CONTACT INFORMATION:

Course Coordinator
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Cardiology Technician
Thomas Sugg
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Cardiology Department
Office: VTH 1618
Rounds room/echocardiogram room: VTH 1616
Catheter laboratory: VTH 1817b
COURSE MATERIALS:

Moodle
Please view course materials by logging into Moodle using your myLSU account information:
http://itsweb.lsu.edu/Moodle

Recommended Text(s)
(Online Version available at http://www.vin.com)


Cardiology Library
There is an extensive collection of veterinary cardiology textbooks in the cardiology library. All books are available for use by students on the cardiology rotation.
• Textbooks may not be removed from the cardiology department
• Most textbooks are also available in the LSU Veterinary School Library

Recommended Websites
http://research.vet.upenn.edu/Home/tabid/4911/Default.aspx
From UPenn. Auscultation, ECG, echo tutorials and more.

http://www.vetmed.ucdavis.edu/vmth/small_animal/cardio_kittleson/cases/
From UC Davis. Case studies in small animal cardiology

http://www.sciencedirect.com/science/journal/17602734
The Journal of Veterinary Cardiology. Original and review articles on Veterinary Cardiology

VIN - Library tab - Books and Manuals.
- Bolton's Handbook of Canine and Feline Electrocardiography
- Cardiac auscultation and phonocardiography
- Echocardiography in the dog, cat and horse
- Small Animal Cardiovascular Medicine. Dr. M. Kittleson

COURSE DESCRIPTION:

This course is designed to teach the principles of the diagnosis and treatment of acquired and congenital cardiovascular diseases in domestic animals.

Goal/Rationale of the Course
The overall objective of the course is to provide the student with clinical experience recognizing, assessing, diagnosing and treating cardiac diseases in dogs and cats. This objective is extended to other domestic species when these less-common cases become available. It requires an understanding of the anatomy and the physiologic principles that govern the cardiovascular system.

The course emphasizes clinical application of knowledge for cases, which may be expected in common veterinary practice.
COURSE OBJECTIVES:

At the end of this course, students should be able to:

<table>
<thead>
<tr>
<th>List course/clerkship learning objectives:</th>
<th>List keywords for each objective (to be used for searching.)</th>
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</thead>
<tbody>
<tr>
<td>1. Use the language of cardiology so communication between veterinarians can be accurate and concise</td>
<td>Cardiology, communication, terminology</td>
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<td>2. Obtain a cardiovascular history</td>
<td>History, client communication, medications, syncope, coughing, heart disease, murmur</td>
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<td>3. Perform an accurate cardiovascular physical examination</td>
<td>Physical examination, murmur, gallop rhythm, femoral pulses, pulse deficits, respiratory rate, dyspnea, tachypnea, cyanosis, capillary refill time, arrhythmia,</td>
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<td>4. Generate an appropriate problem list, differential list and diagnostic plan for the physical examination findings</td>
<td>Problem list, differential list, diagnostic plan</td>
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<td>5. Interpret the results of diagnostic tests specific to the evaluation of an animal with cardiac disease</td>
<td>Stethoscope, electrocardiography, echocardiography, radiography, Holter, Doppler blood pressure, serum biochemical panel, atropine challenge</td>
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<tr>
<td>6. Demonstrate adequate clinical knowledge of common cardiac diseases in dogs and cats</td>
<td>Chronic degenerative valve disease, endocardiosis, dilated cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, hypertrophic cardiomyopathy, cardiac neoplasia, heartworm disease, patent ductus arteriosus, pulmonic stenosis, ventricular septal defect, subaortic stenosis</td>
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<tr>
<td>7. Recognize the most common arrhythmias in dogs and cats</td>
<td>Sinus rhythm, atrioventricular block, ventricular tachycardia, supraventricular tachycardia, atrial fibrillation</td>
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<td>8. Select appropriate treatment for the most common arrhythmias</td>
<td>Antiarrhythmic, pacemaker</td>
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<td>9. Demonstrate understanding of commonly used cardiac medications</td>
<td>Diuretic, inotrope, angiotensin converting enzyme inhibitor, antiarrhythmics, phosphodiesterase inhibitor, vasodilator, antithrombotic, mechanism of action, adverse effects</td>
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<tr>
<td>10. Select appropriate treatment for left and right-sided heart failure in dogs and cats</td>
<td>Diuretic, inotrope, angiotensin converting enzyme inhibitor, thoracocentesis, abdominocentesis</td>
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<tr>
<td>11. Gain hands-on experience in management of common cardiovascular emergencies</td>
<td>Congestive heart failure, atrial fibrillation, supraventricular tachycardia, ventricular tachycardia, syncope, eaval syndrome, cardiac tamponade</td>
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<tr>
<td>12. Gain hands-on experience assisting with cardiovascular interventional procedures</td>
<td>Balloon valvuloplasty, vascular occlusion, angiogram, direct blood pressure measurement, heartworm extraction, pacemaker placement</td>
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ROUNDS LEARNING OBJECTIVES:

