Introduction to Graduate Studies  
BIOL 820  
Fall, 2015

Instructor  
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Course Description (catalog)  
An introduction to graduate study and requirements at UNK with emphasis on research methods and biological techniques for the professional teacher and biologist. Students will gain an appreciation for the scientific method by formulating good scientific questions including sound null and alternative hypotheses, design experimental methods addressing the hypotheses and propose appropriate statistical tests for evaluation of results. Students will practice the art of locating and understanding scientific literature. In addition, students will engage in scientific writing which will include the submission of a research proposal.

Learning Objectives  
1. Students will understand the requirements for their degree program and complete plausible plans for completion of the degree requirements.  
2. The use of appropriate formatting, style and language in professional electronic communications will be emphasized and practiced. Essential aspects for successfully utilizing Blackboard will be introduced.  
3. Students will develop a scientific question and develop testable hypotheses to answer a specific aspect of the question.  
4. Skills related to use of the UNK Library for research will be developed.  
5. Students will gain an appreciation for the design and testing of a scientific hypothesis with an emphasis on the interdependence of data collection to statistical methods.  
6. Students will practice the skill of reading the scientific literature.  
7. An appreciation for the role of the IACUC and IRB in research projects will be gained.  
8. Sources of funding for student-based research will be reviewed. Students will complete an application for funding (generic).  
9. Students will practice the art of writing scientific papers and will demonstrate skills by completion of a scientific review paper. Students will learn proper citation methods and be instructed on strategies to avoid plagiarism.

Course Materials  
Computer and Software: Access to a computer, modern browser and Internet connection are required for the course. A word processor compatible with the instructor's software is needed for preparation of written assignments. Formatting problems should be expected when the instructor's comments are incorporated into draft versions. Details for submitting draft and final versions will be
provided with each written assignment. Statistical analysis of data sets utilizing spreadsheets will be required (Open Office Calc, Excel, Calc, Quattro, etc.), and the presentation will require some form of slide-show package (MS Excel, Impress, etc.). Some assignments will require submitting documents as PDFs for verifying that the formatting was well done.

Digital Imaging Device: Some method of producing digital images may be required for incorporating digital images into assignments. Good solutions include a flatbed scanner, digital camera, etc. Suggest that students not buy anything if possible as a photo from a cell phone will often produce satisfactory results for the purpose of this course.

Web Resources: Blackboard, an online course management system, is used for this course. Students will be responsible for becoming proficient at using the system. Instructions can be found online by searching the eCampus section of the University of Nebraska at Kearney web site. Students will be expected to check the Blackboard site often for announcements and assignments. In addition, students are required to use and check the email account assigned to them by the university.

Lecture AVIs and Provided Study Notes: Lectures are supplied as HTML5 video that will be compatible with a recent Firefox web browser. Support for mobile devices will be hit or miss, but students will be able to download the video if streaming does not work as anticipated. Note that much of the provided material is copyrighted by the authors. Students should refrain from distributing the resources to others without proper permission from the copyright owner(s). All links and access to course materials will expire shortly after the last day of class.

Legal: The materials on this course website are only for the use of students enrolled in this course for purposes associated with this course and may not be retained or further disseminated. The materials on this course website may be protected by copyright, and any further use of this material may be in violation of federal copyright law.

Grading

Quizzes: Quizzes cover ANY of the material contained in a given module (video, notes, handouts, readings, mini-assignments, assignments, discussion, etc.) and must be completed by the due date posted on Blackboard. Each quiz has a time limit.

Mini-assignments: Several small assignments are done throughout the semester to re-enforce introduced concepts and provide an opportunity to practice skills. Instructions and due dates are posted on Blackboard.

Assignments: Students will complete several assignments. The topics will be assigned by the instructor. Typically, assignments are more detailed and rigorous than mini-assignments. Instructions and due dates are posted on Blackboard.

On-line Exams: Multiple time-limited online exams will be given. Students will only be able to take each exam once. Exams are "closed book", so students are not allowed to consult any outside source during the exam.

Discussion Groups: Students will be divided into groups for discussion on topics introduced during the course. Full credit will require meaningful contribution to the discussion as demonstrated by a minimum of 2 thoughtful postings per forum (generic "I agree with ..." are not viewed as thoughtful). Severe point deductions are assessed for any breach in earnest and intelligent discourse (i.e. cordial comment and discussion that is well intentioned and supported by rational thought).

