Washington State University
MAJOR CURRICULAR CHANGE FORM - - NEW/RESTORE COURSE

- ☐ **Please attach rationale for your request, a complete syllabus**, and explain how this impacts other units in Pullman and other campuses (if applicable).
- ☐ **Obtain all required signatures with dates.**
- ☐ **Provide original stapled packet of signed form/rationale statement/syllabus** PLUS **10 stapled copies** of complete packet to the **Registrar's Office**, campus mail code 1035.
- ☐ **Submit one electronic copy of complete packet** to wsu.curriculum@wsu.edu.

Requested **Future** Effective Date: Summer 2016 (term/year) Course Typically Offered: Summer

DEADLINES: For fall term effective date: **October 1st**; for spring or summer term effective date: **February 1st**. See instructions.

NOTE: Items received after deadlines may be put to the back of the line or forwarded to the following year. Please submit on time.

☒ **New Course** ☐ Temporary Course ☐ **Restore Course**

MBioS	586	Molecular Biotechnology Laboratory
course subject/crosslist	course no.	title

1	(3)	Recommended MBioS 585 or concurrent enrollment
Credit hrs	lecture hrs per week / lab or studio hrs per week	prerequisite

Description for catalog: Laboratory exploration of classical and current techniques involved in cloning, characterization, modification and expression of genes

Additional Attributes: Check all that apply.

☐ Crosslisting (between WSU departments)* ☐ Conjoint listing (400/500):_____

☐ Variable credit:_____ ☐ Repeat credit (cum. max. hrs):_____

Special Grading: ☐ S, F; ☐ A, S, F (PEACT only); ☐ S, M, F (VET MED only); ☐ H, S, F (PHARMACY, PHARDSCI only)

☐ Cooperative with UI ☐ Other (please list request): _____

The following items require prior submission to other committees/depts. (SEE INSTRUCTIONS.)

☐ Request to meet Writing in the Major [M] requirement **(Must have All-University Writing Committee Approval.)**

☐ Request to meet UCORE in _____ **(Must have UCORE Committee Approval › › See instructions.)**

☑ Special Course Fee $ 100.00 **(Must submit request to University Receivables.)**

Contact: Todd Farmerie Phone number: 335-1138 Campus mail code: 7520

Email: farmerie@vetmed.wsu.edu Instructor, if different:_____

9/24/15	9-27-15	
Chair/date	**Dean/date**	**All-University Writing Com / date**
Chair (if crosslisted/interdisciplinary)*	**Dean (if crosslisted/interdisciplinary)***	**UCORE Committee Approval Date**
Catalog Subcommittee Approval Date	**GSC or AAC Approval Date**	**Faculty Senate Approval Date**

***If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.**

This two-course proposal is intended to provide the primarily-online students of the Professional Science Masters (PSM) program with an understanding of the techniques used in molecular biology from the perspective of their application in a laboratory setting. The program includes individuals who aspire to manage experimental laboratories, as well as secondary education instructors who may wish to integrate some of these techniques and principles into their classrooms. PSM leadership thinks that both of these groups would benefit from an understanding of the procedural nuts and bolts involved in these techniques, knowledge that on-campus students typically gain through their laboratory work.

The proposed courses complement several changes being instituted in the MBioS graduate curriculum. The content of MBioS 503 & 504 (Molecular Biology I & II) has been merged into a single class that mostly depends on analysis of primary scientific literature. This will result in the elimination of much of the molecular technique content that had been in these classes. The new courses are intended to serve as electives for the PSM curriculum, replacing the discontinued MBioS 504. The courses also fit with the modular course credit structure of the newly-instituted Topics courses (MBioS 525, 529), allowing a mix-and-match opportunity involving those courses and either of the proposed offerings.

While there is passing mention of techniques in most graduate biomedical courses, it is done with a view toward learning the cell or molecular processes the techniques are used to study, while the proposed courses focus on the techniques themselves. A couple of current classes have more significant coverage of molecular techniques:

- MBioS 503/504: Molecular Biology I & II. In the past, certain instructors of these team-taught courses would focus on molecular techniques for their third of the course. Most have focused more on cellular mechanisms, only introducing techniques where they might elucidate these processes. The expansion of the scope of 503 to include material formerly covered in 504, and the latter's discontinuance, will leave little directed instruction in molecular techniques in MBioS 503.
- CHE/MBioS 574: Protein Biotechnology. This on-campus course primarily serves the Biotechnology Training Program. It includes a handful of lectures addressing the basic techniques involved in biotechnology, but the course primarily focusses on the production of marketable products. It emphasizes group planning, large-scale production, commercialization and entrepreneurship. The proposed courses will cover protein biotechnology procedures in more detail, and will also include a range of techniques that do not form part of the material covered by 574.