**Cardiovascular history and physical examination**
- Recognize the normal respiratory rate in dogs and cats, and identify the rate that corresponds to tachypnea
- Identify the 2 main reasons for cough in dogs with cardiac disease
- Recognize the signs of left and right heart failure in dogs and cats
- Recognize the significance of jugular venous distension and pulsation
- Identify the mechanisms underlying the intensity of femoral pulses
- Describe the areas of auscultation of the cardiac valves
- List the mechanisms responsible for S1, S2, S3, S4
- Identify the timing of S1, S2, S3, S4 during the cardiac cycle
- Define the grading scale for heart murmurs
- Describe abnormal cardiac auscultation findings using standard medical terminology
- Describe the characteristics of innocent murmurs in young animals
- Distinguish between historical and physical examination signs of syncope vs seizure
- Identify the mechanisms underlying abnormal mucous membranes
- List normal systolic and diastolic pressures in the cardiac chambers and great arteries

**Electrocardiography**
- Acquire a diagnostic ECG (position patient, hook-up limb leads, adjust ECG machine settings to optimize interpretation)
- Recognize the heart rates that correspond to bradycardia and tachycardia on ECG in dogs and cats
- Identify the characteristics of sinus rhythm on a surface ECG
- List 2 reasons for a wide QRS complex
- Recognize the three types of atrioventricular block
- Discuss diagnostic work-up and treatment for the three types of atrioventricular block
- Recognize sinus rhythms on ECG
- Recognize the three types of atrioventricular block on ECG
- Recognize left bundle branch block on ECG
- Recognize right bundle branch block on ECG
- Recognize atrial fibrillation on ECG
- Distinguish supraventricular tachycardia from ventricular tachycardia
- Recognize supraventricular tachycardia on ECG
- Recognize ventricular tachycardia on ECG
- Recognize accelerated idioventricular rhythm on ECG
- Interpret ECGs performed during the block and provided during rounds

**Management of arrhythmias**
- Determine when medical intervention is appropriate for management of arrhythmias
- Describe main clinical signs caused by arrhythmias
- Identify the role of the AV node during atrial fibrillation and list the drugs used for rate-control of atrial fibrillation
- Recognize the signs of digoxin toxicity
- Describe techniques for evaluating therapeutic efficacy of arrhythmia treatment
- Discuss the Vaughn-Williams classification of commonly used antiarrhythmics in veterinary medicine
- Discuss appropriate antiarrhythmics for treating common arrhythmias (acute and chronic management)
  - Ventricular arrhythmias
  - Supraventricular arrhythmias
  - Atrial fibrillation

