Graduate Capstone in Biological Sciences, Spring 2019
Experimental Techniques and Their Applications
Section 001, 2 credits
Thursday 4:00 – 5:40
Lapham Hall N202

Contact information:
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Email: joliver@uwm.edu
Office: N209 Lapham Hall  
Office Hours: Mon., Wed. 11:00-12:00 or by appointment
Phone: 414-229-4317

Prerequisites: Enrollment in Biological Sciences non-thesis M.S. track, and approval of instructor.

Required Materials: No textbook is required. Regular internet access to the course Canvas site and web-based search engines are essential, as is regular access to the university’s electronic and hard copy library collections. Papers for each student-led discussion will be made available on Canvas.

Course Description: This in-person seminar course serves as a capstone requirement for the non-thesis track M.S. degree and is designed to assess the students’ ability to read and understand current and historic scientific literature in the biological sciences. The presentations in this course will demonstrate that students have developed the ability to choose a current important question or issue in the biological sciences, fully research the area, and present the information in a professional, scientifically sound manner understandable to an audience of broad scientific background. Subtitled sections of the seminar may be offered, potentially allowing students the opportunity to choose a capstone experience that best suits their individual needs.

For Spring 2019 the emphasis of the seminar will be Experimental Techniques and Their Current Applications. Students will be evaluated with both oral presentations and a formal paper.

Attendance: Attendance is mandatory since students are evaluated on their presentations and participation in discussion. Absences must be accompanied by a medical excuse. Each unexcused absence will result in a deduction of 10 points from the final grade.

Evaluation: Students will be evaluated using the following guidelines:

As presenter and discussion leader (Please see sample peer evaluation form):
• You should be organized and prepared to present and lead the discussion of the assigned topic of the day.
• Your final oral presentation and formal paper should include extensive background, description of methods, types of results and their significance, and future considerations.

As a participant in the discussions:
• You should have read the background material and be prepared to discuss each topic.
• You should ask questions and provide constructive feedback on the material presented as well as on the presentation itself. Your peer evaluation forms will contribute to your grade.
• You should participate in thinking about possible alternative approaches and interpretations of the data presented.
Points will be distributed among the following categories:

- **Final Presentation (in lieu of final exam)** 50 points (includes presentation abstract)
- Final Paper 50 points
- Leading Discussion (two, 25 points each) 50 points
- Participation 50 points

**TOTAL:** 200 points

Making up material missed due to absences will not be possible. A medical excuse will be required for work turned in after the deadline. Final grades will be awarded on the basis of A = 100-90%, B = 89-80%, C = 79-70%, and D = 69-60%. Pluses and minuses will be awarded as deemed appropriate. A score of less than 60% of the total available points will constitute a failing grade. A grade of “I” (Incomplete) will be considered only in extraordinary circumstances that are well documented. This is expected to occur only in cases where all work except the final paper has been completed.

**Time Investment:** On average, students are expected to spend 48 hours per credit per semester on in-class activities and activities outside of the classroom. The following is a workload estimate and should be used as a guideline. Time spent on any given assignment as well as total time required to adequately master the material will vary from individual to individual. Students are assessed on their performance on graded assignments and not on the time put into the course.

Total hours: 96 hours
- In class: 30 hours
- Background reading and other research activities: 44 hours
- Writing paper and preparing presentations: 22 hours

Your oral presentations will be evaluated on the basis of: thorough research of the topic, organization, clarity of abstract, providing sufficient background to allow a well-prepared audience member to understand the topic, thoughtful interpretation of the information available and consideration of its significance, clarity of audiovisual aids, and handling of questions. Your final paper will be evaluated on the basis of: thorough research of the topic, organization, providing sufficient background to demonstrate deep understanding of the topic, thoughtful interpretation of the information available and consideration of its significance, clarity of writing, and appropriate citation of references. The instructor will assign final scores; however, the other members of the class will be asked to do a peer evaluation each week. The student evaluations will be considered in the assignment of the score for the presentation.

