ALVIN COMMUNITY COLLEGE
DIAGNOSTIC CARDIOVASCULAR
SONOGRAPHY

NON-INVASIVE
VASCULAR TECHNOLOGY PROGRAM
SYLLABUS
CEREBROVASCULAR EVALUATION
OF PATHOLOGY II
DSVT 2430-01

INSTRUCTORS: Deb Kleinhans
Lab Instructors: Deb Kleinhans

SUMMER 2013
**DSVT 2430 Summer Semester**

Dates: June 4-Aug 13  
Name: Deb Kleinhans  

**Date/Time:** Tuesday 8:00am-12:20 lab and 1pm-3:20 lecture  
Outside scan lab 3:30-7:00pm  

Office: 281-756-5663  
Office hours: Tuesday 3:20-5:00 by appointment  
dkleinhans@alvincollege.edu or deb-emmer@hotmail.com  

Hours: 35 lecture, 45 lab, 22 hrs outside scan time

**ADA STATEMENT**

This college will adhere to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required affording equal educational opportunity. It is the policy of ACC to provide reasonable accommodations for qualified individuals who are students with disabilities. It is the student’s responsibility to contact the Counseling Center in a timely manner to arrange for appropriate accommodations.

**COURSE DESCRIPTION**

This course is a continuation of Vascular Evaluation of Pathology I with emphasis on evaluation of cerebrovascular diseases and interventions.

**PREREQUISITES**

DSVT 2418 – Peripheral Vascular Evaluation of Pathology I

**COREQUISITES**

DSVT 2461 – Clinical Vascular Tech II

**RATIONALE**

To build upon the fundamentals learned in prior courses and apply it to understanding and implementation of techniques used to evaluate for cerebrovascular disease processes. More emphasis will be placed on pathology and its evaluation using: extra-cranial carotid and vertebral duplex for vessel evaluation and transcranial Doppler ultrasound as well as non-imaging techniques used to evaluate the cerebrovascular circulation.

**REQUIRED TEXTBOOKS**

- Ridgeway, Vascular Scanning. 3rd Ed. ISBN-10: 978094 1022705
- Daigle,Robert Techniques in Noninvasive Vascular Scanning. 3rd Ed. ISBN-10:978097065368

**INSTRUCTIONAL METHODS**

Vascular Technology II consists of eight (8) hours of instruction-per-week, over 10-weeks. This time is divided into lecture and lab components. The lectures will be supplemented with slides, overheads and video presentations when necessary. The lab portions will include demonstrations, exercises, and hands-on practice.

**EXAMS**

An exam will be given at the end of each unit. The exams will be averaged to calculate the final grade. **Any missed exams will be made up on the next class day!! NO EXCEPTIONS!!**

Testing will be cumulative and will pull from the information that is covered during class and past information that you should be familiar with. This means that unit 1 information will also be tested on the Unit 2 examination, and the Unit 3 examination will also include Unit 1 and Unit 2, plus Unit 3. And so on for the remainder of the vascular courses.
The comprehensive final exam is required to complete the course; however, the grade will be used to replace the lowest test score. It will not be used against you if the grade is lower than previous test scores. Students may miss one exam and be allowed to make it up. If a second test is missed, the final will be used to replace that grade. Any missed tests after that will be counted as a ZERO.

**Homework Assignments**
Assignments can be given out at any time. The due date will be announced in class otherwise, see the regularly scheduled assignments specific for each unit.

**Five points will be deducted for the first class day an assignment is late and five points for every class day after that.**
**LATE Lab assignments are minus 15 points off for each class day it is late**
Every effort has been made to make assignments clear. **If you do not understand an assignment, please ask the instructor PRIOR to the due date!**
**Lab assignments may be repeated 1 time if the grade is unsatisfactory but the repeat is due by the next week. This includes scan eval repeats.**

**GRADING SYSTEM**
- A = 91 -100
- B = 81 -90
- C = 77 -80
- F = Below 77

Students **must make a grade of 77 or better** to be awarded course credit. The minimal acceptable level for all courses in the DCVS program is a 77.

**Grade Calculation** – The final grade will be calculated as follows: Each of the unit exams will be averaged with the homework/quiz average. Major projects and scan tests will count as exam grades. Students may review graded work in their folder during business hours. Students may not take notes, copy, record, or photograph any tests. Your grades will be available from MyBlackboard for you to review as soon as they are certified by the registrar. Instructors will not always be able to provide you with your final grade prior to that, so please keep track of your average. It is difficult for instructors to respond to multitudes of emails requesting grades.

**RECORD YOUR GRADES HERE:**

<table>
<thead>
<tr>
<th>Major Grades:</th>
<th>Grade:</th>
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<tbody>
<tr>
<td>Assignments/lab average</td>
<td>_____</td>
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<tr>
<td>Exam 1</td>
<td>_____</td>
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<td>Exam 2</td>
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<td>Exam 3</td>
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<tr>
<td>Projects</td>
<td>_____</td>
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<tr>
<td>Final exam</td>
<td>_____</td>
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</table>

Keep track of your grades. If you notice a problem, contact your instructor. Do not let your grades get out of hand.

**I......Incomplete.** No Incompletes or “I” grades will be given except for extreme circumstances. If an “I” grade is assigned and the course work is not completed by the pre-arranged time limit, this grade will convert to an “F”.

**W....Withdrawal.** It is recommended that the student talk to the instructor before withdrawing. Current course withdrawal information can be found in the online or printed version of the ACC Schedule for this semester. Students who file withdrawal requests by the published deadline and have not exceeded the withdrawal maximum will receive a grade of **W.**
**CLASSROOM PROTOCOL**

It is the right of each student to participate in his or her learning, and it is the responsibility of each student to not interfere with the learning of other students. Policies governing the classroom are provided in the ACC Student Handbook and students who repeatedly violate one or more of these policies will be subject to disciplinary action.

**ACADEMIC SUCCESS AND SUPPORT SERVICES:**

**Americans with Disabilities Act**

ACC complies with ADA and 504 Federal guidelines by affording equal access to individuals who are seeking an education. Students who have a disability and would like classroom accommodations must register with the Office of Disability Services, A 136, (281)756-3533. Instructors are not able to provide accommodations until the proper process has been followed.