**Pathophysiology of heart failure**
- Describe the physiology of systolic heart failure
- Describe the physiology of diastolic heart failure
- List and describe cardiac diseases/abnormalities that lead to systolic heart failure
- Describe cardiac diseases/abnormalities that lead to diastolic heart failure
- List the physiology of the RAAS (renin-angiotensin-aldosterone system)
- Describe the effects of sympathetic activation during heart failure
- Describe the effects of RAAS activation during heart failure
- Describe the cardiac response to increased volume
- Describe the cardiac response to increased pressure
- List the 4 stages included in the classification of heart failure
Congenital heart disease
- List normal systolic and diastolic pressures in the cardiac chambers and great arteries
- Name the congenital cardiac diseases that lead to volume overload of the heart
- Name the congenital cardiac diseases that lead to pressure overload of the heart
- Describe the physical examination findings in a dog with a PDA
- Describe the physical examination findings in a dog with subaortic stenosis
- Describe the physical examination findings in a dog with pulmonic stenosis
- Describe the physical examination findings in animals with ventricular septal defect
- Describe the expected course of disease and prognosis of animals with untreated PDA, severe subaortic stenosis or severe pulmonic stenosis
- Identify the congenital cardiac diseases that can be treated via cardiac catheterization (percutaneous occlusion, balloon valvuloplasty)

Heart failure management in dogs and cats
- Discuss the drug classes, mechanism of action, and potential adverse side effects of commonly used cardiac medications for heart failure:
  - Diuretics
  - Angiotensin enzyme inhibitors
  - Positive inotropes
  - Anti-hypertensive medications
- Identify when to start ACE-inhibitors for the management of heart failure
- Indicate the mode of administration of furosemide for the acute treatment of stage C heart failure
- Indicate how to monitor response to diuretics during acute treatment of stage C heart failure
- List the drugs recommended for chronic treatment of stage C heart failure
- Discuss the vasodilator preferentially used for the treatment of pulmonary hypertension

TENTATIVE CLINICAL SCHEDULE:

Monday, Tuesday, Thursday, Friday:

- **7:30-8:00 am:** On-call student arrives. Check the board outside of the ICU for emergency service transfers to cardiology. Review transfer records and perform physical examination.
  - If patient is in oxygen cage, request assistance of cardiology technician BEFORE working with the patient.
  - If the cardiology technician does not think the patient is stable enough for a physical examination, wait for Dr. Magee.

- **8:30-9:00 am:** Complete ICU orders, generate working problem list, differentials, diagnostic and treatment plan. Review plan with Dr. Magee. Call owner after confirming plan with Dr. Magee.

- **9:00-10:00 am:** Rounds or self-study in cardiology echo room

- **10:00 am-5:00 pm:** Appointments/emergency referrals/in-house consultations. Most cardiology appointments are admitted, diagnosed, treated and discharged within 1.5-2 hours. Efficiency with paperwork is essential and is a valuable clinical skill to develop. Some patients require an extended appointment time or hospitalization. Time will be allotted for lunch; however, students may not be able to take lunch at the same time (depends on the appointment schedule and patient needs).
  - Each patient will have an assigned primary student. Students will sign up for scheduled appointments when the schedule is finalized (usually by 4 pm the day before the appointment).
  - If a patient is hospitalized, the primary student on the case is responsible for completing ICU orders, maintaining client contact, and completing paperwork. All students on the rotation are expected to assist in patient care.
  - Cardiology is usually finished by 5:00 pm, but we stay until our work is done.
  - Students should review charts for
Wednesday:

Non-clinic day for cardiology. The cardiology service performs phone and email consultations only.

Cardiology students work on the daytime emergency service.

- **All Cardiology students arrive at 7:30 am**
  - Report to the ER Intern on duty – Intern may change from week-to-week
    - Check the whiteboard outside of the ICU
    - Be sure to check-in with the ER Intern
  - Additional information regarding duties while on ER will be provided by that service
    - Scrubs may be worn while working ER

**On-call schedule:** The cardiology service is available for emergency consultations and catheterizations after-hours. Although rare, the cardiology on-call student will be asked to come in if this service is necessary. On-call students should stay within an hour of the hospital. The on-call schedule will be made on the first day of the rotation.

