Molecular Biotechnology
BIOL 844 (Online Course)
Spring 2017

Course Description

The course will consist of a short review of pertinent principles in protein structure and function, enzyme mechanisms and kinetics, and the basics of the genetic dogma and recombinant DNA technology. The bulk of the course will be made up of a topical consideration of subjects in biotechnology such as: the production of protein pharmaceuticals, genetic engineering of animals and plants, and cloning of organisms. Special consideration will be given to the molecular mechanisms behind the processes discussed. Offered online, Spring of odd-numbered years.

Learning Objectives
1. Understand Genomics and Gene Expression
2. List and describe functions of data mining in the context of Proteomics
3. Describe the process of Protein engineering
4. Describe how environmental biotechnology can impact environmental health
5. Understand how transgenic plants are created and their roles in agriculture
6. Understand how transgenic animals are created and their roles in agriculture
7. Describe the cloning process and how stem cells can be utilized in this process
8. Discuss biological warfare and bioethics in biotechnology

Instructor

Dr. Rachel Hellmann Whitaker
Office Location: Bruner Hall of Science (BHS) 315
Phone: 308-865-8085 (Instructor)
308-865-8548 (Biology Department)

Email: whitakerra@unk.edu
Office hours: 10-11am Mon, Tue, Thu; and by appointment
Blackboard discussion boards: you may also post general comments/questions/concerns on weekly discussion boards. Please ensure that these questions are general (rather than pertaining to you specifically).

As this is an online course, email or posts on the weekly discussion board are the best ways to contact me. I will respond to emails and discussion board posts within 48 hours.
Course Materials

- **Technical Requirements**: Full access to a computer and Internet are required for this course.

Course Structure

I will have all weekly materials up on Blackboard by Monday, and an announcement will always go up at this same time letting you know that all materials are up, and provide any information and other details you need to know for that particular week.

Each week I will post:
- Video lectures
- Notes/outline corresponding to the lecture videos
- Assigned readings from the textbook or supplemental readings that I will provide you
- Weekly quiz
- Link to the week’s discussion board for questions/concerns/comments
- Possibly occasional short length movies to help understand concepts

Assessments

Your progress in class will be assessed by weekly quizzes and 4 Exams.

- **Quizzes**
  - Weekly, 10pts each (total of 9 quizzes)
  - Multiple-choice questions (5-10 questions worth 1-2pts each)
  - 2 attempts allowed, only the score from your final attempt will be recorded
  - 6-day access to each weekly quiz
  - Timed at 10 minutes per quiz

- **Exams**
  - 100pts each (total of 4 Exams)
  - Multiple choice, matching, fill-in the blank, short answer (1-2 sentence answers) questions (~50 questions)
  - 1 attempt only
  - 6-day access to each Exam
  - Timed at 60 minutes per Exam
  - The final Exam is partially comprehensive and all other exams will cover
topics from indicated lectures (see class schedule)

- **Grades**
  3 Regular Exams* (100pts each) – 300pts
  1 Final Exam** (100pts) – 100pts
  1 Introduction post – 5pts
  1 Initial writing assignment – 5pts
  9 Quizzes – 90pts

**TOTAL: 500pts**

* Regular Exams will cover topics from indicated lectures
** Final Exam will be partially comprehensive, i.e. 50% comprehensive, 50%
  focused on topics from indicated lectures

**Grade Assignment**

Final grades will be assigned using the following grading scale:
All grades are final unless there is a calculation error.

**Expectations from students**

- As students enrolled in this class it is your responsibility to log in to
  blackboard every week and keep up with all weekly course materials. Seek
  help when you need it and do not wait till the last moment to do this.

- You must log on to Blackboard at least weekly and keep up with the
  announcements that I post. You will not get an email of all the
  announcements so you MUST check in to Blackboard and make sure that you
  keep up with the Announcements and stay informed about what is
  happening and going to happen in class.

- It is your full responsibility to complete Exams and Quizzes within the time
  that they are available. Exams and quizzes are available for 6 days and 2
  Quiz attempts are allowed – **In the exceptional situation that an
  extension is provided I will require documentation of a legitimate
  excuse (fully up to my discretion)**

- All quizzes and exams (except the final) will be available from Tuesday
  – Monday. You MUST do your quizzes within this time frame. Once the quiz is closed, it will
  remain closed. Therefore, please plan ahead to make sure that you get your quiz or exam
  done in time.
- Understandably, you all have several commitments in your life other than this class. Nonetheless, as a student who has registered for this class, it is absolutely your full responsibility to ensure that you can meet the time requirements of this class, and any deadlines.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 - 100%</td>
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<tr>
<td>A</td>
<td>93 - 96%</td>
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<tr>
<td>A-</td>
<td>90 - 92%</td>
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<tr>
<td>B+</td>
<td>88 - 89%</td>
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<tr>
<td>B</td>
<td>83 - 87%</td>
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<tr>
<td>B-</td>
<td>80 - 82%</td>
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<tr>
<td>C+</td>
<td>78 - 79%</td>
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<tr>
<td>C</td>
<td>73 - 77%</td>
</tr>
<tr>
<td>C-</td>
<td>70 - 72%</td>
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<tr>
<td>D+</td>
<td>68 - 69%</td>
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<tr>
<td>D</td>
<td>63 - 67%</td>
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<tr>
<td>D-</td>
<td>60 - 62%</td>
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<td>F</td>
<td>Below 60%</td>
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</table>

- You are encouraged to utilize the discussion board not only for any comments/questions/concerns that you may have, but also to interact with your classmates (provided you keep such interactions primarily related to the class). Always be respectful to everyone when using discussion boards.