**Behavioral Intervention Team (BIT) – Letting someone know**

The Behavioral Intervention Team (BIT) at Alvin Community College is committed to improving community safety. College faculty, staff, students and community members may communicate safety concerns to the BIT team by email, BIT@alvincollege.edu or through an electronic reporting option located on the BIT page of the college website.

The ACC Learning Lab, located upstairs in building A, provides students with a variety of services including tutoring (math, writing, and other disciplines); computers and printers; a testing facility; and tables/carrels for studying. Learning Lab hours are M-TH 8:00am – 9:00pm and F 8:00am – 4:00pm. Testing hours are M-TH 10:00am – 7:30pm (Tests must be completed by 8:30pm) and F 10:00am – 12:00pm (Tests must be completed by 1:00pm). *Closed on Fridays in the Summer. Call 281-756-3566 for more information.

**MyBlackboard** - Any technical problems or issues with MyBlackboard should be directed to the Distance Education Department at de@alvincollege.edu. Include your first and last name, student ID number and a description of the problem. Students will not be penalized if there is an interruption in MyBlackboard service and the instructor is notified of such an issue by the Distance Education Department.

**WEBACCESS, Passwords or ACC Computer Lab Information** - contact the IT Dept. Help Desk at 281-756-3544.

**CODE OF ACADEMIC INTEGRITY AND HONESTY**

Alvin Community College students are members of an institution dedicated to the pursuit of knowledge through a formalized program of instruction and learning. At the heart of this endeavor, lie the core values of academic integrity which include honesty, truth, and freedom from lies and fraud. Because personal integrity is important in all aspects of life, students at Alvin Community College are expected to conduct themselves with honesty and integrity both in and out of the classroom. Incidents of academic dishonesty will not be tolerated and students guilty of such conduct are subject to severe disciplinary measures.

**Withdrawal**

*The last date to submit a withdrawal for this term is XXXXX*

Include: Name, Student ID or SSN, course (ENGL), number (1301), and section (01).

**Email:** Withdraw@alvincollege.edu

Email withdrawals are accepted only when sent from the official email address on file with the college. Email addresses may be verified and updated using WebACCess-Profile Information. A confirmation receipt for the withdrawal will be sent within 24 business hours. Please contact sstockstill@alvincollege.edu if a receipt is not received.
Mail: Alvin Community College  
Enrollment Services Center  
3110 Mustang Road  
Alvin, TX 77511

In Person: Enrollment Services Center – A100

*Withdrawals could result in repayment of financial aid or veterans benefits and may impact eligibility for insurance claims and future financial aid.

ATTENDANCE
Each student is expected to attend class regularly and **ON TIME**. This is a very short semester which covers a great deal of information so attendance is extremely important.

It is the student’s responsibility to make up any assignments that are missed. Please call/email/text the instructor if you are absent to make arrangements for missed assignments, handouts, and/or tests.

**PARTICIPATION IN LAB ACTIVITIES IS ALSO REQUIRED. STUDENTS WHO COME LATE, LEAVE EARLY, OR WHO DO NOT STAY FOR LAB WILL BE COUNTED ABSENT FOR THAT CLASS!!!**

**TARDIES GREATER THAN 20 MINUTES late or leaving early WILL BE CONSIDERED AS AN ABSENCE.**

**IF A STUDENT MISSES MORE THAN FOUR (4) CLASSES, THEY MAY BE DROPPED!!!**

**STUDENTS MUST ATTEND CLASS AND LAB REGULARLY TO BE AWARDED COURSE CREDIT!!!**

**NOTICE:** If a student leaves class or lab early, they must submit a note with their name, date, time, and reason for leaving early to the instructor prior to leaving.

**Mock Capstone** - The mock capstone is implemented as a way to evaluate the student’s knowledge of the protocol and to assist the instructor and student to focus on strengths and weaknesses during lab scanning time. Each student should have completed one prior to midterm or prior to the final capstone. It will be counted as a lab grade that will be averaged in with the other homework and lab grades. The purpose of these competency profiles is to ensure students will be prepared for the capstone scan test.

**Mid –Term and Final Scan Evals** - For **Mid-Term Scan**, a complete ACC vascular carotid protocol will be turned in to the instructor by Ultralinq. **Final Scan** - A complete ACC vascular protocol for carotid will be performed and submitted on Ultralinq for the instructor to critique. The scan should not take the student any longer than 40 minutes to complete. The protocol must be complete and thorough including assessment, H&P, printouts, and the tech worksheets. The first will be due at mid-term and the second will be due toward the end of the semester. These will be averaged together for one major grade. See due dates in assignment schedule.

**Weekly Lab Assignments** - Lab assignments are due on the day of lab. If they are turned in on time by the end of lab, students will receive a max grade of 100 (minus points for any problems with the scan, or worksheet). If it is late and turned in the next lab it will be an 85, next lab 70 and so forth. **Lab assignments can be done early during outside scan time.** Turning in lab assignments late or being absent from lab will affect your grade in this manner.

**Weekly Lab assignment Information**

**LAB HOMEWORK RULES**

**Lab Homework Rules Apply Every time, every semester.**

Make sure your name is in the system properly. Work should be your own. Make sure you delete your studies after you have completed them.
Instructions for ALL Lab Assignments, including Scan EVALS, lab work, full scans and Capstones – Fill out the ACC student worksheet and scan it in to Ultralinq with assessment, BP, H&P and COMPLETE SVU/ICVL interpretation. You may choose to do the Ultralinq interp if it works well for you. Be sure to clip the info page and all report pages each time.

Scan EVALS
A complete protocol will be performed and clipped then sent to Ultralinq for review. The protocol must be complete and thorough according to the latest ACC protocol. If there is pathology it should be appropriately interrogated. You will receive extra time if you find pathology as long as you properly evaluate it. You should time yourself and complete it within 40 minutes. Print the start and end time and scan that into Ultralinq as an attachment so your time can be verified if you are using the Biosound. Be sure to clip the first image when you start and the last image when you finish even if it is after additional measurements are completed. 0.5 points for the first scan eval and 1 point for the second scan eval will be deducted for each minute over 40. Start/End time includes measurements. Both Scan Evaluations will be averaged together to count as a major grade. Make sure you label these assignments as Scan EVAL #1 and Scan EVAL #2.