**Cardiac catheterizations:** Non-emergency interventional procedures are scheduled as necessary. The primary student on the case will scrub in on the procedure and will assist the cardiologist in performing the procedure.

**Self-study:** If/when there is downtime, students should work on interpreting ECGs in the orientation packet, completing the cardiovascular drug worksheet, preparing for rounds, preparing for cases and student presentations.

**Student Presentations:** Students will present a 20 minute presentation to the group on a cardiology topic of their choosing. The presentation is 5% of the final grade.

  - Submit 2 potential topics to Dr. Magee by 5 pm, on the 1st Wednesday of the rotation
    - 1 Topic will be approved for your presentation
  - Presentation should be prepared in Microsoft PowerPoint
  - Presentation style should be professional and should incorporate current literature on the topic
  - Presentations will replace rounds on the last Friday of the rotation

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**DRESS CODE:**

Professional attire (same as internal medicine rotation)

- Tennis shoes, denim, shorts, torn and/or stained clothing are not professional; therefore, they are not allowed on the cardiology rotation
- Scrubs are allowed on procedure days and Wednesdays
  - Keep a set of scrubs in your locker for emergency procedures
- White coat is required when interacting with clients
  - White coat should be clean and wrinkle-free
  - Nametag should be visible to clients
- Stethoscope is required
- Men are encouraged to wear a tie
TEACHING PHILOSOPHY:

This course is designed to give you the knowledge-base necessary to recognize and treat the most common cardiac diseases in dogs and cats. There is a lot more to the field of cardiology than what will be covered in this course. It will however give you all you need to successfully manage your first cardiac patient.

COURSE POLICIES:

Attendance mandatory. It is the student’s responsibility to get anticipated absences excused in advance by both the course coordinator and the Office of Student Affairs (ex. NAVLE, interview, etc.). The course coordinator and the Office of Student Affairs should be made aware of unexpected absences as soon as possible (ex. sick, family emergency, etc.).

COPY STATEMENT:

Some of the materials in this course are possibly copyrighted. They are intended for use only by students registered and enrolled in this course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act (Section 110(1) of the Copyright Act) http://www.copyright.gov/docs/regstat031301.html.

GRADING/EVALUATION:

This course includes direct patient assessment and care, cardiovascular worksheets, rounds participation, participation on the daytime emergency service, on-call duty and a formal presentation. The grade for the course is calculated using points earned in categories on the rotation grade sheet, cardiology worksheets and the student presentation as follows:

1. The grade sheet will be used to indicate the student’s performance in the following categories: 85%
   • History/Physical examination
   • Rounds
   • Patient assessment and clinical thinking skills
   • Records and communication
   • Technical skills
   • Cardiovascular knowledgebase
   • Professionalism and attitude
   • Patient care

2. Cardiology Worksheets: 10%
   • Accuracy of initial physical examination
   • Generation of an appropriate problem list, differentials and initial diagnostic plan
     o Heavily influenced by improvement over the course of the half-block.
   • Worksheets allow evaluation of your patient assessment and clinical thinking skills

3. Student Presentations: 5%

A blank grade sheet and cardiology worksheet is available for review on Moodle.

The grade is partially subjective (as is the case with most clinical rotations).

Objective grading components include the presentation and cardiology worksheets
Performance feedback will be provided via a combination of the cardiology worksheets, verbal communication, e*Value and grade sheets.