Participation points will be awarded based on promptness, attentiveness, and contribution to discussion of the topics, as well as the instructor’s review of your peer evaluation forms.

**Weekly Readings:**
Original research papers, review papers, and manufacturers’ product sheets that serve as background for each week’s discussion will be made available on Canvas. For student-led discussions, the students presenting each week’s topic will be responsible for selecting appropriate background papers. The instructor will offer guidance in selecting readings, and will approve the background materials **two weeks prior to the presentation.** Each student leading the daily discussion will provide examples that illustrate at least **one specific technique** relevant to the topic.
Selected papers should provide historical perspective and describe the current state of the art. The papers made available on Canvas are meant to provide adequate background to enable the audience to participate in the discussion. Presenters are expected to use additional materials in their preparation in order to fully cover the topic of the presentation.

Project Paper:
The project paper will completely explore one technique that has particular relevance to the students’ career development. It should trace the origin of the methodology, when possible, from its first publication as an original manuscript. It should include development of the technique to its various current applications, with attention to the range of applications and why the technique has broad power. Adequate coverage of the topic is likely to require a minimum of 20-25 pages.

Rules and Regulations:
**Attendance at each meeting is mandatory.** If you require accommodation for religious observances, please let your instructor know as soon as possible. Excusing absences will be entirely at the discretion of the instructor. Advance notice is expected, and documentation will be required. Switching presentation dates with another student is not allowed without the prior consent of the instructor. Note that this would require switching topics as well as dates for all student-led discussions except the final presentations.

The highest standards of academic conduct are expected in this course. The UWM website (http://guides.library.uwm.edu/c.php?g=56459&p=363133#s-lg-box-1083130-container) defines plagiarism as the following:

“Plagiarism is presenting another person's words or ideas as your own. In academic writing, any time you use a work's information or ideas, credit must be given to your source. The only exception to this rule is that commonly known facts do not require attribution. Plagiarism includes not only the presentation of other's original ideas as your own, but the act of weakly paraphrasing another's writing style and passing it off as your own prose. **Plagiarism is a serious instance of misconduct. Several professional careers have been ruined by the discovery of an act of plagiarism.** As a general rule and whenever in doubt, it is always better to include a citation rather than risk the appearance of plagiarism. Please see the UWM Libraries guide ‘Citation Styles’ for more information.”

Note that wording copied directly from other sources and presented as your own, even when properly referenced, is defined as plagiarism and considered to be misconduct. Academic misconduct may result in expulsion from the University. Links to University policies and procedures regarding academic conduct can be found at:

Tentative Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>24 January</td>
<td>Introduction</td>
<td>Julie Oliver</td>
</tr>
<tr>
<td>31 January</td>
<td>Search strategies</td>
<td>Oliver</td>
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<td></td>
<td>Library and internet resources</td>
<td></td>
</tr>
<tr>
<td>07 February</td>
<td>Critical reading</td>
<td>Oliver</td>
</tr>
<tr>
<td></td>
<td><em>Deadline for selection of individual topic</em></td>
<td></td>
</tr>
<tr>
<td>14 February</td>
<td>Critical reading</td>
<td>Oliver</td>
</tr>
<tr>
<td>21 February</td>
<td>Evaluating statistics</td>
<td>Students A, B</td>
</tr>
<tr>
<td>28 February</td>
<td>Evaluating statistics</td>
<td>Students C, D</td>
</tr>
<tr>
<td>07 March</td>
<td>Evaluating graphics</td>
<td>Students E, F</td>
</tr>
<tr>
<td>14 March</td>
<td>Evaluating images</td>
<td>Students G, A</td>
</tr>
<tr>
<td></td>
<td><em>Deadline for selection of review literature</em></td>
<td></td>
</tr>
<tr>
<td>21 March</td>
<td>SPRING BREAK</td>
<td>N/A</td>
</tr>
<tr>
<td>28 March</td>
<td>Evaluating instrumentation</td>
<td>Students B, C</td>
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<tr>
<td>04 April</td>
<td>The “supplementary information” section</td>
<td>Students D, E</td>
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<tr>
<td>11 April</td>
<td>Evaluating product sheets</td>
<td>Students F, G</td>
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<tr>
<td></td>
<td><em>Deadline for selection of primary literature</em></td>
<td></td>
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<tr>
<td>18 April</td>
<td>Evaluating abstracts</td>
<td>Oliver</td>
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<td></td>
<td><em>DEADLINE: PROJECT PAPER</em></td>
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<tr>
<td>25 April</td>
<td>Overview of topic presentations</td>
<td>All students</td>
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<td></td>
<td><em>Deadline: Presentation Abstract</em></td>
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<td></td>
<td><em>Test projection/display of audiovisual components</em></td>
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<tr>
<td>02 May</td>
<td>Oral Presentations</td>
<td>Students A, B, C, D</td>
</tr>
<tr>
<td>09 May</td>
<td>Oral Presentations</td>
<td>Students E, F, G</td>
</tr>
<tr>
<td>14 May</td>
<td>Course Evaluations</td>
<td></td>
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<tr>
<td></td>
<td>Tues., 12:30-2:30</td>
<td>(Final exam slot for this course)</td>
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Note: Assignment of discussion to students or instructor will be adjusted according to enrollment.
Peer Presentation Evaluation
Highest possible score = 50 points; value will be divided by 2 for presentations worth 25 points