Grading Rubric for all scans:
- It is one (1) point off for each optimization mistake.
- 1 point off for each measurement mistake made.
- Missing View is 5 points off.
- Start and Stop time missing is 5 points off.
- Missing measurement is 1 point off.
- Anything left blank on a worksheet is 3 points off. (The only exception to this is for TDS patients. Have the instructor back scan and label the images so we know they were unable to be obtained. This way, we will not penalize you for missing measurements and worksheet blanks)
- No interpretation is 10 points off.
- Incomplete interpretation is 5 points off.
- History, physical, or assessment missing 10 points off.
- NO back scan performed on lab patients – 25 points off. All lab patients should be back scanned by the instructor prior to letting them leave even if you do not plan to use that scan as an assignment.
- Scan turned in late is 15 points off if it is late. Late scans will NOT be accepted after one week.
- Study labeled incorrectly is 5 points off. IE: Week 1 Full Scan, Scan Eval 1, Capstone 1, etc.. It is too difficult for faculty to try and match up studies that are not labeled properly in the grade book!!
- 1 point off for each minute over time limit of 50 minutes for all weekly full scans.
- .5 points off for each minute over time limit of 40 minutes for scan eval #1.
- 1 point off for each minute over time limit of 40 minutes for scan eval #2 and Capstone.
- Time requirements do not include Pedoff. Be sure to clip your stop time if you do measurements at the end. Then do Pedoff Last. Submit Pedoff on the SAME patient as your full scan. Do NOT SUBMIT it as a separate scan.
- Bonus points: 1 point per minute you are under time will be added to the final grade as long as the overall quality of the scan is good.
- Don’t forget H&P, Assessment, and BP for all scans

What is “On time” when submitting scans to Ultralinq?
Notice: Scanning assignments are due, submitted to Ultralinq with worksheet complete, H&P, and interpretation, attachments, assigned to the reading instructor by midnight on the day of lab. Scanning assignments can be done early, during the break before that semester and during outside scan time but not earlier than one month before the due date. REDOS may be permitted by the instructor and will be announced in lab.

FILE NAMING for ALL SCANNING Assignments:
Make sure you label scan properly: Example: Full Scan # 1, Carotid #1, Scan Eval # 1. Use the proper file naming protocol for the Ultrasound System so we can find it in Ultralinq.
First Name: Your first and last name EX: Murphy, Jessica PTX
Last Name: The name of your assignment EX: FS# 1, CAR #1, Scan Eval #1, CAP#1, ect.
PT ID #: assignment abbreviation, date, patient initials with no spaces EX: CAR14081912JAD
Add a number or letter for dates with two assignments like 2 or B.
Sonographer ID#: Your three digit Ultralinq code
BE SURE you put in your Ultralinq code under the sonographer on the US System or you will not have access to fill out the worksheet and assign it to the instructor which could cause your study to be late.
Assignments that are not identified properly and assigned to their lab instructor will not be graded until they are properly labeled. This may cause your study to be late. Don’t chance it.

METHOD OF EVALUATION
Student evaluation is based on completion of unit examinations, homework assignments, attendance, and class/lab participation.

MODELS
The Diagnostic Cardiovascular Sonography Program is in need of models/volunteers each night of class for the hands-on practice. If you, a family member, or friend would like to model, please have them call Susan at 281-756-5625 to schedule an appointment so a volunteer schedule can be made in advance whenever possible, and to ensure an adequate number of models for each lab.

BONUS POINTS – Maximum of Two (2) added to final average.
- Attend professional society meetings, computer CME activities.
- Students can arrange for other bonus points – upon approval of Instructor.
- Other bonus point activities may be announced by the program director.

OUTSIDE SCAN TIME - Students are required to log in twenty two (22) hours of actual hands-on-probe-time by the end of the semester. This additional scanning practice is outside of class and lab. Outside scanning may be completed at your work facility if agreeable with the department supervisor. It can also be completed here on campus during supervised scanning labs. A schedule will be posted. The scan time must be verified and documented. **See attached documentation form for details.

ACC LAB USE - ACC has Parks, Hokanson, SonoSite Titan, GE Vivid 3, Biosound MyLab 30, and Acuson Sequioa C512, HP 2500 and the GE Logiq 7 ultrasound machines available to use after hours. You must first sign a lab use permission slip, and make an appointment to avoid over-crowding by signing up in the outside scan log calendar on yahoo as to the day and time you are coming. If you sign up, show up. If you are habitually absent for the times you sign up for, you will no longer have sign up privileges and will just have to take what ever is left over.

Three strikes rule...if you sign up but do not show up 3 times, you may be dismissed from the program. Please be courteous to your fellow students and the instructors who are working outside scan labs. For maximum benefit, students should come to scan when the instructors are scheduled to be here.

NO FOOD OR DRINKS IN THE SCANNING AREA OF THE LAB!! No Children allowed unless hooked up to the machine. You must make sure that the lab is cleaned up, the jelly jars are filled, supplies re-stocked and the DOORS are LOCKED when you leave.

Outside Scan Lab Sign Up Procedure:
1. **IF you sign up SHOW up.**
2. **You may only sign up 2 weeks in advance.**
3. **If you cannot make your scheduled time call the instructor assigned to that lab and let them know. Also, call, text or email your classmates to let them know that time slot is available.**
4. **Failure to show up for scheduled scanning appointments will result in a 3 strikes and you are OUT policy.**

5. **You must sign in properly by listing the date, start time, stop time, and machine you want to use. If you do not fill in the reservation completely, your spot will be taken.**

6. **You must sign in and out with security each time. Page or call the officer before you are ready to go so they can secure the area and sign your scan log. (Sometimes they are in Pearland so call in advance.)**

7. **You may sign up for a maximum of 2 hours per outside scan lab using gmail to reserve a machine. Students who are working on a scan eval may sign up for 3 hours at a time but only twice per semester.**

**PROJECT ASSIGNMENT –**
Due August 6, 2013 so it can be graded before finals.

Each student will be required to complete a cerebral review book by the end of the semester. It will count as an exam grade and will be included in calculating the final average. The student will be graded on completeness of the book and originality. USE ARDMS OUTLINE. This review book is designed to assist you when you study for future exams and your RVT exam. A review book will be due every semester on the topics covered.