**Grades are based on the standard LSU percentages, +/- system:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>100-97</td>
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<tr>
<td>B+</td>
<td>96-93</td>
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<tr>
<td>C+</td>
<td>92-90</td>
</tr>
<tr>
<td>A</td>
<td>90-88</td>
</tr>
<tr>
<td>B</td>
<td>88-86</td>
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<tr>
<td>C</td>
<td>85-79</td>
</tr>
<tr>
<td>D+</td>
<td>79-77</td>
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<tr>
<td>D</td>
<td>76-70</td>
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<tr>
<td>D-</td>
<td>69-63</td>
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<tr>
<td>F</td>
<td>&lt; 60</td>
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</tbody>
</table>

Any issues related to grading or cardiology worksheet feedback must be presented to the course coordinator within 1 week of receiving feedback or posting of grades.

**ASSIGNMENTS/RESPONSIBILITIES:**

This course includes direct patient assessment and care, cardiovascular worksheets, rounds participation, participation on the daytime emergency service, on-call duty and a formal presentation.

**PHOTOGRAPHS AND VIDEO OF PATIENTS:**

Photographs and video may be taken of patients for educational purposes (e.g., for use in abstracts, articles, and presentations). Any photographs and video for use by the media may not be taken without the express consent of the patient’s owner. Verbal consent by the animal’s owner is an acceptable means of gaining permission to photograph/video the patient. If a member of the media is present in the hospital and wishes to take background footage of clinicians and students working with animal, no close-up shots are permitted such that the animal would be identified by its owner. All media requests must be directed to the LSU – School of Veterinary Medicine Public Relations Coordinator.

**POSTINGS ON INTERNET/ SOCIAL NETWORKING SITES:**

Posting, releasing, or otherwise disclosing photos, identifiable case descriptions, images, or records related to the educational, clinical, or research activities of the LSU - School of Veterinary Medicine, outside of the LSU - School of Veterinary Medicine via social networking sites (e.g. MySpace, Facebook, Twitter, etc.) or via other than standard professional means of query and/or dissemination of educational, clinical, or research information is prohibited. This policy applies to all students, faculty, staff, clients, and visitors of the LSU - School of Veterinary Medicine and to all activities of the LSU - School of Veterinary Medicine, on or off campus, related to veterinary clinical services and teaching and research labs. Pictures of animals (whether owned by University or client), and client information are strictly forbidden from being published or posted on social networking sites such as “Facebook”, “Twitter”, and “Myspace”; and non-educational blogs, message boards, or internet websites; without the prior approval from an appropriate Supervisor, Department Head, Director of the LSU – School of Veterinary Medicine Veterinary Teaching Hospital, or the Director of the Louisiana Animal Disease Diagnostic Laboratory. This policy is to promote the safety and privacy of students, faculty, staff, clients, and visitors. Failure to comply with this policy could result in damage to persons or property, may be a violation of legal, professional, and/or ethical obligations, and may result in disciplinary action by the LSU - School of Veterinary Medicine, up to and including dismissal.

**LSU SCHOOL OF VETERINARY MEDICINE ACADEMIC MISCONDUCT POLICY:**

_The Office Student Affairs suggests:_

The LSU Code of Student Conduct applies to the School of Veterinary Medicine within the Code is the Academic Misconduct Policy, which outlines the School of Veterinary Medicine expectations for the integrity of students’ academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the LSU Code of Student Conduct Policy and for living up to their pledge not to violate the Code.

I. It shall be a violation of this Code for a student to cheat.
II. It shall be a violation of this Code for a student to knowingly circumvent any course requirement.
III. It shall be a violation of this Code for a student to steal.
IV. It shall be a violation of this Code for a student to purposely impair another student's educational opportunity.
V. It shall be a violation to act in a manner which is detrimental to the moral and ethical standards of the veterinary medical profession.
VI. It shall be a violation for a student to knowingly deceive another student, faculty member, or professional associate with the intent to gain advantage, academic or otherwise, for said student or for any other student.

VII. It shall be a violation for any student to fail to report any infraction of the LSU Code of Student Conduct Policy to an appropriate representative.

