The Ohio State University
Colleges of the Arts and Sciences New Course Request

Microbiology
Academic Unit
Microbiology
Book 3 Listing (e.g., Portuguese)
522.02 **Immunobiology Laboratory**
Number Title
Immunobiol Lab **U G** **3**
18-Character Title Abbreviation Level Credit Hours

Summer Autumn Winter **X** Spring Year **2009**
Proposed effective date, choose one quarter and put an "X" after it; and fill in the year. See the OAA curriculum manual for deadlines.

A. Course Offerings Bulletin Information

Follow the instructions in the OAA curriculum manual. If this is a course with decimal subdivisions, then use one New Course Request form for the generic information that will apply to all subdivisions; and use separate forms for each new decimal subdivision, including on each form the information that is unique to that subdivision. If the course offered is less than a quarter or a term, please complete the Flexibly Scheduled/Off Campus/Workshop Request form.

Description (*not to exceed 25 words*): **Methods in immunobiology**

Quarter offered: **Wi** Distribution of class time/contact hours: **2 2-hr lab 1 cl**
Quarter and contact/class time hours information should be omitted from Book 3 publication (yes or no): **NO**

Prerequisite(s): **Microbiology 522.01 or concurrent**

Exclusion or limiting clause: **Not open to students with credit for Microbiol 522**

Repeatable to a maximum of **0** credit hours.

Cross-listed with:

Grade Option (Please check): Letter **X**☐ S/U ☐ Progress ☐ What course is last in the series? _____

Honors Statement: Yes ☐ No **X**☐ GEC: Yes ☐ No **X**☐ Admission Condition
Off-Campus: Yes ☐ No **X** ☐ EM: Yes ☐ No **X** ☐ Course: Yes ☐ No **X** ☐
Embedded Honors Statement: Yes ☐ No **X** ☐

Other General Course Information:
(e.g. "Taught in English." "Credit does not count toward BSBA degree.")

B. General Information

Subject Code_____ Subsidy Level (V, G, T, B, M, D, or P)_____
If you have questions, please email Jed Dickhaut at dickhaut.1@osu.edu.

1. Provide the rationale for proposing this course:

The demand for the course has outpaced the ability of the department to accommodate the students. Some students desire and need the laboratory experience but many others do not necessarily need the laboratory. Dividing the course into separate lecture and laboratory sections will allow us to meet the increased demand and to provide the level of instruction that is commensurate with the current and future needs of the students.

2. Please list Majors/Minors affected by the creation of this new course. Attach revisions of all affected programs.
This course is (check one): ☐ Required on major(s)/minor(s) ☐ A choice on major(s)/minors(s)
X ☐ An elective within major(s)/minor(s) ☐ A general elective:

3. Indicate the nature of the program adjustments, new funding, and/or withdrawals that make possible the implementation of this new course.
None required

4. Is the approval of this request contingent upon the approval of other course requests or curricular requests?

Yes ☐ No X ☐ List:

5. If this course is part of a sequence, list the number of the other course(s) in the sequence: _____

6. Expected section size: **35** Proposed number of sections per year:

7. Do you want prerequisites enforced electronically (see OAA manual for what can be enforced)? Yes X ☐ No ☐

8. This course has been discussed with and has the concurrence of the following academic units needing this course or with academic units having directly related interests (*List units and attach letters and/or forms*):
Not Applicable ☐

9. **Attach a course syllabus that includes a topical outline of the course, student learning outcomes and/or course objectives, off-campus field experience, methods of evaluation, and other items as stated in the OAA curriculum manual and e-mail to asccurrofc@osu.edu.**

Approval Process The signatures on the lines in ALL CAPS (e.g. ACADEMIC UNIT) are required.

1. Academic Unit Undergraduate Studies Committee Chair	Printed Name	Date	
2. Academic Unit Graduate Studies Committee Chair	MICHAEL IBBA	12/18/07	
3. ACADEMIC UNIT CHAIR/DIRECTOR	**Printed Name**	**Date**	

4. After the Academic Unit Chair/Director signs the request, forward the form to the ASC Curriculum Office, 105 Brown Hall, 190 West 17th Ave. or fax it to 688-5678. Attach the syllabus and any supporting documentation in an e-mail to asccurrofc@osu.edu. The ASC Curriculum Office will forward the request to the appropriate committee.