Final Exam: Students will be provided access to the final exam approximately one week before the due date. The final exam is comprehensive and late exams will not be accepted. The final exam may include closed or open book portions as dictated in the instructions.
Tentative Point Distribution: Anticipated assignments with distribution of points for the course. Changes may be made at the discretion of the instructor.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Total Points</th>
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</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>12 @ 20 pts</td>
<td>240</td>
</tr>
<tr>
<td>Mini-assignments</td>
<td>14 @ 10 pts</td>
<td>140</td>
</tr>
<tr>
<td>Assignments</td>
<td>A1: bibliography @ 30 pts</td>
<td>265</td>
</tr>
<tr>
<td></td>
<td>A2: review paper @ 80 pts</td>
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<td></td>
<td>A3: hypotheses and design @ 70 pts</td>
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<td>A4: IRB or IACUC protocol @ 20 pts</td>
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<td></td>
<td>A5: student grant reviews @ 25 pts</td>
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<tr>
<td></td>
<td>A6: generic grant @ 40 pts</td>
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<tr>
<td>Discussion</td>
<td>11 @ 5 pts</td>
<td>55</td>
</tr>
<tr>
<td>Exams</td>
<td>2 @ 100 pts</td>
<td>200</td>
</tr>
<tr>
<td>Final Exam</td>
<td>1 @ 100 pts</td>
<td>100</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td><strong>1000 pts</strong></td>
<td></td>
</tr>
</tbody>
</table>

The final grade will be determined based on the number of earned points. In the event that assignments are changed, the scores will be normalized to 1000 pts (points earned / total possible x 1000). Grades will be assigned as follows:

A+ (1000-990), A (989-960), A- (959-930), B+ (929-900), B (899-870), B- (869-840), C+ (839-810), C (809-780), C- (779-750), D+ (749-720), D (719-690), D- (689-660), F (Below 659)

Course Information and Policies

**Expectations:** Because students admitted to the graduate program in biology have significant exposure to biology, related disciplines (math, chemistry, physics, etc.) and general education coursework (English, writing, grammar, geography, history, etc.), it is anticipated that previously developed skills and knowledge will be utilized extensively throughout the course and reflected in the student's academic performance. Students are required to maintain a professional and cordial mannerism when communicating with the instructor and other students.

Because the course is offered in both regular and summer semesters, students will need to pay close attention to the pace of the course. On average, students will complete one module per week during 16 week semesters and two modules per week during 8 week (summer) semesters. While plenty of lead time will be provided for major assignments and exams, it is the student's responsibility to schedule time for completion of each assignment. I make every attempt to post materials early to provide as much flexibility to students as possible; however, note that grading of assigned items typically does not occur until after the due date.

**Due Dates:** Due dates will be clearly identified on Blackboard and strictly enforced. Some due dates fall on official UNK holidays; therefore, work must be submitted before the due date to take full advantage of these holidays (i.e. holidays tend to be meaningless to distance students and are not acceptable rational for submitting work after the due date). Students are strongly encouraged to complete assignments several hours (if not days) before due. There will be no opportunity to make up missed quizzes, assignments or exams, and a score of zero will be assessed. Assignments submitted by email after the assignment link has expired in Blackboard will only be accepted at the discretion of the
instructor. The final exam must be submitted by the due date or a grade of zero will be given. In the rare instances that material is accepted late, students will be assessed a late penalty (minimum of 10% for each day late).

Note on Technology: While not common, problems with technology do happen. This can be caused by instructor error, server crashes, weather-related power outages or problems with Internet connections. Verified problems with course technology will be dealt with fairly. If you find that the Blackboard service is not responding or behaving improperly, notify the instructor immediately. If the problem is reasonably beyond the student's control, an opportunity to reclaim missed points may be provided (see due dates above as they relate to completing tests and assignments well in advance of the due date). While instructors generally attempt to be helpful with the resolution of computer related problems, the operation of each student's personal computer is the sole responsibility of the student (i.e. virus protection, operating system maintenance, software installation, etc.), and user-specific issues are normally resolved through interaction with the UNK helpdesk.

