MICROBIOLOGY SENIOR SEMINAR (MB 490)
SYLLABUS
Fall and Spring Every Year

Instructor: Dr. Hosni M. Hassan
Office hours: by appointment
1542A Gardner Hall
Class Meetings: Wednesdays
Phone: 515-7081
Sec 001 3:00 pm/ Sec 002 4:30 pm
hosni_hassan@ncsu.edu
Location: Room 106 Scott Hall

Course Objectives:
1. To be able to search the scientific literature for information needed.
2. To be able to understand the scientific literature, organize and make sense of the information learned, raise pertinent questions, and make reasonable conclusions.
3. To be able to integrate the knowledge gained in the formal classes you completed in High School and at NCSU (e.g., Microbiology, Biochemistry, Mathematics, Physics, etc.) in order to understand and critique the published literature.
4. To be able to communicate and explain the information learned orally to different audiences, be able to answer questions, and to defend their conclusions.
5. To be able to present the information in the form of a clear and accurate written report.

Approach/Procedures:
1. Select a Microbiological topic of interest.
2. Research the selected topic, making full use of modern literature searching engines.
3. Prepare and submit a short (~250 words) abstract on their chosen or assigned topic (Due on the 4th week). The ABSTRACT must include information from a minimum of five recent research articles that have been read (primary literature only - no news paper reports/popular press/magazines). At the end of the abstract, please cite the papers you read and used in preparing the abstract.
4. Each student will present one short (approximately 25 minutes) seminar on their topic, using appropriate visual aids, and respond to questions from the audience.
5. Each student will write and submit a report (minimum of 5 single-spaced pages- 12 pt. Font; not including figures or the Literature cited) - that summarizes the information presented during the seminar.
6. Each student is expected to participate in class discussions in a productive manner.

Expected Outcomes:
By the end of this course, students will be able to demonstrate their ability to:
1. Apply their foundational knowledge in microbiology when challenged with new situations by asking intelligent questions that lead to an understanding of the new situations.
2. Effectively explain information related to microbiology in the popular press to non-scientific audiences.
3. Summarize the important information from scientific articles.
4. Make a critical judgment of scientific material, using as support their analysis of its research questions and hypotheses, the appropriateness and precision of its research methods, the effectiveness of its presentation of results, and the interpretation and conclusions it draws from the results insofar as they answer the research questions.
Grading and Attendance:
Course attendance is required because a seminar course, by its very nature, only succeeds when there are participants. Auditors and "credit only" students must attend and complete the same assignments as graded students. This course will be letter graded according to the +/- grading scale. The following table shows the grade distribution for each assignment and attendance.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>presentation</td>
<td>40</td>
</tr>
<tr>
<td>Written Report</td>
<td>20</td>
</tr>
<tr>
<td>Abstract with Citations</td>
<td>10</td>
</tr>
<tr>
<td>Questions and comments during class discussions</td>
<td>15</td>
</tr>
<tr>
<td>Attendance</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>100</strong></td>
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Evaluation criteria for presentations and Reports:
The Student will prepare and deliver a “research seminar” of information on the selected subject using the current literature. Each presentation should include:

- **Introduction** – Explaining the importance of the topic and why the audience should be interested.
- **Methods used in the research** - Appropriate description of the methods and techniques used in the research.
- **Results obtained**: Appropriate description of the rational for each experiment and presentation of the data obtained.
- **Discussion**: Appropriate in-depth and Logical conclusions of the results and how they relate to the current literature.

Good use of presentation software, knowledge of the subject, and ability to handle questions are important attributes for excellent presentation. (Don't panic, you don't have to know all the answers – but you should be able to use logic to come-up with a plausible answer.)

