The University Of Toledo
Existing Graduate Course Modification Form

* denotes required fields

Contact Person*: Robert Steven
Phone: 530-7890 (xxx-xxxx) Email:
robert.steven2@utoledo.edu

Present
Supply all information asked for in this column. (Supply core, research intensive and transfer module info if applicable)

College*: College Nat Sci and Mathematics
Dept/Academic Unit*: Biological Sciences
Course Alpha/Numeric*: BOL 6020

Course Title:
Advanced Molecular Biology Laboratory
Credit hours: Fixed: 3 or Variable: to

CrossListings:
Insert
To add a course, type in course ID and click the Insert button.

Remove
To remove a course, select the course on left and click the Remove button.

Proposed
Fill in appropriate blanks only where entry differs from first column.

College: [Select a College]
Dept/Academic Unit: [Select a Department]
Course Alpha/Numeric:

Course Title:
Credit Hours: Fixed: 2 or Variable: to

CrossListings:
Insert
To add a course, type in course ID and click the Insert button.

Remove
To remove a course, select the course on left and click the Remove button.

Prerequisite(s)(if longer than 50 characters, please place it in Catalog Description):

Corequisite(s)(if longer than 50 characters, please place it in Catalog Description):

Catalog Description (only if changed) 75 words max:
Library screening and sequencing of selected clones.

Catalog Description (only if changed) 75 words max:
Students will gain a working knowledge of essential laboratory techniques used in molecular biology. These techniques, including polymerase chain reaction (PCR), electrophoresis, DNA cloning, microscopy and transfection, will be used in a course project to express and analyze a protein of interest in cultured mammalian cells. The concepts underlying these procedures will be studied online before the lab. This course is designed to prepare students for careers in research, biotechnology and science education.
Has course content changed?  
- Yes  
- No

If course content is changed, give a brief topical outline of the revised course below (less than 200 words):

The revised course updates the topics covered to focus on techniques in wide use in the majority of molecular biology labs; techniques that are essential for the manipulation and analysis of DNA and proteins as performed in labs studying life science topics such as cancer, neurobiology, immunology and microbiology. Students will study the necessary theory behind the techniques online before coming into the lab to learn how to effectively perform the techniques. The specific laboratory techniques students will learn include polymerase chain reaction (PCR), gel electrophoresis for the separation of DNA, polyacrylamide gel electrophoresis (PAGE) and western blotting for protein analysis, maintaining mammalian cells in culture, transfections, transformations, DNA cloning and fluorescence microscopy. These techniques will be used in a course project to manipulate and analyze sample proteins expressed in tissue culture cells.

Proposed effective term*: 201530  
(e.g. 201140 for 2011 Fall)

<table>
<thead>
<tr>
<th>File Type</th>
<th>View File</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syllabus</td>
<td>View</td>
</tr>
</tbody>
</table>

List any course or courses to be deleted.

Rationale:

Course is being offered as part of the Masters of Education in Science (Biology track) program, changes in course content and credits better match content and learning objectives of this course. Course will be offered as an intensive 1 week, 8hr/day in-lab format (see attached syllabus).

Approval:

Department Curriculum Authority:  
- John Plenefisch  
  Date  
  2015/02/21

Department Chairperson:  
- Douglas W Leaman  
  Date  
  2015/02/21

College Curriculum Authority or Chair:  
- Johan Gottgens  
  Date  
  2015/02/25

College Dean:  
- Brian Ashburner  
  Date  
  2015/02/27

Graduate Council:  
- [Signature]  
  Date  
  4-25-15  
  (GC 4-7-2015)
Advanced Molecular Biology Laboratory
BIOL 6020 - August 3-7, 2015
9:00 a.m.-5:00 p.m. in WOXXXX

Instructor

Dr. Robert Steven
Office: WO3235
Phone: 419-530-7890
Email: robert.steven2@utoledo.edu
Office Hours: By appointment

Course Description

Students will gain a working knowledge of essential laboratory techniques used in molecular biology. These techniques, including polymerase chain reaction (PCR), electrophoresis, DNA cloning, microscopy and transfection, will be used in a course project to express and analyze a protein of interest in cultured mammalian cells. The concepts underlying these procedures will be studied online before the lab sessions. This course is designed to prepare students for careers in research, biotechnology and science education.