Other Policies of Interest

Exams and Quizzes: All online evaluations are closed book. It is expected that students will not utilize notes, textbooks, the Internet, or any other source of information during an assessment. Note that use of the Internet during a quiz or exam has been the most commonly detected source of academic dishonesty by students.

Plagiarism and Academic Dishonesty: Presenting someone else's work as your own is a serious academic offense. Any material containing plagiarism or reflecting academic dishonesty will receive a grade of zero and may result in placing a record of the offense in the department's file. A second offense will result in assignment of an "F" for the course. All instances of plagiarism or academic dishonesty carry the risk of referral to the graduate committee, review of the student's file, and potentially expulsion from the program.

Withdraw and Incomplete Grades: Students should consult the academic calendar for the last day to withdraw from a course which will result in a grade of "W". Instructors are not permitted to withdraw a student; therefore, any student not continuing the class that fails to withdraw will receive a grade of "F". If unusual circumstances prevent completion of a course (such as major hospitalization, overseas deployment, etc.), students may request a grade of incomplete. At the sole discretion of the instructor, an "I" may be assigned for the course, and the instructor will provide the student with an enumeration of requirements with a deadline for completing the course.

Students with Disabilities or Those Who are Pregnant: Students with disabilities or those who are pregnant are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska at Kearney to provide flexible and individualized reasonable accommodation to students with documented disabilities or those who are pregnant. To receive accommodation services for a disability, students must be registered with UNK Disabilities Services Coordinator, David Brandt, in the Academic Success Office, 163 Memorial Student Affairs Building, 308-865-8214 or by email brandtdl@unk.edu. For those needing accommodation due to pregnancy, you need to visit with Student Health. The following link provides information for students and faculty regarding pregnancy rights. http://www.nwlc.org/resource/pregnant-and-parenting-students-rights-faqs-college-and-graduate-students

Attached is the link to the above statement for your convenience.

http://unkcms.unk.edu/offices/disability_services/

Reporting Student Sexual Harassment, Sexual Violence or Sexual Assault: Reporting allegations of rape, domestic violence, dating violence, sexual assault, sexual harassment, and stalking enables the University to promptly provide support to the impacted student(s), and to take appropriate action to prevent a recurrence of such sexual misconduct and protect the campus community. Confidentiality will be
respected to the greatest degree possible. Any student who believes she or he may be the victim of sexual misconduct is encouraged to report to one or more of the following resources:

- Local Domestic Violence, Sexual Assault Advocacy Agency 308-237-2599
- Campus Police (or Security) 308-627-4811
- Title IX Coordinator 308-865-8655

Retaliation against the student making the report, whether by students or University employees, will not be tolerated.

If you have questions regarding the information in this email please contact Mary Chinnock Petroski, Human Resources Director (petroskimj@unk.edu or phone 8655).
**Tentative Schedule**

The sequence of lessons, notes and reading assignments are listed. Sequence, topic, assignments and any dates are **tentative** and subject to change by the instructor. **Details for each assignment will be posted on Blackboard including due dates.**