**LABORATORY ATTIRE**
Students during the Laboratory periods are required to wear their student ID with either an ACC DCVS t-shirt, ACC polo shirt, or scrub attire, or a lab coat with appropriate casual business attire. A student must always present themselves professionally and maintain a professional appearance and ATTITUDE when in the presence of community volunteers. All information collected from the volunteer is to be done confidentially. **NO GUM CHEWING WHILE WORKING WITH VOLUNTEERS.**

**CAPSTONE SCANNING**
At the end of the summer semester, each student will be required to pass a Capstone scanning experience in order to be awarded course credit. This consists of a one-on-one session during lab with the student and instructor. The student will be asked to scan a volunteer according to the standard ACC Cerebrovascular protocol including proper optimization, routine measurements, and calculations. The instructor will critique the scan. Students will have 45 minutes (5 minutes will be added if asked to image the suprasternal notch) each to complete a normal routine scan. The student may be asked to perform additional calculations or measurements if pathology is present on a randomly selected volunteer. (If the student is requested to perform additional advanced calculations, 15 minutes will be added to the scan time limit.)

**Students will be graded on quality, optimization, accuracy, speed of acquisition in obtaining the images, performing correct measurements and calculations, completion of study in required time, and a correct/complete tech worksheet. Please print out report pages and attach to worksheet to be verified and graded.** See attached Capstone grading sheet.

**EXIT EXAM:**
It is required for accreditation purposes that all students demonstrate competence in both knowledge and psychomotor domains. Therefore, each student in this course must pass a computer based exit exam for successful course completion. The final grade for this course will be held until the exit exam is passed and the student will not be allowed to advance to the next semester. Students will be given ample opportunity to pass the exit exams and multiple attempts. For students graduating from the Vascular Technology program the following exams must be passed in order to graduate: Vascular Technology Specialty Exam, and Ultrasound Physics/Vascular Principles Exam. The exams are administered via CBE from Pegasus Lectures and will need to be purchased right away. The disk must be purchased directly from Pegasus. We will be collecting money orders made out to Pegasus. Then we will send in the order so you can start your attempts. Once you have the CD, it must be activated. Do not wait until the last minute to activate the CD. A password is required to activate. You must then furnish the printed grade report to the instructor for verification that you have passed by the end of the semester. You must make at least an **85%** to pass. **The first student to bring me a passing score report will receive 5 bonus points to be added to the test of their choice.** DO NOT PUT THIS OFF!!! START EARLY!!!
SPI disk – must be passed by the end of summer or pass the SPI exam from ARDMS
VT disk – must be passed by the end of the fall.

**COURSE COMPLETION REQUIREMENTS**
In order to successfully complete this course and be awarded course credit, the student must:
1. Make a seventy-seven (77) or better on the final average.
2. Complete twenty two (22) hours of outside scan time and turn in documentation form.
3. Complete and turn in the project assignment on the specified due date.
4. Have no more than four (4) absences.
5. Participate in lab by scanning and recording studies to be critiqued by instructor.
6. Successfully challenge the capstone scanning requirement by passing with at least a score of 85.
7. **Attend at least one professional society meeting. – This is a requirement for this course. This meeting can not be used for bonus or clinical make up so make sure you attend more than one meeting if you think you will need bonus or clinical time.**
8. Pass the exit examination and provide print out.
9. Complete both scan evals.

**COURSE OUTLINE**
- Unit 1 - Review Cerebrovascular Anatomy and hemodynamics
- Unit 2 – Carotid/Vertebral Duplex
- Unit 3 – Transcranial Doppler
- Unit 4 – Non-imaging (Peri-Orbital Doppler, OPG)

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### Cerebrovascular Evaluation of Pathology II _DSVT 2430_

**TENTATIVE SCHEDULE SUMMER 2013**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>Outside Scan Homework</th>
<th>UNIT</th>
<th>TOPIC/READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>06-04</td>
<td>Bilateral Carotid</td>
<td>Begin Unit 1- Review Cerebrovascular anatomy Start Circle of Willis anomalies</td>
<td>Zwiebel Ch. 6, 7 Ridgeway pp. 87-118 Rumwell pp.192-200</td>
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<tr>
<td>2</td>
<td>06-11</td>
<td>Bilateral Carotid</td>
<td>Circle of Willis – anomalies cont. Start: Cerebrovascular hemodynamics</td>
<td>Rumwell 201-222 Outside scan practice – Ridgeway pp.118-122 (1-23) and read 261 Homework Due</td>
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<td>3</td>
<td>06-18</td>
<td>Non-imaging Arterial</td>
<td>Cerebrovascular hemodynamics Start- Carotid Duplex</td>
<td>Daigle 53-70, Ridgeway pp. 17-23, 219-229</td>
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<td>4</td>
<td>06-25</td>
<td>Bilateral Arterial LE</td>
<td>EXAM Carotid Duplex (cont)</td>
<td>Zwiebel Ch. 8, 9, Review Ridgeway Ch. 7 Homework Due</td>
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<td>5</td>
<td>07-02</td>
<td>Bilateral Venous LE</td>
<td>Vertebrobasilar Evaluation</td>
<td>Zweibel Ch. 10, 11 Rumwell pp. 144-157 and 162-167 Mid Term Scan Tape Due Homework Due</td>
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<td>Date</td>
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<td>Assignment</td>
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<td>6</td>
<td>07-9</td>
<td>Bilateral Carotid Transcranial Doppler</td>
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<td>Zwiebel Ch. 11 Rumwell 247-250</td>
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<td>7</td>
<td>07-16</td>
<td>Non Imaging Arterial EXAM TCD cont.</td>
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<td>Zwiebel Ch. 12 Rumwell pp. 241-246 Ridgeway pp.39-48 Homework Due</td>
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<tr>
<td>8</td>
<td>07-23</td>
<td>Bilateral Venous LE Periorbital Doppler- OPG</td>
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<td>Rumwell pp.213-216 Handouts, Rumwell pp 217-222</td>
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<td>9</td>
<td>07-30</td>
<td>Bilateral Arterial LE Cerebrovascular Interventions</td>
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<td>Rumwell pp 251-260 Capstones, Exit Exam Due Review Book Due Homework Due</td>
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<td>10</td>
<td>08-06</td>
<td>Final Scan Tape DUE EXAM</td>
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<td>Outside Scan Time Final Scan Tape Due</td>
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<td>11</td>
<td>08-13</td>
<td>Final Exam</td>
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<td>Start Reading for Fall semester.</td>
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**LAB ASSIGNMENT:** All lab assignments will be uploaded to Ultralinq for faculty assessment. All worksheets must be completed fully.