5. COLLEGE CURRICULUM COMMITTEE	**Printed Name**	**Date**
6. ARTS AND SCIENCES EXECUTIVE DEAN	**Printed Name**	**Date**
7. Graduate School (if appropriate)	Printed Name	Date
8. University Honors Center (if appropriate)	Printed Name	Date
9. Office of International Education (if appropriate)	Printed Name	Date
10. ACADEMIC AFFAIRS	**Printed Name**	**Date**

MICROBIOLOGY 522: IMMUNOBIOLOGY
WINTER 2009
LABORATORY SYLLABUS

Instructor – Dr. Abhay Satoskar
Satoskar.2@osu.edu
292-3243

Lab Period I:

A. EXERCISE 1 - Antibody Purification: Part A and B
   1. Introduction to Antibodies - types, classes, structure, and function
   2. Practical uses for Antibodies in the research lab
   3. Purification of unknown antibodies by affinity Chromatography
   4. Use spectroscopic data to calculate purified antibody concentration

B. Supplement: How to use micropipettors
   1. One minute video
   2. Handout

Lab Period II:

A. EXERCISE 1 - Antibody Purification: Part C
   1. Run Bradford Assay using a protein standard and purified unknown antibody.
   2. Introduction to a standard curve: Plot a standard curve using data from Bradford assay
   3. Use Bradford assay data to determine purified antibody concentration

B. EXERCISE 2 - Hematopoiesis: Cells of the Blood
   1. Observe prestained slides of Blood cells under the microscope and identify different cell types.

C. EXERCISE 3 - Antibody Reactions - Radial Immuno Diffusion (RID)
   1. Introduction to a prelab: prepare RID prelab - *due next lab period (Jan 16/17)*

Lab Period III:

A. EXERCISE 3 - Antibody Reactions - Radial Immuno Diffusion (RID): Part A
   1. *Turn in RID pre-Lab*
   2. Set up RID to titer antibody purified in lab period I

B. EXERCISE 4 - The Use of ELISA to Characterize an Antibody - Titering: Part A.1

1. Introduction to ELISA
2. Prepare ELISA pre-lab flow chart for part A.1 and A.2-*due at the end of this lab period*
3. Coat wells of 96 well plate with antigen

Lab Period IV:

A. EXERCISE 3 - Radial Immuno Diffusion (RID): Part B
   1. Measure diameter of precipitin rings. *Turn in your data.*

B. EXERCISE 4 - ELISA – Titering: Part A.2
   1. Add antibody purified in Lab Period I to plate wells coated with antigen in Lab Period III and run ELISA
   2. Read absorbance of your plate. *Turn in your data.*

C. **QUIZ 1 (Ex. 1, 2)**

Lab Period V:

A. EXERCISE 3 – RID: Part C
   1. Generate a standard curve using collated data from Lab period IV to determine the concentration of unknown antibody purified in Lab Period I - *due this lab period.*

B. EXERCISE 4 - ELISA – Titering: Part A.2
   1. Prepare a linear plot of absorbance vs. antibody dilution and determine titer of purified unknown antibody-*due this lab period*

C. EXERICSE 4 - ELISA – Specificity: Part B.1
   1. Prepare ELISA Part B.1 and B.2 pre-Lab- *due at the end of this lab period*
   2. Coat wells of 96 well plate with antigen

Lab Period VI:

A. EXERICSE 4 - ELISA – Specificity: Part B.2
   1 Add antibody purified in Lab Period I to plate wells coated with antigen in Lab Period V and run ELISA
   2. Read absorbance of your plate. *Turn in your data.*

Lab Period VII:

A. EXERICSE 4 - ELISA – Specificity: Part B
   1. Prepare a linear plot of absorbance vs. antibody dilution using your group data
   1. Identify unknown antibody
   2. Discussion of Antibody specificity vs. cross-reactivity

B. EXERCISE 5 - Immunoblotting (Western Blot): Part A
   1. Load and run SDS-PAGE gels
   2. Introduction to SDS-PAGE, Immunoblots and their use in the research lab
   3. Western blot assembly DEMO/practice

4. Set up transfer assembly for transfer of proteins from gel to nitrocellulose
5. When transfer is complete, membranes will be placed in blocking solution for probing in Lab Period VIII.

Lab Period VIII:

A. EXERCISE 5 - Immunoblotting: Part B
   1. Probe membranes with primary and secondary antibodies
   2. Develop via chemiluminescence

B. EXERCISE 6 – Introduction to Tissue Culture Technique: Part A
   1. Video (20 minutes)
   2. Introduction to aseptic cell culture technique using laminar air flow hood
   3. Set up the culture of A20 cells, a mouse B cell lymphoma cell line, using RPMI 1640 medium
   4. Observe suspension vs. adherent cell cultures using inverted microscopes
   5. Stain different cell types provided to you on a slide and observe them under the microscope

C. **QUIZ 2 (Ex. 3, 4A and 4B)**

Lab Period IX:

A. EXERCISE 5 - Immunoblotting: Part B continued
   1. Discuss the results and interpret data
   2. Compare immunoblotting results with ELISA-Part B

B. EXERCISE 6 – Introduction to Tissue Culture Technique: Part B
   1. Harvest A20 cells from the cultures set up in lab VIII
   2. Determine cell number and viability using a hemacytometer

C. EXERCISE 7 - Lymphocyte Signal Transduction: Part A
   1. Stimulate A20 cells for various lengths of times
   2. Lyse the stimulated cells and control cells
   3. Separate lysates by SDS-PAGE
   4. Set up transfers for Western Blot analysis

Lab Period X:

A. EXERCISE 7 - Lymphocyte Signal Transduction: Part B
   1. Probe membranes with primary and secondary antibodies
   2. Develop via chemiluminescence
   3. Interpret data