MBioS 585 will be delivered on-line, with 30 instructional units roughly corresponding to 50-minute lectures. MBioS 586 is a hybrid course, with 40 hours of laboratory activities in the presence of the instructor, coupled with additional on-line assignments and activities that should take a minimum of 5 hours. The courses have been developed and will be taught by Dr. Todd Farmerie, annually during summer sessions. Compensation will use a combination of base pay and enrollment-based revenue model (Annual Average Full Time Equivalent Revenue Model). Dr. Farmerie has been teaching MBioS 504, which is slated for removal from the schedule, making the offering salary-neutral. Department-controlled laboratory space has been identified for MBioS 586, with reagents purchased through a course fee. We are coordinating with Global Campus for the online-delivery components of the courses. Publicity will be through the existing PSM marketing, as well as selected on-campus posting and emails.

MBioS 586
Molecular Biotechniques Laboratory
Summer 2016

Course Overview
1 credit
Times: 18-22 July 2016, 8:30 – 12:00, 1:00-5:30
Location: 414 Abelson Hall, WSU Pullman

Prerequisites
Recoomended MBioS 585 or concurrent enrollment

Course Instructor

Instructor: Todd Farmerie
Office: 321 BLS
Email: farmerie@vetmed.wsu.edu
Phone: (509) 335-1138
Office Hours: After lab or by email

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Office: TBA
Email: TBA
Phone: TBA
Office Hours: TBA

Course Overview
The techniques of molecular biology have become pervasive in the biological and medical fields, as well as more diverse areas of study, such as anthropology and soil science. However the frequent use of commercial kits and 'cookbook' protocols often leaves practitioners with an insufficient understanding of the basic principles to enable them to troubleshoot problems. This class represents a companion to MBioS 585, which covers the mechanistic and technical underpinnings in more detail. This laboratory class will provide experience performing a set of typical and novel techniques, and exposure to some of the equipment used in the fields that apply molecular techniques to answer biological questions.

Students will perform a mix of experiments ranging from basic DNA purification and manipulation to cutting-edge approaches such as CRISPR editing and isothermal amplification of DNA. They will interpret and troubleshoot their results, and will keep a detailed laboratory notebook. After conclusion of the lab exercises, students will present their results to their peers, and discuss their own results as well as those of others.

Course Materials
A customized lab manual will be provided upon arrival.

Graded Assessments
A. Notebook (75 pts) – The experiments performed should be fully documented in a research notebook. The record should be complete, detailed, well organized and clear, such that it could be used in preparing a research publication or be consulted by another individual to repeat the experiments.

B. Protocol (25 pts) – Each student will be assigned an experimental approach, and will provide a detailed protocol for performing an experiment. It should identify the samples to be prepared, including appropriate controls, and detail the reagents (including buffers) and their amounts, reaction conditions and times, and equipment to be used. A step-by-step description of the experiment to be done should be given in a format that can be easily followed in a laboratory setting. Due at the start of the lab week.

C. Presentation (50 pts) – After the lab week has been completed, students will prepare a 'virtual lab meeting' presentation. A voice-over PowerPoint presentation should describe the goals of the activities and the experimental procedures. They should report, interpret and evaluate any data acquired. The presentation should include difficulties that were encountered and how they might be avoided, and indicate the experiment(s) that would follow from their results. After submission, all students should provide peer feedback to each of their classmates.

Total: 150 pts

Grading

Grades will be assigned based on points earned as follows:

A	≥90% (135)	D	≥60% (90) - <70%
B	≥80% (120) - <90%	F	<60%
C	≥70% (105) - <80%		

Course objectives and student learning outcomes

By the end of this course, students will be able to:

1. Apply this knowledge to experimental design.
2. Conduct designed experiments with good laboratory practice
3. Troubleshoot unexpected experimental findings
4. Appropriately document and evaluate their experimental findings.
5. Describe and predict outcomes of future experiments.