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<tr>
<th>Date</th>
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<th>Assignment</th>
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<tbody>
<tr>
<td>1</td>
<td>06-04</td>
<td>Perform a complete Carotid Duplex without color using anterior, lateral, and posterior approach and standard ACC protocol. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation. Due at the end of lab. Read Ridgeway pp 60-67 and 87-106 before lab class. Daigle pp.26-33</td>
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<td>2</td>
<td>06-11</td>
<td>Perform a complete Carotid Duplex with color using anterior, lateral, and posterior approach and using standard ACC protocol. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation. Due at the end of lab Read Ridgeway pp.106-118 before lab class Daigle pp 26-45</td>
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<tr>
<td>Day</td>
<td>Date</td>
<td>Task Description</td>
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<tr>
<td>3</td>
<td>06-18</td>
<td>Perform a complete Carotid Duplex with color using anterior, lateral, and posterior approach and using standard ACC protocol. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation. Due at the end of lab Read Ridgeway pp. 190-207; Daigle pp. 45-52 before lab class.</td>
</tr>
<tr>
<td>4</td>
<td>06-25</td>
<td>Perform a complete Carotid Duplex with color using the 2 best views and standard ACC protocol. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation. Due at the end of lab Read Ridgeway 219-229.</td>
</tr>
<tr>
<td>5</td>
<td>07-02</td>
<td>Perform a complete Carotid Duplex with color using the best views and standard ACC protocol within 30 minutes. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation. Include Suprasternal notch image. Due at the end of lab.</td>
</tr>
<tr>
<td>6</td>
<td>07-09</td>
<td><strong>MOCK CAPSTONES</strong> Perform a complete Carotid Duplex using standard ACC protocol in 30 minutes. Print out computerized report pages/worksheets, fill out tech report including history, assessment, blood pressures (bilateral), and interpretation.</td>
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<tr>
<td>7</td>
<td>07-16</td>
<td>Perform TCD exam utilizing multiple windows. Try to identify as many vessels as possible. Note the depth, flow direction and TAMV on Doppler. Read Daigle pp 259-271; Review Rumwell pp. 241-246 before lab class.</td>
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<tr>
<td>8</td>
<td>07-23</td>
<td>Perform TCD exam utilizing multiple windows. Try to identify as many vessels as possible. Note the depth, flow direction and TAMV on Doppler. Read Daigle pp. 271-280; Rumwell pp. 247-2 before lab class.</td>
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<tr>
<td>9</td>
<td>07-30</td>
<td><strong>Capstones</strong> Read Ridgeway pp. 272-274; Rumwell pp 213-223 before lab class.</td>
</tr>
<tr>
<td>10</td>
<td>08-06</td>
<td><strong>Finish Capstones if necessary.</strong> Perform Periorbital Doppler techniques with and without compression. Print and label waveforms. Include H&amp;P, blood pressures, and interpretation. Due at the end of lab.</td>
</tr>
<tr>
<td>11</td>
<td>08-15</td>
<td><strong>FINAL EXAM</strong></td>
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</table>

**COURSE COMPETENCIES**

Upon completion of this course, the student will be able to:

1. Define the etiology, signs, symptoms, and treatment for cerebrovascular disease. (C6, C7, F1, F2, F5, F10)
2. Implement methods of recognition, evaluation, and quantification of those diseases utilizing technical skills. (C7, C9, C16, C18, C19, C20, F7, F8, F9, F13, F17)
3. Understand the pathophysiology and hemodynamic consequences of each disease. (C5, C6, C7, F10, F12)
4. Recognize and differentiate various cerebrovascular interventions. (C1, C8, C13, C15, C17, F3, F4)
5. Successfully challenge a Capstone scanning experience (85 or better) during lab at the end of the semester.

*See SCANS legend for more details about competencies.*

Students are responsible for and will be tested on all material texts, handouts, class notes, and laboratory notes.
UNIT 1 OBJECTIVES - Review Cerebrovascular Anatomy

By the end of this unit the student will be able to:

1. Identify the vessels of the upper aortic arch, neck, face, brain, and head.
2. Discuss and map ALL the possible collateral blood supply routes.
3. Recognize normal and abnormal characteristics of the Cerebrovascular, vertebrobasilar, and circle vessels commonly imaged during carotid duplex, TCD, or periorbital examinations.
4. Differentiate between the common, vertebral, internal, and external vessels via multiple methods.
5. Locate the vessels of the Circle of Willis on a diagram and map the possible variations.
6. Distinguish the various flow patterns and velocity profiles from the vessels imaged in both normal and diseased states.
7. Identify other potential vascular variations for the Cerebrovascular circulation.
8. Review the hemodynamics of Cerebrovascular blood flow.

Unit 1 Homework Assignments:

1. a. Draw a diagram/model of the normal circle of Willis and diagrams representing each one of the possible variations.
   b. Draw a diagram of the different collateral routes to the brain when the CCA or ICA are occluded.
   If you are not artistic you may use tracing paper or an overhead/projector blow up of a diagram to trace.
   Due Week 2.

