Nora Egan Demers, PhD (Comparative Immunology)
Department of Biological Sciences
239-590-7211
Office: Whitaker Hall 218
Office Hours: T 10:30-11:45, T/R 2:30-4:30 and by appointment

Text: You will obtain scientific literature using the FGCU library databases and Google Scholar. Additional readings will be provided through CANVAS

Course Description:
Students are introduced to the philosophy and methodology of the scientific practice in this discussion-format seminar. Through self practice and collaborative review, students learn: philosophical and practical differences between experimental and historical science; ethical issues surrounding the practice of science; hypothesis generation and testing; experimental design; construction of a research proposal; composition of a scientific paper; oral presentation; and critical review of scientific literature and research proposals. Students should plan to take this course near the beginning of their junior year, prior to the development of their research or internship plans. Students are encouraged to use this course to focus their own research interests, and may use this course to develop a proposal and research plan for a subsequent investigation. In order to foster a mentoring environment and to introduce students to the variety of interests among FGCU’s scientific community, all members of the science faculty and student body are encouraged to participate.

Required Teaching Material:
All required course materials are provided through CANVAS. It is your responsibility to be sure that you are receiving e-mail from your FGCU and CANVAS accounts, and that you check them regularly for details for assignments and modifications to this syllabus.

Teaching Philosophy:
Scientific Process is taught as a seminar course. Students and faculty interact through discussion and debate; creating a peer-group setting rather than the traditional atmosphere of a lecture-based classroom. This course includes content that relates to religious beliefs that is necessary for achieving our learning objectives. In addition, the course is based in the disciplines of biology, geology, and ecology, which are dependent on the concept of natural selection as the mechanism for evolution. Professional respect for conflicting viewpoints is expected. The course has three principle objectives. First, students will be introduced to the philosophies and methods of science with the ultimate goals of: preparation for conducting research, functioning as an effective professional, and understanding the role of science in society in order to become an effective citizen in a democracy. This will be accomplished through active participation in the scientific design process as both a creator and a reviewer. Second, students will engage, and learn to critically review, scientific literature. Third students will get to know the science faculty and their fellow students. This will help students to define their own research interests and to identify potential research mentors.
Grading Policies:

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<thead>
<tr>
<th>Grade</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
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<tbody>
<tr>
<td>A</td>
<td>93 up to 100</td>
<td>A- 90 up to 92.9</td>
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<tr>
<td>B+</td>
<td>87 up to 89.9</td>
<td>B 83 up to 86.9</td>
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<tr>
<td>B-</td>
<td>80 up to 82.9</td>
<td>C+ 77 up to 79.9</td>
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<tr>
<td>C</td>
<td>70 up to 76.9</td>
<td>C 70 up to 76.9</td>
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<tr>
<td>D</td>
<td>60 up to 69.9</td>
<td>F &lt; 60</td>
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Student grades will be based on the following: (1) their preparation for participation in class through required assignments; (2) the structure and content of their research proposal; (3) their proposal poster presentation; (4) their participation in peer review; and (5) their final examination.

30% Research proposal:
- 10% first submission
- 20% final submission

40% Activities including:
- quizzes on readings
- assignments for the development of the proposal
- in class assignments
- group assignments

10% Presentation of Research Proposal (poster):

10% Peer Review activities:
- peer review of proposal sections
- peer review of poster
- peer review of draft proposals

10% Final Exam

Attendance: Because participation is such an integral component of this course, attendance is required of all students. Not being present in class reduces your learning opportunity and that will affect your grade. While you will be expected to do much learning on your own through reading and research, much scientific learning is due to verbal interactions with other scientists. You must learn how to ask questions, explain your ideas to colleagues, and defend a position in order to understand it. This can only occur if you attend class.

Absences and tardiness will be excused on a case-by-case basis. The circumstance must be communicated as soon as possible. Excused absences include medical issues and death in the family, and official documentation will be required. If you know that you will have to miss a class for personal reasons (for example, travel, religious holiday, etc.), you must notify us at the beginning of the semester. You will have to arrange and negotiate make-up work in the cases of excused absences.

Each unexcused absence may result in a reduction in your final grade (see Student Guidebook, "Authorized Absence", and "Absences Due to Other Causes"). Late assignments for unexcused absences will not be accepted.

As of Fall 2015, all faculty members are required to confirm a student’s attendance for each course by the end of the first week of classes. Failure to do so will result in a delay in the disbursement of your financial aid. The confirmation of attendance is required for all students, not only those receiving financial aid.
Assignments: Assignment instructions are provided on the CANVAS site. Students are expected to check the schedule in advance of all classes to ensure completion of all assignments. We are not responsible for reminding you of any assignment(s). All assignments are to be turned in to CANVAS. In some cases you are also required to bring a copy, or copies, of your assignment to class for peer review.

