysiology, and ultrasound testing methods.

**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:**

None

**Schedule Type:**

Classroom Course

**Disclaimer:**

None

**Core Course Performance Objectives (CCPOs):**

1. Describe basic vascular physical principles and ultrasound instrumentation. (CCC 1, 4, 5, 6; PGC 4)
2. Identify and differentiate normal and abnormal vascular physiology and hemodynamics. (CCC 1, 5, 6; PGC 1, 4)
3. Differentiate normal and abnormal anatomy, vascular pathophysiology of arterial and venous disease of the upper and lower extremities, and clinical diagnostic procedures, including noninvasive arterial and venous testing. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4)
4. Differentiate normal and abnormal anatomy, vascular pathophysiology, and sonographic evaluation of acquired and congenital disease states of abdominal aorta, iliac arteries, inferior vena cava (IVC), liver vasculature, splanchnic arteries, and renal vasculature. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4)
5. Differentiate normal and abnormal anatomy and sonographic evaluation of acquired and congenital cerebrovascular testing. (CCC 1, 2; PGC 1, 2, 3, 4)
6. Perform basic skills of selected noninvasive vascular procedures. (CCC 1, 2, 3, 4, 5, 6; PGC 1, 2, 3, 4)
7. Outline the importance and impact of other diagnostic and therapeutic arterial, venous, abdominal, and cerebrovascular procedures. (CCC 1, 2, 3, 4, 5, 6; PGC 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. Describe the basic vascular physical principles and ultrasound 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 the following concepts regarding ultrasound imaging and instrumentation:
    1. imaging principles
    2. imaging artifact
    3. ultrasound transducer
    4. Doppler signal processing
    5. Doppler instrument
2. Identify and differentiate normal and abnormal vascular physiology and hemodynamics.
  1. Explain normal vascular physiology and hemodynamics, including but not limited to arterial and venous physiology and hemodynamics.
  2. Differentiate normal from abnormal hemodynamics.
3. Differentiate normal and abnormal anatomy, vascular pathophysiology of arterial and venous disease of the upper and lower extremities, and clinical diagnostic procedures including noninvasive arterial and venous testing.
  1. Identify normal anatomy of the extremity arteries and veins.
  2. Describe arterial and venous disease of the extremities and indications for arterial and venous extremities testing, including but not limited to patient history and physical exam.
  3. Explain clinical diagnostic procedure of noninvasive arterial extremities testing, including but not limited to Doppler evaluation, pressure measurements, Duplex imaging, and pulse volume recording (plethysmography).
  4. Explain clinical diagnostic procedure of noninvasive venous extremities testing, including but not limited to Doppler waveform characteristics, Duplex imaging, and plethysmography.
4. Differentiate normal and abnormal anatomy, vascular pathophysiology, and sonographic evaluation of acquired and congenital disease states of abdominal aorta, iliac arteries, inferior vena cava (IVC), liver vasculature, splanchnic arteries, and renal vasculature.
  1. Identify normal anatomy of abdominal aorta and its major branches (including splanchnic arteries, renal arteries, and iliac arteries), IVC, and liver vasculature (including hepatic artery and hepatic portal veins).
  2. Describe acquired and congenital diseases of an abdominal aorta, IVC, liver vasculature, splanchnic arteries, and renal vasculature, including but not limited to aortic aneurysm, aortic coarctation, IVC thrombosis, portal hypertension, Budd-Chiari Syndrome, mesenteric ischemia, and renal artery stenosis.
  3. Explain Doppler characteristics and sonographic evaluation of an abdominal aorta, IVC, liver vasculature, splanchnic arteries, and renal vasculature.
5. Differentiate normal and abnormal anatomy and sonographic evaluation of acquired and congenital cerebrovascular testing.
  1. Identify the anatomy of cerebral arterial system, including but not limited to extracranial, carotid, and vertebral arteries and intracranial arteries (circle of Willis).
  2. Describe cerebral artery disease and indications for extracranial carotid and vertebral tests, including but not limited to patient history and physical exam.
  3. Explain clinical sonographic procedures for noninvasive tests in the evaluation of extracranial carotid arteries and vertebral arteries, including but not limited to Doppler characteristics and duplex imaging.
6. Perform with competency basic skills of selected noninvasive vascular procedures.
  1. Perform basic skills of lower extremity pulse volume recordings/segmental limb pressures (PVR/SLP) arterial tests.
  2. Perform basic skills of lower extremity venous duplex test to rule out deep venous thrombosis.
  3. Perform basic skills in the duplex evaluation of extracranial carotid and vertebral arteries.
7. Outline the importance and impact of other diagnostic and therapeutic arterial, venous, abdominal, and cerebrovascular procedures.
  1. Discuss the importance and impact of invasive arterial and venous extremity testing.
  2. Describe the therapeutic intervention of extremity arteries and veins.
  3. Discuss the importance and impact of other diagnostic procedures of abdominal vessels.
  4. Explain the importance and impact of therapeutic intervention for abdominal vessels and their sonographic evaluation, including aortic bypass graft, IVC filter, transjugular intrahepatic portosystemic shunt (TIPS), and other shunts.
  5. Explain the importance and impact of invasive extracranial carotid arteries tests.

### 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.

**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):**

1. Graduates will demonstrate clinical competence by performing a full range of diagnostic medical sonography procedures on all patient populations pertaining to their learning concentration.
2. Graduates will professionally utilize verbal, nonverbal, and written communication skills in patient care, procedure intervention, and professional relationships.
3. Graduates will demonstrate professional growth and development by acting in a professional and ethical manner and comply with the professional scope of practice.
4. Graduates will 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.