Date: ____________________________________________

Speaker: _________________________________________

Range of point values:
Not at all successful  Completey successful

1. **Appropriateness of literature on the topic**: Does the literature chosen illustrate the specific topic well? Are the examples readily understood by a Biological Sciences audience with broad interests?
   1  2  3  4  5

2. **Organization**: Was the presentation clear? Did the topic flow logically from one point to the next?
   1  2  3  4  5  6  7  8  9  10

3. **Background**: Was sufficient information provided and discussed to allow a well-prepared audience member to understand the material? Were hypotheses/goals/relevant applications presented?
   1  2  3  4  5  6  7  8  9  10

4. **Results**: Were the example data presented clearly and concisely? Was sufficient explanation of the methods provided to allow the audience to judge the data for themselves?
   1  2  3  4  5  6  7  8  9  10

5. **Interpretation**: Was the significance of the data explained? Were the results related to the hypotheses or goals presented? Were alternative interpretations provided and discussed? Was the broad impact of the topic upon Biological Sciences discussed?
   1  2  3  4  5  6  7  8  9  10

6. **Handling Questions and Leading Discussion**: Was the speaker able to clarify any points brought up in the discussion? Did the speaker have additional insight into the topic? Did the speaker engage the audience and draw relevant comments from them?
   1  2  3  4  5

7. **Additional Comments for the Speaker**: 
Project Paper Scoring  
Highest possible score = 50 points

Author: ____________________________________________

Topic: ____________________________________________

Range of point values:  
Not at all successful                                      Completely successful

1. **Thoroughness of literature on the topic**: Does the literature chosen represent the origin of the technique? Does the literature cover how the technique evolved into its current form(s)?

   1   2   3   4   5   6   7   8   9   10

2. **Demonstration of understanding**: Does the description demonstrate excellent understanding of how and why the technique works in its various forms?

   1   2   3   4   5   6   7   8   9   10

3. **Interpretation of significance**: Is the impact of the technique on research / diagnostics / therapeutics clearly demonstrated?

   1   2   3   4   5   6   7   8   9   10

4. **Recognition of future impact**: Is there indication of the way the technique is expected to continue evolving? Is the student willing to make reasonable speculation(s) about potential future applications?

   1   2   3   4   5

5. **Organization and clarity of writing**: Were the ideas clearly and concisely presented? Did the points flow logically from one to the next? Was the paper well proofread, without spelling, grammatical, or typographical errors?

   1   2   3   4   5   6   7   8   9   10

6. **References cited appropriately**: Did the student provide references for others’ ideas? Was a format found in a high-impact journal appropriate to his/her field been used consistently and correctly?

   1   2   3   4   5

7. **Additional comments for the student**: 