LSU Code of Student Conduct can be found at: http://saa.lsu.edu/code-student-conduct

SEXUAL HARASSMENT POLICY

The University reaffirms and emphasizes its commitment to provide an educational and work environment free from sexual harassment and to provide a means to remedy sexual harassment that employees may have experienced. (PS-73 Sexual Harassment and PS-95 Sexual Harassment of Students)

The intent of this policy is to express the University's commitment and responsibility to protect its students from sexual harassment and from retaliation for participating in a sexual harassment complaint. It is not intended to infringe upon constitutionally guaranteed rights nor upon academic freedom. In considering allegations of sexual harassment, the University must be concerned with the rights of both the complainant and the accused.

All proven cases of sexual harassment shall result in appropriate disciplinary action. The severity of the disciplinary action shall be consistent with the seriousness of the act of sexual harassment. Additionally, under appropriate circumstances, the University may take action to protect its students from sexual harassment by individuals who are not students of the University. If the alleged harasser is a student, the Dean of Students Office must be notified of the complaint.

Student Advocacy & Accountability, Office of the Dean of Students, LSU Student Life & Enrollment, 340 LSU Student Union, Baton Rouge, LA 70803, Phone: (225) 578-4307 Fax: (225) 578-5637 dossaa@lsu.edu

GENERAL STATEMENT ON ACADEMIC INTEGRITY:

Louisiana State University adopted the Commitment to Community in 1995 to set forth guidelines for student behavior both inside and outside of the classroom. The Commitment to Community charges students to maintain high standards of academic and personal integrity. All students are expected to read and be familiar with the LSU Code of Student Conduct and Commitment to Community, found online at www.lsu.edu/saa. It is your responsibility as a student at LSU to know and understand the academic standards for our community.

Students who are suspected of violating the Code of Conduct will be referred to the office of Student Advocacy & Accountability. For undergraduate students, a first academic violation could result in a zero grade on the assignment or failing the class and disciplinary probation until graduation. For a second academic violation, the result could be suspension from LSU. For graduate students, suspension is the appropriate outcome for the first offense.

PLAGIARISM AND CITATION METHOD:

As a student at LSU, it is your responsibility to refrain from plagiarizing the academic property of another and to utilize appropriate citation method for all coursework. In this class, it is recommended that you use:

Article in journal

Book chapter

Proceedings

Electronic material
Ignorance of the citation method is not an excuse for academic misconduct. Remember there is a difference between paraphrasing and quoting and how to properly cite each respectively.

One tool available to assist you in correct citations is the “References” function in Microsoft Word. This program automatically formats the information you input according to the citation method you select for the document. This program also has the ability to generate a reference or works cited page for your document. The version of Microsoft Word with the “References” function is available in most University computer labs. A demonstration of how to use this tool is available online at www.lsu.edu/saa.

GROUP WORK AND UNAUTHORIZED ASSISTANCE:

All work must be completed without assistance unless the faculty member gives explicit permission for group or partner work. This is critical so that the professor can assess your performance on each assignment. If a group/partner project is assigned, the student may still have individual work to complete. Read the syllabus and assignment directions carefully. You might have a project with group work and a follow up report that is independently written. When in doubt, e-mail the faulty member or ask during a class session. Seeking clarification is your responsibility as a student. Assuming group/partner work is okay without permission constitutes a violation of the LSU Code of Student Conduct.

AMERICANS WITH DISABILITIES ACT:

Louisiana State University is committed to providing reasonable accommodations for all persons with disabilities. The syllabus is available in alternate formats upon request.

Students with disabilities: If you are seeking classroom accommodations under the Americans with Disabilities Act, you are required to register with Disability Services (DS). DS is located in 115 Johnston Hall. Phone is 225/578-5919. To receive academic accommodations for this class, please obtain the proper DS forms and meet with me at the beginning of the class. The Office of Student and Academic Affairs can help you if you have questions as well. http://disability.lsu.edu/students

SYLLABUS CHANGE POLICY:

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advanced notice.