2. Teach the Class. Each student will be assigned a topic and will give a 15-20 minute power point presentation to the class on the date assigned. Weekly

Unit 1 Lab Assignments:

Refer to Schedule on page 3

UNIT 2 OBJECTIVES – Carotid Duplex Evaluation of Pathology

By the end of this unit the student will be able to:

1. Understand the etiology and pathophysiology of cerebrovascular diseases.
2. List the risk factors, signs and symptoms associated with cerebrovascular diseases.
3. Perform duplex ultrasound imaging examination of the cerebrovascular system.
4. Complete a full carotid duplex exam including measurements and calculations.
5. List the different types and possible causes of stroke: ischemic, embolic, obstructive, hemorrhagic, hypertensive.
6. Define and state the difference between CVA, TIA, and RIND.
7. Illustrate the different carotid artery plaque composition and how it appears sonographically.
8. Recognize disease states of the cerebrovascular system including but not limited to: stenosis, thrombus, aneurysm, dissection, carotid body tumor, and FMD via 2D, color flow, Doppler, and velocity characteristics.
9. Define the common medical therapies and interventions used to treat cerebrovascular disease and how or if it is evaluated with follow up duplex exams.
10. Identify the surrounding anatomy and discuss other potential (incidental) findings: thyroid, venous system of the neck, trachea.
11. Grade stenosis accurately using velocity, ratio, plaque appearance, image and Doppler criteria.
12. Identify the methods used to confirm and correlate non-invasive results such as angiogram, MRI, MRA, Cat Scan, etc.
13. Understand the common mistakes, pitfalls, and complications while performing carotid duplex exams.
15. State the purpose and procedure for carotid intimal measurements and how the Framingham score is utilized for determining vascular age and patient management of hyperlipidemia, heart disease and stroke risk treatment.
16. Identify interpretation criteria such as NACET, etc.
17. List and define research being performed in the area of Cerebrovascular disease.
18. Identify the pros and cons of carotid artery screening agencies. (May have a debate.)

**Unit 2 Homework Assignments:**

1. Interps – Find at least 2 abnormal studies while at clinical. Gather brief data regarding: signs, symptoms, physical assessment, history, vitals, and the results of the diagnostic exam, any follow up for treatment or further studies. Share with fellow students **Week 4**

**Unit 2 Lab Assignments:**
Check Schedule on page 3.

**UNIT 3 OBJECTIVES – Transcranial Doppler**

By the end of this unit, the student will be able to...

1. List the capabilities and uses for transcranial Doppler. (Intraoperative, ICU, Brain Death, Occlusions, AVM’s, sickle cell, SAH, vasomotor reactivity, variations in circle anatomy, trauma, )
2. List the challenges, pitfalls, and limitations of transcranial Doppler.
3. Discuss the physical principles associated with TCD.
4. Prepare the patient for a TCD exam using proper positioning, protocol, techniques, and equipment.
5. Accurately identify each vessel examined using the following criteria: window, depth, direction of flow, velocity, angle, and compression maneuvers.
6. Find each window for obtaining a TCD signal.
7. Perform measurements associated with TCD examination.
8. Discuss the interpretation and significance of findings for TCD and how well this test correlates with other methods.
9. Identify how TCD is being used in conjunction with contrast agents or saline bubble studies to identify patients with PFO related stroke events.

**Unit 3 Homework Assignment:**
1. Do a search on the web of subjects related to TCD (ex: new uses, new research protocols, new equipment, new protocols or guidelines). Prepare a 2-page type written report of your findings including resources/bibliography/webliography. **Due Week 7**

**Unit 3 Lab Assignments:**
Check Tentative Schedule p. 3
UNIT 4 OBJECTIVES – Non-Imaging Techniques for Cerebrovascular Disease.

By the end of this unit, the student will be able to...

1. List the capabilities and uses of non-imaging techniques such as peri-orbital Doppler and OPG-Gee.
2. List and define the limitations of these tests.
3. Discuss the physical principles associated with these tests including equipment, physics, and calibration.
4. Prepare and perform the exam using proper positioning, protocol, techniques, and equipment.
5. Accurately identify the vessels and/or waveforms generated.
6. Understand and perform the maneuvers used during peri-orbital Doppler. (ipsilateral and contralateral compression)
7. Discuss the interpretation and significance of the results.
8. Define the types of pathology, which can be specifically identified using these methods.
9. Discuss how these tests correlate with other methods.

Unit 4 Homework Assignment:
Use images from lab/internet of TCD and label all vessels.

Unit 4 Lab Assignments
Check Schedule on page 3.

TURN IN EVERYTHING: OUTSIDE SCAN TIME, PROOF OF MEETING/SEMINAR, BONUS POINT ACTIVITIES, CPI EXIT EXAM SCORE RESULTS, ETC...

DIAGNOSTIC CARDIOVASCULAR SONOGRAPHY PROGRAM
VASCULAR TECHNOLOGY
LAB ACTIVITIES

SCAN LAB
Each week of lab, students are expected to –

- Practice each view until you have it mastered.
- Once a view is mastered and can be maintained, begin to practice measurements.
- Then begin to work on color, and Doppler measurements.
- By the end, put it all together in a standard scan protocol. Work on speed of acquisition and timing of the recording. Don’t clip trash. Watch your written annotation. Write out a preliminary report on each model during lab.
- Each lab, and during outside scanning, students should be working on their project assignment and scan evals.
- Each student must scan every lab day. Take turns, be fair, and help each other.
  - Use a different machine each lab so you are comfortable with each one.
- We are using ULTRALINQ for our studies. Remember to limit the number of clips to include only what’s needed to speed up the transfer process and minimize file size. Don’t clip trash. Use the digital clips wisely when recording your lab work. If pathology is identified clip what is needed to make an accurate assessment and notify the instructor.
• Call volunteers to remind them of appointments. Set up patients, log them in, confirm signed consent forms, protect privacy, and wash hands, and clean transducer and equipment each time.
• Take a history, perform a physical exam, and a bilateral blood pressure on every patient even if it is a fellow student. Treat this like an outpatient clinic and do the whole workup.
• Perform a complete scan each lab and fill out a technical worksheet (no patient names) to be turned in on Ultraling for a grade.
• Complete any lab assignments due that week and turn in to lab instructor. These lab assignments may be done during lab or at the clinical site that week. Make sure the work is your own and your name is in the system. Do not turn in any patient identified work!
  • Sign in and out of lab with Campus Police if here after hours.
  • Delete your old scans once they are sent to Ultraling to keep the hard drives clean.

