

BIOLOGY 630: CRITICAL THINKING FOR LIFE SCIENCE

INSTRUCTORS: Dr. Farzan Nadim (farzan@njit.edu) **OFFICE HOURS:** M,R: 10:30am-11:30am

COURSE SCHEDULE: M,R: 11:30am-12:55pm in CKB 341 **COURSE WEBSITE:** <http://moodle.njit.edu/>

OBJECTIVE:

The goal of this course is to prepare graduate students in understanding the scientific method, reading and critical analysis of scientific literature, and effective oral and written scientific communication in the context of biological sciences.

OUTLINE AND EXPECTATIONS:

- Each student will choose a topic of current research, choose 5-10 original research papers in this topic area, and develop a review paper and a mini grant proposal based upon their topic. This topic could be initially broad and then narrowed down after the paper presentations, but before writing the review paper and mini proposal.
- Individual assignments include:
 - Identification of 5-10 original papers that frame the current state of research on the topic.
 - Written description of the significance of the topic that justifies the choice of topic by the student.
 - In-class presentations that summarize individual papers as well as the chosen topic.
 - E-Summaries of original research papers and review papers.
 - A written review paper on the chosen topic, including drafts with comments and revisions; a draft of the paper must be submitted three weeks before the final paper is due.
 - A mini grant proposal to continue some aspect of the chosen research topic, consisting of a Summary/Significance section and Specific Aims/Hypotheses
- **Unless otherwise noted, written assignments must be submitted via Moodle/Turnitin.**

REQUIRED TEXT:

None: Be sure to have access to Moodle (moodle.njit.edu, login with UCID).

PRESENTATIONS: There will be three presentation categories:

1. Presentations of individual scientific papers.
2. Presentation of the research topic.
3. Presentation of the research proposal.

CLASS PARTICIPATION:

Students are expected to attend every class meeting, participate in discussion and provide feedback and constructive criticism. This is a significant portion of your grade. Do NOT ignore it.

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WRITTEN ASSIGNMENTS:

- **Justification of Research Topic:** At the beginning of Week 2, each student will provide a written justification (i.e. significance) of their research topic and a list of 5-10 scientific papers related to the topic. This draft will be returned to you with comments. A second and third version will be due on assigned dates.
- **e-Summaries:** A summary of an original research paper that includes significance, main highlights of results, methodology (if relevant) and critical thoughts. Two sets of 5 e-summaries will be assigned, the first due together with the third version of the research topic. Additionally, an e-summary of a published review paper will be assigned.

REVIEW PAPER INSTRUCTIONS:

Each student will write one paper during the semester based on their topic of discussion in class and the papers they have chosen. The Review Paper is meant to lead to a hypothesis. A first version will be due in early November. Submit the files electronically on Moodle in Word format. The draft must include Title and Author, draft Summary, draft Introduction and highlights of the sections in the Body (see the final version instructions below) and a brief bibliography. In addition, attached as an Appendix, the draft should include a 100-200 word summary of at least three scientific research papers (excluding the ones presented in class) on this topic. These summaries may be in bullet-point format. The outline of the paper is due a week after the discussion is presented. The final version will be due early **November**. Submit the files electronically on [Moodle](#) in Word format (NOT pdf).

The paper should consist of:

- Title
- Summary (max 200 words)
- Introduction (Significance and Background)
- Body (divided into sections)
- Conclusions (leading to a scientific hypothesis)
- References (no web page references allowed)

There will be a maximum of 3,500 words (including all the above sections except references). For every day a paper is late, 10 points will be deducted. Papers will be submitted via Turnitin. **Plagiarized papers will receive an automatic zero grade; the student will receive an F in the course and will be reported to the Dean of Student Affairs.**

MINI PROPOSAL INSTRUCTIONS:

Each student will write a short (1000-1500 words) description of a grant proposal to continue some aspect of the chosen research topic. This proposal will include a Summary section (including Significance) and Specific Aims and/or Hypotheses sections. The mini proposal will be due late November. Submit the files electronically on [Moodle](#) in Word format (NOT pdf).

GRADING POLICY:

GRADE DISTRIBUTION	Percentage
Participation	10%
Presentations	20%
Written Assignments	20%
Review Paper	30%
Grant Proposal	20
TOTAL	100%

A	90-100
B+	80-89
B	73-79
C+	67-72
C	59-65
F	0-58

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IMPORTANT RULES AND POLICIES

- The [Academic Integrity Code](#) is strictly enforced.
- The use of cell phones and other electronic devices during class or exam times is prohibited. Laptops can be used for taking notes at the discretion of the instructor.
- There will be no make-up exams.
- Students who miss an exam due to a valid medical excuse need to provide a doctor's note. The grade of exams missed because of a valid excuse will be determined on a case-by-case basis.

SCHEDULE AND COURSE OUTLINE:

WEEK OF		LECTURE TOPICS	NOTES
Week 1	9/5	Introduction and outline; Reading and presenting scientific papers; Choosing a topic and justifying the choice	9/5: Labor Day – No Classes
Week 2	9/12	Student presentation of scientific papers; critical review by class.	
Week 3	9/19	Student presentation of scientific papers; critical review by class.	
Week 4	9/26	Student presentation of scientific papers; critical review by class	
Week 5	10/3	Student presentation of scientific papers; critical review by class	
Week 6	10/10	Student presentation of scientific papers; critical review by class	
Week 7	10/17	How to write a paper. Student presentation of research topic; critical review by class.	
Week 8	10/24	Student presentation of research topic; critical review by class.	
Week 9	10/31	Student presentation of research topic; critical review by class.	
Week 10	11/7	How to write a research proposal. Development of the main hypothesis and the Specific Aims.	
Week 11	11/14	Student presentation of sample proposals.	
Week 12	11/21	Student presentation of Hypothesis and Specific Aims of proposal.	11/22: Classes follow a Thursday schedule
Week 13	11/28	Student presentation of Hypothesis and Specific Aims of proposal.	11/24-27: Thanksgiving Recess

Week 14	12/5	Student presentation of Hypothesis and Specific Aims of proposal.	
Week 15	12/12	How to review, critique and score a proposal.	

FINAL EXAM WEEK: DECEMBER 16-22, 2016