Main Learning Outcomes

Students who successfully complete the course will be able to:

• Perform the techniques essential for the operation of a molecular biology lab including those required for the manipulation and analysis of DNA, protein and tissue culture cells.
• Understand the concepts underlying the techniques used in a molecular biology lab.
• Apply these techniques in the analysis of protein, nucleic acid and cell function.
• Interpret data sets.
• Understand the scientific method and what constitutes good experimental design.
Teaching Strategies

This course will be taught using a combination of 1) online delivery of reading and video materials, 2) mini-lecture presentations and 3) hands-on demonstrations of lab techniques and computer applications.

Required Materials

The materials required to complete this course will be supplied online through the Blackboard course management website (https://blackboard.utdl.edu). Computer and internet access will therefore be required. The following Browser Check Page will enable you to perform a systems check on your browser to ensure that your browser settings are compatible with Blackboard:
http://www.utdl.edu/utlv/Bb9BrowserCheck/innovation/blackboard/browsercheck.html

- **Clicker**: Turning Technologies response cards are available in the UT bookstore and elsewhere. The most basic model is sufficient. Register your clicker ID on Blackboard (see below).
- **Supplementary resources**: The following resources contain a wealth of information and may be referenced as necessary. Current Protocols in Molecular Biology (Wiley Publisher), and Molecular Cloning (Green and Sambrook; Cold Spring Harbor Laboratory Press).

Prerequisites

Instructor approval is required.

General Information

- Information required for the day’s in-lab activities will be available for download from Blackboard the day before the lab.
- All grades will be posted in the Gradebook on Blackboard. Contact the instructor immediately if there are any issues regarding the posted grades.
- Put away your cell phone while in the lab. Make sure it is off or in silent mode.
- If you bring a laptop or tablet to the lab please use it for note taking only.
- If you wish to make audio recordings of the mini-lectures for your personal use, please ask the instructor first. Recordings are not to be distributions without the permission of the instructor.
- A list of valuable resources, to help students with their academic and social life at the University of Toledo, can be found at “www.utoledo.edu/menu/current.html”. This includes tutoring services, the writing center, library information, and IT services among others.

Lab Safety

- Do not enter the lab without the instructor present.
- Strict adherence to the dress code (see below) is required.
- No drinking, eating, or chewing of gum or tobacco in the lab.
• Keep your lab bench clean and free of books, papers, coats, etc.
• Wear protective eyewear as necessary.
• Do not wear contact lenses in the lab.
• Do not pipette by mouth.
• Dispose of solutions and other waste products in the correct location.
• Broken glass must be carefully placed in the labeled glass disposal box.
• No unauthorized experiments are to be performed.
• Wash hands during the lab as necessary and at the conclusion of the lab.

**Dress Code**

Shoes must completely cover the feet. No sandals are allowed. Pants/shorts/skirts must be at least knee length to provide adequate protection. Tops must have a sleeve and cover the shoulder and midriff areas.

**Student Evaluation**

Your final grade will be calculated as follows:

- 40% Five in-lab quizzes (8% of your final grade for each)
- 15% Lab write-ups
- 10% Assessment of in-lab activities
- 15% Final exam
- 10% Online quiz homework
- 10% In-lab clicker questions
- 100%

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
<td>A</td>
<td>67-70%</td>
</tr>
<tr>
<td>87-89%</td>
<td>A-</td>
<td>63-66%</td>
</tr>
<tr>
<td>83-86%</td>
<td>B+</td>
<td>59-62%</td>
</tr>
<tr>
<td>79-82%</td>
<td>B</td>
<td>55-58%</td>
</tr>
<tr>
<td>75-78%</td>
<td>B-</td>
<td>50-54%</td>
</tr>
<tr>
<td>71-74%</td>
<td>C+</td>
<td>&lt;50%</td>
</tr>
</tbody>
</table>