DSVT 2430 PROJECT: REVIEW BOOK

You are required for this course and subsequent courses to create and assemble a “review book”. This book can be used to help you study for the vascular technology portion of the registry exam. This review book will also assist you in studying for your clinical finals and final exams. This book will count as a major test grade. For Summer session, a cerebrovascular section will be assembled and count as a major grade.

You will be making a book for each study area: Arterial and Venous –2 sections (Fall), Cerebrovascular (Summer), Abdominal (Spring). I have included the ARDMS vascular technology content outline for you to use as a reference for your books. You can use this as a guide, however, go to www.ardms.org to print out the most recent content outline.

Each book MUST contain a Table of Contents. Feel free to add pictures, tables, etc. Remember this is your book and will be used to assist you as a study guide in preparation for your RVT exam, so be creative and include items that will be helpful to you. Try to be brief and precise. Rumwell is a good reference. NOTE: Many of the information that you use for your clinical protocol book can also be included in your review book. (example diagnostic criteria, signs and symptoms, etc).

CEREBROVASCULAR
I. Cerebrovascular (25%-35%)
   A. Anatomy, Physiology and Hemodynamics
      1. Aortic arch
      2. Upper extremity
      3. Cervical carotid
      4. Vertebral
      5. Intracranial (circle of Willis)
   B. Mechanisms of disease
      1. Risk factors
      2. Atherosclerosis
      3. Dissection
      4. Thromboembolic
      5. Subclavian steal
      6. Carotid body tumor
      7. Fibromuscular dysplasia
      8. Neointimal hyperplasia
   C. Signs and symptoms
1. Transient symptoms
2. Stroke
3. Physical exam (neurologic, bruits, bilateral brachial pressures)

D. Testing
1. Noninvasive (patient positioning, technique, interpretation, capabilities and limitations)
   a. Duplex imaging (B-mode, Doppler, color Doppler)
      (1). Stenosis
      (2). Occlusion
      (3). Intraoperative
   b. Transcranial Doppler
   c. Periorbital Doppler
2. Miscellaneous diagnostic tests (methods, interpretation, limitations)
   a. Arteriography
   b. MR angiography
   c. CT
3. Treatment/followup
   a. Medical (pharmacological, risk reduction, lifestyle modification)
   b. Endovascular(angioplasty, stent)
   c. Surgical

ALVIN COMMUNITY COLLEGE
DIAGNOSTIC CARDIOVASCULAR SONOGRAPHY PROGRAM
LABORATORY GUIDELINES

I. Safety
A. Know where fire exits, fire hoses, extinguishers, and alarm pull stations are.
B. Remember RACE - Remove patients that are in danger, Activate alarm, Confine fire by closing doors, Evacuate.
C. Check all electrical cords for loose connections or frayed wires before plugging in.
D. Do not leave any equipment blocking doorways or hallways, especially near exits.
E. Watch for hazards that may cause trips or falls.

II. Infection Control
A. Wash your hands before and after you scan.
B. Check patient for broken skin and use a barrier device if necessary.
C. Clean probes after each patient.
D. If you are ill, please do not come to class until you are feeling better.

III. Transducer Safety
A. DO NOT DROP THE TRANSDUCER!!!!
B. Treat it like a child - very gently!!!!
C. When you are finished scanning, wipe the probe off and hang it up.
D. DO NOT HAND OFF THE PROBE TO THE NEXT STUDENT!!!!
E. Keep the cords straight and untangled. Do not kink or bend the probe cable!!

IV. Machine Use
A. Only adjust the controls needed for everyday scanning. These include the depth, gain, compress, and TGCs. You can use the Doppler and color functions as well as record and annotate.
B. You may NOT try to adjust the programming or presets!!!! Any attempt to access higher machine functions will result in your removal from lab!!!!
C. We encourage you to optimize your image, but do not use a button that you are not sure about.
D. When in doubt, ask the instructor for help.
V. **Model Etiquette**
   A. Introduce yourself and explain what you are going to do.
   B. Take the patient’s history so that privacy is maintained. (HIPAA)
   C. Position the model and make them comfortable and warm.
   D. KEEP THEM COVERED!! Work under the gown, sheet, or towel.
   E. Try not to use excess probe pressure. Ask them to tell you if it is hurting.
   F. Do not make jokes. Be aware of sexual innuendos (harassment)
   G. **BE PROFESSIONAL!!!**
   H. Male students should have a female partner when working on female models and vise versa for male models.
   I. Preserve modesty. Keep curtains or doors closed. Keep lights low.
   J. Give models a break if necessary.

VI. **Lab Clean-Up**
   A. Everybody should pitch in to help clean up. Students should not leave until the lab is in order. Clean all tables, machines, chairs, and take out trash
   B. Start clean-up at about 15-minutes before the end of class.
   C. Step out of the room and have models get dressed.
   D. Clean transducers, machine, and room. Restock supplies
   E. Refill gel jars from ACCs gallon jug.
   F. Reposition furniture/equipment the way you found it.
   G. Lock up labs.

VII. **Supplies**
   A. Use ACCs gel and electrodes.
   B. Try not to use too many linens. Check the laundry, wash, dry, fold and put away as necessary.
Attempt #_________
Alvin Community College – DCVS Program
Capstone/Scan EVAL Scanning Critique (Circle one)

Student: ___________________________ Date: __________________ Start time: __________
Course: ____________________________ Rubric and #: __________ End time: __________
Instructor: __________________________ Grade: _________________
E=Excellent S=Satisfactory, NI=Needs Improvement, U=Unsatisfactory, N/A

2D scan: ___________________________________________ Comments
Obtained image quickly
Optimization of image (straight, centered, open)
Image is homogenous (depth, freq, proc, TGC, gain)
Able to maintain image (stable, not drifting)
Recognize and correct artifacts
Correct Scan order (not jumping around, follows prot)
Knows 2D anatomy, correct 2D msrmnts
Does NOT tape trash
Pathology evaluated properly (quantified)

Color Doppler scan:
Correct view used, cursor in proper location
Obtained Color image quickly
Optimization Color image (open, homogeneous, proc, gain)
Able to maintain Color image (stable, not drifting)
Corrects artifacts
Knows Color anatomy
Does not tape Color image trash