Academic Dishonesty/Cheating Policy: All students are expected to demonstrate honesty in their academic pursuits. The university policies regarding issues of honesty can be found under the Code of Conduct Section V. Offenses, subsection A. Academic Dishonesty/Cheating in the Student Guidebook. All students are expected to study this document that outlines their responsibilities and consequences for violations of the policy. Any instances of academic misconduct or cheating will result in forfeiture of all points for any associated assignments, and possible failure of the course. All violations will be reported to the Dean of Students.

Plagiarism: Plagiarism in any form is not accepted. Specifically, all ideas must be credited to their original source by citation, the source of all written words must be identified by citation and the words themselves must be identified by the use of quotations or indentations and font. For examples of plagiarism see: [http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml](http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml)

Turnitin.com also has additional material on plagiarism. Required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site.

Disability Accommodations Services: Florida Gulf Coast University, in accordance with the Americans with Disabilities Act and the university’s guiding principles, will provide classroom and academic accommodations to students with documented disabilities. If you need to request an accommodation in this class due to a disability, or you suspect that your academic performance is affected by a disability, please contact the Office of Adaptive Services. The Office of Adaptive Services is located in Howard Hall 137. The phone number is 239-590-7956 or TTY 239-590-7930.

Student Observance of Religious Holidays: All students at Florida Gulf Coast University have a right to expect that the University will reasonably accommodate their religious observances, practices, and beliefs. Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith. Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence. Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances. Where practicable, major examinations, major assignments, and University ceremonies will not be scheduled on a major religious holy day. A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. The FGCU General Counsel Policies is available online at [http://www.fgcu.edu/generalcounsel/policies-view.asp](http://www.fgcu.edu/generalcounsel/policies-view.asp).
### Course’s Objectives:

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<th>Objectives</th>
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| Introduce students to the practice of science (theoretical basis, philosophy and practical and theoretical methodology). | 1. Students will read and discuss the writings (i.e., essays, opinions) of prominent philosophers and critics of science.  
2. The differences among science, non-science, and pseudoscience will be defined, discussed, and illustrated with examples.  
3. Different scientific practices and disciplines will be compared.  
4. A model for the framing of a scientific project (scientific design) will be presented, discussed, and applied. |
| Develop the ability to critically evaluate science and relate evaluations to peers through the application of principles above (1). | 1. Primary journal articles will be discussed and their scientific structure and validity critiqued.  
2. Participants may take turns moderating the discussion of individual papers.  
3. At the conclusion of each critique, participants will suggest design changes to improve the quality of the science. |
| Transform creative scientific questions into testable hypotheses (i.e., scientific design). | 1. The development of hypotheses will be explored by analyzing the design of others in published papers.  
2. Students will collaboratively work through the design of their own research project. |
| Develop skills associated with the presentation of scientific information (e.g., proposals, primary journal articles, poster and oral presentations). | 1. Students will draft, review, and redraft their own unique research proposal and critically evaluate those of their peers.  
2. Proposals will be presented, either orally or as posters, and defended by individuals late in the semester. |
| Make students and other faculty aware of individual faculty research interests and expertise. | 1. Faculty member may provide a brief research presentation or prospectus available on the course website.  
2. Faculty not teaching the course may visit and participate periodically. During these visits faculty will make brief presentations about their research interests. |
| Instill within students an understanding of the ethics of scientific practice. | 1. Students will read & discuss essays addressing ethical issues in science.  
2. Throughout the semester while journal articles and research projects are reviewed, ethical issues concerning scientific practice will be considered. |
| Help students define their research discipline and identify potential research mentors. | 1. Faculty participation and on-line resources developed for the course should help students learn the research interests of FGCU faculty and help define their own interests.  
2. The published material reviewed during the semester will cover a diverse array of scientific topics, thereby exposing students to a wide range of research disciplines. |
Students will develop a research proposal by the semester’s end. The proposal will be presented and scrutinized by peers and faculty.

| 1. | After a research question is identified by a student, he or she will work collaboratively with other students and faculty to develop a research plan which will then be transformed into a proposal. |
| 2. | Proposals and presentations will be peer reviewed. |

Students will be introduced to various methodological techniques employed by researchers within the scientific disciplines represented.

| 1. | The published papers reviewed during the course will introduce participants to various methodologies and technologies, allowing the student the opportunity to begin to learn about methodologies unique to many different fields of science. |
| 2. | Throughout the semester faculty, students, or guest speakers may make presentations concerning the specialized methodologies and technologies they use in their research. |

If possible, members from the scientific community outside of the university may occasionally participate in this course.

| 1. | Course faculty periodically invite local or visiting scientists relevant to the day’s discussion. |
| 2. | Reading lists may be altered to include literature relevant to visiting scientists. |