**Homework**

- Homework will be completed using the Blackboard course website.
- Homework will consist of pre-lab quizzes based on online readings and videos.
- Quiz questions will include fill-in-the-blanks, multiple choice, short answer, and short essay.
- A component of the homework will be due the day before the lab starts.
Absences

- Make-up tests/assignments and adjustments to clicker grades or homework deadlines will only be provided for serious medical or personal reasons that are backed up with the proper documentation such as a doctor’s note. Accommodations will be made only if the instructor is notified by email or phone call as soon as possible after the absence.
- Additional information regarding absences can be found in the University of Toledo Missed Class Policy, located at www.utoledo.edu/fac senate/missed_class_policy.html.

Technical Support

If you encounter technical difficulties with Blackboard, please contact the UT Online Help Desk at (419) 530-8835 or utdl@utoledo.edu. The Help Desk offers extended hours in the evenings and on weekends to assist students with technical problems. When calling after hours, leave a detailed message, including your Rocket Number and phone number, and an Online Learning staff member will respond on the next business day. The UT Online Help Desk website is available at: http://www.utoledo.edu/dl/helpdesk/index.html

Technical questions related to on-campus Internet access, hardware, and UTAD account management can be directed to UT’s IT Help Desk at (419) 530-2400 or ithelpdesk@utoledo.edu. The IT Help Desk website is http://www.utoledo.edu/it/CS/HelpDesk.html.

University Policies

Policy Statement on Non-Discrimination on the Basis of Disability:
- The University of Toledo abides by the Americans with Disabilities Act (equal and timely access) and Section 504 of the Rehabilitation Act of 1973 (non-discrimination on the basis of disability). If you have a disability and are in need of academic accommodations, but have not yet registered with the Office of Academic Access (OA) please contact the office by phone (419-530-4981) or email as soon as possible for more information and/or to initiate the process of accessing academic accommodations.
- Students receiving accommodations through OA are encouraged to discuss these with the instructor, after class or during my office hours, so that s/he may be better informed on how to assist you during the semester.

Academic Dishonesty:
- The university policy on academic dishonesty can be accessed at: “http://www.utoledo.edu/dl/students/dishonesty.html”
- Bringing a clicker to class for someone else is considered academic dishonesty for both students involved. Both students will be sanctioned according to university policy.
- Do not talk to other students or use electronic devices during quizzes and examinations. Keep your eyes on your own work. Those that violate these rules will receive an F for that evaluation.
# Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 1-2</td>
<td></td>
<td>Complete Advanced Readings Videos and Quizzes on Blackboard</td>
</tr>
<tr>
<td>Aug 3</td>
<td>1</td>
<td><strong>Discussion: Cell Culture and DNA Cloning Basics</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab Project 1: PCR Product Cloning for RNAi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab Project 2: Cell Transfection</td>
</tr>
<tr>
<td>Aug 4</td>
<td>2</td>
<td><strong>DNA Sequence Analysis Using APE Software</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab Project 1: Bacterial Culture Inoculation</td>
</tr>
<tr>
<td>Aug 5</td>
<td>3</td>
<td>Lab Project 1: DNA Minipreps and Analysis</td>
</tr>
<tr>
<td>Aug 6</td>
<td>4</td>
<td><strong>Lab Project 1: DNA Fragment Purification and Cloning</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab Project 2: Cell Lysis, PAGE and Western Blotting</td>
</tr>
<tr>
<td>Aug 7</td>
<td>5</td>
<td>Lab Project 1: DNA Minipreps and Analysis II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab Project 2: Probe Western Blot and Analyze</td>
</tr>
</tbody>
</table>

*Register your **clicker** by 3 p.m. on August 2, the day before first use.*