Mapping of Student Learning Outcomes

Student Learning Outcomes for this course:	Course Topics The following topic(s) will address this outcome:	Evaluation of Outcome (Assessments)
1. Apply to design	Pre-and post-lab Discussions	B
2. Good Practice	Pre-and post-lab Discussions	A, B, C
3. Troubleshoot	Pre-and post-lab Discussions	C
4. Document and evaluate findings	Pre-and post-lab Discussions	A, C
5. Predict outcomes	Pre-and post-lab Discussions	C

Late Assignments

Assignments are due by midnight at the end of their due date, as given in the schedule. For the majority of assignments, this falls at the end of the lecture portion of the course. Each day or portion thereof that an assignment is late will result in a deduction of 20% from the total available points for that assignment. No assignments will be accepted for grading after three full calendar days, although students are encouraged to complete late assignments so as not to miss out on the learning opportunity each entails.

Laboratory Comportment

Students should maintain a professional demeanor in all interactions with the professor, Virtual Mentor, TA, staff and classmates. During the laboratory portion of the course, the work areas should be kept clean and professional, and students must follow lab safety rules *at all times.* Failure to do so may result in deduction of points.

Attendance and Participation Policy

Students should plan on attending the entire laboratory week. A student unable to attend should withdraw from the class. If unavoidable circumstances interrupt a student's participation during the week, a decision will be made based on the proportion of activities completed whether the participation up to that point merits grading based on that portion completed, an incomplete grade for the class, or will necessitate a failing grade if the student does not withdraw.

Disabilities Accommodation

For on-campus lab: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

For online component: Reasonable accommodations are available in online classes for students with a documented disability. All accommodations must be approved through your WSU Disability Services office. If you have a disability and need accommodations, we recommend you begin the process as soon as possible. For more information contact a Disability Specialist on your home campus:

- **Pullman or WSU Online**: 509-335-3417 http://accesscenter.wsu.edu, Access.Center@wsu.edu
- **Spokane**: http://spokane.wsu.edu/students/current/studentaffairs/disability/
- **Tri-Cities**: http://www.tricity.wsu.edu/disability/
- **Vancouver**: 360-546-9138 http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services

Academic Integrity
Each student must turn in their own original work, using their own words. No assignment that is team composed, ghost-written, plagiarized or contains excessive quotation will be acceptable. Students who violate WSU's Standards of Conduct for Students will receive an F for the assignment or for the entire course, without the opportunity to withdraw, depending on the severity of the misconduct. All infractions will be reported to the Office of Student Conduct. For a detailed description of cheating, see http://apps.leg.wa.gov/wac/default.aspx?cite=504-26-010. It is strongly suggested that you read and understand these definitions.

Distribution of the course material, including but not limited to assignments and the laboratory manual, to third parties for the purpose of academic misconduct or commercial gain is prohibited.

WSU Safety Statement
Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Safety is the responsibility of every member of the campus community and individuals should know the appropriate actions to take when an emergency arises. In support of our commitment to the safety of the campus community the University has developed a Campus Safety Plan, http://safetyplan.wsu.edu. It is highly recommended that you visit this web site as well as the University emergency management web site at http://oem.wsu.edu/ to become familiar with the information provided.

Provisional Lab schedule:
Extended incubation times will both allow and require multi-tasking, so experiments will not be performed as isolated exercises. Rather, steps for one experiment will be performed during incubation times for another, and a single experiment will be spread over numerous days. Thus the schedule below is only representative of the major experimental components of each time block.

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 AM-9 AM	Pre-Lab Discussion	Pre-Lab Discussion	Pre-Lab Discussion	Pre-Lab Discussion	Pre-Lab Discussion
9 AM-12 Experiments	Cloning	RT-PCR, Tissue Culture	Cloning, Genetic screening	Blotting; Genetic Screening	CRISPR, Tissue Culture
1-2 PM Facilities	Genomics Core	Transgenic Core	Tissue Culture	Plant Core/ Greenhouse	EM Core
2-5 PM Experiments	Cloning CRISPR	RT-PCR, Cloning	CRISPR, Genetic screening	Blotting	CRISPR, Blotting
5-5:30 PM	Post-Lab Discussion	Post-Lab Discussion	Post-Lab Discussion	Post-Lab Discussion	Post-Lab Discussion