Although, the written report is not officially due till the end of the semester, I strongly suggest that you submit it ASAP after the oral presentation (i.e., while the material is still fresh in the memory). The written report should be complete, summarizes your presentation, and includes complete citations. Please follow the style and format for the ASM (American Society for Microbiology) Journals [http://jb.asm.org/misc/ifora.shtml](http://jb.asm.org/misc/ifora.shtml). You can download the “Instruction to Authors” from that website. In general, each citation should include:

Authors’ names, year of publication, title of the article, journal title, volume, starting and ending page numbers. **Example:**


Criteria for Course Evaluation:
The ABSTRACT, Presentation and the Final Report: Select and read at least 5 research articles related to your seminar topic. Write a single paragraph integrating and summarizing what
you read (i.e., do not simply copy the abstracts of the 5 articles). You need to understand and integrate the information you read, before writing a single coherent paragraph (~250 words) - in your own words. List the references used (Authors names, year of publication, title of article, journal title, volume, starting and ending page numbers). The articles should be research articles from the primary literature, not review articles, book chapters, web or popular press articles. Turn in the ABSTRACT and list of the articles you read by the 4th week of classes. One week before your scheduled presentation, bring enough copies of your abstract to be distributed to your classmates. The presentation should be clear precise and have enough slides/material for 25 minutes oral presentation. A 5-10 presentation is as bad as 30-35 presentation (i.e., make sure to practice on delivering the information in 20 minutes to allow time for questions. The written report should detail the information presented orally. Assignment will be graded on basis of:

• Articles appropriate to topic and timely
• Complete citations
• Accurate identification of major results and significance
• Ability to integrate the information and explain the implications of the research.

Evaluation of participation in class discussions:
Ask questions and/or make comments on the assigned presentations.

Attendance: Required - No excuses are accepted except in extreme emergencies. There will be a 5-point deduction for each class period missed without acceptable excuse.

Grading Scale
<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>98 to 100</td>
</tr>
<tr>
<td>A</td>
<td>92 to 97.9</td>
</tr>
<tr>
<td>A-</td>
<td>90 to 91.9</td>
</tr>
<tr>
<td>B+</td>
<td>88 to 89.9</td>
</tr>
<tr>
<td>B</td>
<td>82 to 87.9</td>
</tr>
<tr>
<td>B-</td>
<td>80 to 81.9</td>
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<tr>
<td>C+</td>
<td>78 to 79.9</td>
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<tr>
<td>C</td>
<td>72 to 77.9</td>
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<tr>
<td>C-</td>
<td>70 to 71.9</td>
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<tr>
<td>D+</td>
<td>68 to 69.9</td>
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<tr>
<td>D</td>
<td>62 to 67.9</td>
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<tr>
<td>D-</td>
<td>60 to 61.9</td>
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<tr>
<td>F-</td>
<td>Below 60</td>
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Prerequisites: Microbiology Major and senior standing. It is anticipated that students will have completed most of their required microbiology courses (MB 351/352 are required; while MB 411/412 and MB 414 are recommended) prior to this course. Senior seminar is considered a "capstone" course, where much of what you have learned can be brought to bear in learning and communicating about a microbiology problem.

Academic Integrity
The papers you hand in should be your own work, prepared specifically for this course. You may obtain as much help as you need from reference librarians or others so that you can search the literature for articles relevant to your topic on your own. You should practice your oral presentations in front of others, and you may discuss your topics, specific reference articles, etc. with other students or faculty - talking about your topic will help you clarify your own understanding. Use a spell check and a grammar check programs, if your word processing program has one, to check your written reports. If you have any questions, please ask me. It is expected that the student will read and abide by the NCSU Code of Student Conduct that is
available from the Office of Student Conduct or at:
http://www2.ncsu.edu/ncsu/stud_affairs/policies/code95.html.

Examples of Topics Covered in MB 490:

A- **Microbial Physiology & Metabolism** (Heat & cold shocks, Quorum sensing & biofilms, Nutrient Starvation, Sporulation & Spore inactivation, Bacterial Nitrogen Fixation, Iron Metabolism/Storage, Oxidative stress, Acid resistance/adaptation, etc.)

B- **Industrial Microbiology & Biotechnology** (Alcohol Fermentation, Lactic Fermentation, Citric Fermentation, Hydrogen production for fuel, Probiotics, Biosensors, Wine production, etc.)

C- **Drug Resistance** (molecular mechanisms, Quinolone resistance in *E. coli*, Penicillin resistance, etc.)

D- **Microbial/Viral Pathogenesis** (*E. coli* O157:H7, Hepatitis B and cancer, Cholera, Ebola & Ebola Vaccine, SARS, West Nile Virus, AID, Genital Herpes, etc.)

E- **Molecular Biology** (DNA microarrays and global profiling of gene expression/regulation, Diagnostic real-time PCR for detecting Listeria, etc.)