Doppler scan:
Correct view used, cursor in proper location
Obtained Doppler from quality image with color
Obtained Doppler quickly
Optimization of spectrum (scale, baseline, proc, gain)
Able to maintain doppler signal (stable, not drifting)
Recognize and Corrects artifacts
Doppler measurements/calculations correct
Doppler pathology is evaluated properly

Advanced measurement/calculation: __________________________
View, cursor, calipers in correct location
Proper use of software calc/report package
Able to recognize and interpret values
Recording, printing, worksheet correct

Vascular Non-Imaging modality: __________________________
Correct placement of devices
Obtains waveforms quickly and optimizes
Able to maintain clear waveforms
Makes correct measurement or analysis/report
Class Expectations

1. NO TEXTING DURING CLASS. YOUR PHONE WILL BE TAKEN AND KEPT UNTIL THE END OF CLASS.

2. PHONES SHOULD BE TURNED TO VIBRATE DURING CLASS. Emergency calls only can be taken during lecture if the student steps outside and is not disruptive.

3. NO GUM CHEWING.

4. You must bring the blue permission slip to the instructor to be signed before starting your exam. Log your volunteer’s name, your name and the study that you will be performing every time.
Bilateral Carotid Duplex Doppler Study

Student’s Name:_____________________ Due Date______________

Assignment ___________________________

Directions: Provided below is the competency and the images that must be demonstrated, along with your clinical sites protocol for this study. All measurements and annotations (scan plane, Rt/Lt, vessel identification) must also be included.

† Do not use color-flow imaging
† Use color flow imaging

Competency: Bilateral Carotid Duplex Doppler Study

Obtain pulsed-waved Doppler waveforms from the following sites with peak systolic velocity and end diastolic velocity of each duplex sample. Calculate the ICA/CCA Ratio for each side.

1. Common Carotid Artery- Proximal, Mid, Distal
2. External Carotid Artery- Proximal
3. Internal Carotid Artery-Proximal, Mid, Distal
4. Vertebral Artery- Proximal, Mid
5. Subclavian Artery

- You must perform a transverse and longitudinal sweep from proximal common carotid through distal internal carotid. Demonstrating the bifurcation of the ICA/ECA. If taking pictures you can print this out.

Include a copy of the completed examination from with patient history and clinical indications. If your clinical site requires more view/measurements, please include them.

* Make sure to delete patient names from all images.
Bilateral Lower Extremity Arterial Duplex Doppler Study

Student’s Name: ______________________ Due Date ______________

Assignment ______________________________

Directions: Provided below is the competency and the images that must be demonstrated, along with your clinical sites protocol for this study. All measurements and annotations (scan plane, Rt/Lt, vessel identification) must also be included.

↑ Do not use color-flow imaging
↑ Use color flow imaging

Competency: Bilateral Lower Extremity Arterial Duplex Doppler Study

Obtain pulsed-waved Doppler waveforms from the following sites with peak systolic velocity and end diastolic velocity of each duplex sample.

1. External Iliac Artery (Distal)
2. Common Femoral Artery (Proximal, Distal)
3. Superficial Femoral Artery (Femoral)-Proximal, Mid, Distal
4. Deep (Profunda) Femoral Artery- Proximal,
5. Popliteal Artery –Proximal, Distal
6. Posterior Tibial Artery –Proximal, Mid, Distal
7. Peroneal Artery –Proximal, Mid
8. Anterior Tibial Artery- Proximal, Mid
9. Dorsalis Pedis Artery- Distal

Include a copy of the completed examination from with patient history and clinical indications. If your clinical site requires more view/measurements, please include them.

* Make sure to delete patient names from all images.
Bilateral Lower Extremity Venous Duplex Doppler Study

Student’s Name:_____________________ Due Date________________

Assignment ______________________

Directions: Provided below is the competency and the images that must be demonstrated, along with your clinical sites protocol for this study. All measurements and annotations (scan plane, Rt/Lt, vessel identification) must also be included.

↓ Do not use color-flow imaging
↑ Use color flow imaging

Competency: Bilateral Lower Extremity Venous Duplex Doppler Study

Obtain compression images and pulsed-waved Doppler waveforms from the following sites with proximal and distal augmentation for each duplex sample site.

1. External Iliac Vein-Distal
2. Common Femoral Vein- Proximal
3. Greater Saphenous Vein- Proximal (at junction), Mid, Distal
4. Superficial Femoral Vein (Femoral)-Proximal, Mid, Distal
5. Deep (Profunda) Femoral Vein- Proximal
6. Popliteal Vein-Mid
7. Posterior Tibial Vein –Proximal, Mid, Distal
8. Peroneal Vein –Proximal, Mid
9. Anterior Tibial Vein- Proximal, Mid
10. Lesser Saphenous Vein (Short-Small Saphenous) Mid (at calf)

Include a copy of the completed examination from with patient history and clinical indications. If your clinical site requires more view/measurements, please include them.

* Make sure to delete patient names from all images.
Students in the Echo and Vascular modules of the DCVS Program are required to gain **22 hours** of outside (outside means not during class, lab, or clinical) scanning time for each semester. **Outside scanning must be verified and witnessed by campus security or a hospital employee.** Please have witness verify the date and hours you were scanning, sign the form, and include a phone number where they can be reached. Students can scan at any time the lab is open when coordinated with the instructor. Hours can be accumulated in any increment: 30-minutes, 1,2,3,4 hours at-a-time per-day or week, as long as completed by the end of the semester. Remember to log your cases on the case log.

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<th>PHONE #</th>
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**TOTAL HOURS** ____________
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<td><strong>Last Name</strong></td>
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<td><strong>Work Address</strong></td>
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<td><strong>Street:</strong></td>
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<td><strong>Your Background, i.e., credentials:</strong></td>
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**Additional Information?**

**Yes _____ , I would like my name, address and phone # o n the roster.**
**No _____ , Please do not include my information on the roster.**

**PLEASE RETURN THIS FORM TO YOUR INSTRUCTOR on the [first day of class](#) so a roster may be made!**