**Class Policies**

- **Policy on plagiarism:** Anyone caught plagiarizing any exercise you will receive a 0 for that exercise; subsequent violations will result in referral to the Vice Chancellor for Academic Affairs for dismissal from the university.

- **Policy on incomplete:** To be considered for an incomplete in Biology 830P:
  1. You must submit the reasons you cannot complete the scheduled work. This must include a copy of your class schedule and description of your responsibilities outside the classroom. This should be done in writing and include confirmation from your employer or doctor when appropriate.
  2. You must specify the assignments you have missed and a schedule of plans to complete them.
  3. You must submit a copy of the above information to the Chair of the Department of Biology and the Dean of Natural and Social Sciences.
  4. Upon completion of items 1-3, your request for an incomplete will be considered.

I expect all students to progress through the requirements for Biology 846 in a timely fashion. Unless your circumstance is quite remarkable, do not consider an incomplete.

- **Extensions or rescheduling** of Exams and quizzes will NOT be possible unless circumstances are exceptional – a legitimate excuse (based on my discretion) with provided documentation will be required for such considerations.

- **Assignments, quizzes, exams** will receive zero (0) points if they are not completed within the given due dates.

**Students with Disabilities or Students Who are Pregnant**
It is the policy of the University of Nebraska at Kearney to provide flexible, individualized, and reasonable accommodations to students with documented disabilities or students who are pregnant. To receive accommodation services for a disability, students must be registered with UNK Disabilities Services. Contact David Brandt, in the Academic Success Office, 163 Memorial Student Affairs Building, 308-865-8214 or by email brandtdl@unk.edu to register. For students needing accommodation due to pregnancy, you need to contact Student Health. (The following link provides information for students and faculty regarding pregnancy rights. http://www.nwlc.org/resource/pregnant-and-parenting-students-rightsfaqs-college-and-graduate-students) Students with disabilities or students who are pregnant need to provide the proper documentation from Disability Services or Student Health to their faculty members in order to receive academic accommodations. Anyone who feels they were not afforded these rights, should contact the campus Title IX/ADA Officer at 308-865-8655. Attached is the link to the above statement for your convenience. http://www.unk.edu/offices/disabilityservices.aspx?id=13673

Please keep in mind that accommodations become valid only after I sign relevant paperwork, therefore if you require any accommodations please contact me, and the relevant office as soon as possible.

**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

**Tentative Class Schedule, BIOL 844, Spring 2017**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Assignment/Quiz/Exam</th>
<th>Reading</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction, Syllabus</td>
<td>Introduction post and writing assignment (due: Jan 16th)</td>
<td>-</td>
<td>1</td>
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<tr>
<td>Genomics and gene expression</td>
<td>-</td>
<td>Chapter 8</td>
<td>2</td>
</tr>
<tr>
<td>Proteomics</td>
<td>Quiz 1 (Covers Wk 2 material)</td>
<td>Chapter 9</td>
<td>3</td>
</tr>
<tr>
<td>Protein engineering</td>
<td>Quiz 2</td>
<td>Chapter 11</td>
<td>4</td>
</tr>
<tr>
<td>Topic</td>
<td>Quiz/Exam</td>
<td>Chapter (Module)</td>
<td>Section</td>
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<tr>
<td>Environmental biotechnology</td>
<td>Exam 1 (Covers Module 1, Wk 2-4 material)</td>
<td>Chapter 12</td>
<td>5</td>
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<tr>
<td>Transgenic plants and plant biotechnology</td>
<td>Quiz 3 (Covers Wk 5 material)</td>
<td>Chapter 15</td>
<td>6</td>
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<tr>
<td>Transgenic plants and plant biotechnology</td>
<td>Quiz 4 (Covers Wk 6 material)</td>
<td>Chapter 15</td>
<td>7</td>
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<tr>
<td>Transgenic animals</td>
<td>Quiz 5 (Covers Wk 7 material)</td>
<td>Chapter 16</td>
<td>8</td>
</tr>
<tr>
<td>Transgenic animals</td>
<td>Exam 2 (Covers Module 2, Wk 5-8 material)</td>
<td>Chapter 16</td>
<td></td>
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<tr>
<td>Cloning and Stem cells</td>
<td>Quiz 6 (Covers Wk 9 material)</td>
<td>Chapter 18</td>
<td>10</td>
</tr>
<tr>
<td>Biological warfare: infectious disease and bioterrorism</td>
<td>Quiz 7 (Covers Wk 11 material)</td>
<td>Chapter 22</td>
<td>12</td>
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<tr>
<td>Forensic molecular biology</td>
<td>Exam 3 (Covers Module 3, Wk 9-12 material)</td>
<td>Chapter 23</td>
<td>13</td>
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<tr>
<td>Bioethics in biotechnology</td>
<td>Quiz 8 (Covers Wk 13 material)</td>
<td>Chapter 23</td>
<td>14</td>
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<tr>
<td>Bioethics in biotechnology</td>
<td>Quiz 9 (Covers Wk 14 material)</td>
<td>Chapter 23</td>
<td>15</td>
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<tr>
<td>Q &amp; A</td>
<td>Q &amp; A</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>FINALS</td>
<td>FINAL EXAM (Covers all modules, Wk 2-14 material)</td>
<td></td>
<td>17 FINALS WEEK</td>
</tr>
</tbody>
</table>

- Quizzes will be available from 12:00pm (CST) on Tuesdays until Monday 12:00pm (CST)
- During Exam weeks, Exams will be available from 12:00pm (CST) on Tuesdays until Monday 12:00pm (CST)
- The final Exam will be available on the 12:00pm (CST) Thursday before finals week till Wednesday 12:00pm (CST) of finals week