<table>
<thead>
<tr>
<th>Module Date</th>
<th>Topic / Activities / Notes</th>
<th>Assignments (due dates posted on Blackboard)</th>
<th>Reading</th>
</tr>
</thead>
</table>
| **Module 1** 8/24/2015 | Introduction and syllabus  
Why graduate school?  
Essential elements of Blackboard  
Etiquette in the digital world (email and discussion boards)  
Why graduate school? | Quiz 1  
mA1: short paragraph on why you are engaged in graduate study  
mA2: properly formatted and worded email | Syllabus  
UNK Blackboard Web Site  
Loper-Mail | IT email advice |
| **Module 2** 8/31/2015 | Types of research -- lab, field, "blended", theoretical  
Faculty at UNK  
Scope of scientific projects at UNK -- thesis vs. Bio831, acceptable projects  
What area of science appeals most to you? | Quiz 2  
mA3: short paragraph on the area most interesting to the student | Resources posted to Blackboard |
| **Module 3** 9/7/2015 | Requirements for graduation  
What is science? How is science done?  
Good scientific question and hypothesis development (Dr. Freeman's philosophy on the doing of science)  
Post scientific question for comment by students. | Quiz 3  
mA4: hypothetical program of study  
mA5: preliminary scientific question, null and alternative hypotheses | Department of Biology Graduate Student Handbook  
Graduate Catalog  
Heath Chapter 1 and 2  
**Projects utilizing human participants must be approved by instructor via email (do this early)** |
| Module 4 | 9/14/2015 | Getting scientific information, The library at UNK, How to access and use resources at the library -- online journals, interlibrary loan, etc. | Quiz 4 | McMillan Chapter 1  
Papers posted on Blackboard |
| --- | --- | --- | --- | --- |
|  |  | Reading papers (couple of example papers -- review vs. primary literature  
Writing in science  
Writing research papers | Discussion 04 | McMillan Introduction and Chapter 4 |
|  |  | Discussion over one of the readings (distribution of Karner Blues) |  |  |
| Module 5 | 9/21/2015 | Writing review papers  
Proper citation of sources  
Academic honesty and plagiarism  
Answering Essay Questions | Quiz 5 | McMillan Chapters 5,6 and 7  
Graduate Handbooks |
|  |  | Academic honesty and consequences of breaches in integrity | A1: annotated bibliography (best 15+)  
A2: Review Paper (SafeAssign) | McMillan, pp. 212-214 (or 188-190 depending on edition)  
Paper on Graduate Writing |
|  |  |  | Discussion 05 |  |
|  |  | No credit, extra discussion for peer interaction during prep of A2 |  |  |
|  |  | Exam I (modules 1-5) |  |  |
|  | 9/28/2015 |  |  |  |
| Module 6 | 10/5/2015 | Fundamentals of good experimental design, qualitative vs. quantitative data, data collection and records, critical evaluation | Quiz 6 | Heath Chapter 3 and 4  
McMillan Chapter 2  
Heath Chapter 9, 11 and 12 |
|  |  | Student's experimental design presented for peers to evaluate and comment. | mA7: data sheets and data management plan  
mA8: critical evaluation of scientific question and hypotheses with preliminary experimental design |  |
|  |  |  | Discussion 06 |  |
| Module 7 10/12/2015 | Descriptive statistics  
Use of spreadsheets and internet resources for statistical analysis  
Hypothesis testing, statistical methods for the biologist (t-test, ANOVA, Chi-square and linear regression), p-values  
Why does good experimental design consider statistical methods before beginning data collection? What data will students collect? | Quiz 7  
mA9: spreadsheet assignment  
Discussion 07 | Spreadsheet software for personal computer  
general readings from Health Chapters 6-12 |
| --- | --- | --- | --- |
| **Module 8 10/19/2015 (Fall Break)** | Continuation of hypothesis testing and statistical methods (exercises)  
Displaying data and statistical information  
Tables  
Graphs  
Body text of manuscript  
What are appropriate uses for tables and graphs? | Quiz 8  
mA10: Internet resources for statistical analysis  
mA11: table and graphs of provided data sets  
Discussion 08 | McMillan Chapter 3 |
| Module 9 10/26/2015 | Critical evaluation of scientific question, hypotheses, experimental design and statistical tests  
Discussion on experimental design. | Quiz 9  
A3: final scientific question with hypotheses, experimental design and proposed statistical tests (checklist)  
Discussion 09 | Heath, Chapter 12, appropriate checklist(s) |
| 11/2/2015 | | Review Paper Due  
Exam II (modules 1-9) | |
| Module 10 | You must be kidding ... the realities of conducting scientific studies! The use of animals in research The use of human subjects in research Legal restrictions Other things to consider | Quiz 10 | IRB instructions and forms, HHS document | Legal restrictions
| Module 11 | Other types of Scientific Writing, posters, presentations and grants Grant Writing: overview of problem, specific aims, experimental plan, budget, justification of research and budget, etc. What are the required resources for your proposed work, and how might those resources be acquired? | Quiz 11 | McMillan Chapter 10 | Other things to consider
| Module 12 | How am I going to pay for all this stuff? Funding a research project UNK sources of funds (RSC and departmental) Extramural funding sources (largely limited to professional scientists) Peer reviews of student grants | Quiz 12 | RSC application (budget example) | Thanksgiving Break
| Module 13 | Peer review of student grants (cont.) | A6: generic grant application | Student grants posted to file exchange of the discussion groups | Final Exam
| Last Day of Course | Note that this is on a **Thursday** afternoon. Course closes and becomes unavailable a few days later. |   |   |   |