B. QUIZ 3 (Ex. 5, 6, 7)

C. Lecture MIDTERM I discussion

Lab Period XI:

A. EXERCISE 8 - Role of Complement in Antibody-dependent cell lysis- Jerne Plaque Assay

1. Isolation of lymphocytes from the mouse spleen-done by TA
2. Determination of cell number and viability using trypan blue and a hemacytometer
3. Run Jerne Plaque Assay

B. EXERCISE 9 - Antibody Reactions - Ouchterlony
1. Set up ouchterlony plates using the purified antibodies and antigens
2. Discuss cross reactivity, partial identity of antigens as determined by ouchterlony technique.
3. Compare data from ELISA-Part B and Immunoblotting to ouchterlony

Lab Period XII:

A. EXERCISE 10 - Phagocytosis
1. Video
2. Introduction to phagocytic cells of the immune system
3. Introduction to the endocytic pathway and the phagosome
4. Bactericidal activity of phagocytic cells
5. Infect macrophages with microbe
6. Gram stain of infected macrophage

B. EXERCISE 9 - Antibody Reactions – Ouchterlony
1. Observe the plates for precipitation reactions

C. **QUIZ 4 (Ex. 8, 9, 10)**

Lab Period XIII

A. EXERCISE 11 - Measuring the Bactericidal Activity of macrophages: Greiss Reaction
1. Production of nitric oxide – Run Greiss Reaction
2. Prepare standard curve using data - *due this lab period*

Lab Period XIV:

A. EXERCISE 12 - Viral Hemagglutination/Inhibition of Viral Hemagglutination
1. Run hemagglutination assay

B. EXERCISE 13 – Bactericidal effects of serum

C. **Lecture MIDTERM II discussion**

Lab period XV:

A. EXERCISE 14 - Antibody Reactions - Agglutination - Rheumatoid Factor Test
1. Introduction to agglutination
2. Run Rheumatoid Factor Test

B. EXERCISE 15 - Antibody Reactions – Precipitin reaction
1. Run Precipitin test

C. **QUIZ 5 (Ex. 11, 12, 13)**

Lab Period XVII:

A. EXERCISE 16 - FACS/Immunofluorescence
   1. Intro and DEMO
B. Open Book **QUIZ 6 (Ex. 14, 15, 16)**

Laboratory coordinator: Dr. Madhura Pradhan
Room140, Riffe Building, 496 W. 12th Ave.
pradhan.2@osu.edu , Phone: 292-1196

GRADING

The point breakdown for the lab is as follows:

Six quizzes (10 points each)	60 points
Assignments	30 points
Final Lab Practical	50 points
Lab practice points	10 points
TOTAL	**150 points**

Lab practice points (10 pts) are distributed as follows:

Attendance and completion of laboratory work	5 points
Development of proper laboratory technique	3 points
Participation in lab discussions	2 points

A standard grading scale based on percent of total points earned will be used to determine the grades.

%	
>= 93	= A
90-92	= A-
87-89	= B+
83-86	= B
80-82	= B-
77-79	= C+
73-76	= C
70-72	= C-
67-69	= D+
60-66	= D
<60	= E

ATTENDANCE POLICY

Attendance in the lab is mandatory. It is not possible to make up any missed labs because of the nature of the labs offered in this course. There are total 5 points for the lab attendance and completion of laboratory work. Only one absence with a *valid* excuse is allowed in this course without losing any attendance points. If you miss two or more than two labs, you will lose 1 point for each missed lab. This policy applies to both excused

and non-excused absences. The validity of the excuse will be decided on a case by case basis by your TA and lab coordinator.

Make up Quizzes

Make up quizzes will be offered only to those with valid excused absences. You must provide a document supporting your absence to your lab coordinator in order to arrange for a make up quiz. All make up quizzes will be offered on the last day of labs which is Mar 1st/2nd for Winter 2007.

If you have any questions/concerns or complaints regarding grading of any of the quizzes/assignments offered in this course, you must submit it in writing to your lab coordinator within two lab periods from the date the graded quiz/assignment was received.

ACADEMIC MISCONDUCT

OSU has a strict code of academic misconduct that requires us to report any and all cases of suspected misconduct (e.g. cheating on an exam, plagiarism in written assignments, using an exam proxy, etc.) to the OSU Committee on Academic Misconduct for adjudication. We will adhere to this policy.

ACCOMODATION OF SPECIAL NEEDS

Any students registered with the Office of Disability Services as needing accommodation should make an appointment with the instructor to discuss those needs. Please do this within the first two weeks of the quarter. Only the course coordinator is authorized to sign ODS forms. Please fill out those parts of the proctor sheet forms that are to be completed by the student before bringing the form for signature. This will help us ensure that your individual needs will be met appropriately and fairly.

SEXUAL HARASSMENT

OSU considers sexual harassment offenses to be unacceptable behaviors that disrupt opportunities for learning. While all members of the staff involved in this course have been trained in the OSU sexual harassment policies and procedures, this is not true for all OSU students. Please report any concerns about questionable or unwanted behavior to the instructor.