Department & Course Number | Microbiology, Immunology, and Molecular Genetics 98T  
Course Title | The spread of Drug Resistant Infections: Causes and Response  
Indicate if Seminar and/or Writing II course | Seminar  

1. Check the recommended GE foundation area(s) and subgroup(s) for this course

**Foundations of the Arts and Humanities**
- Literary and Cultural Analysis  
- Philosophic and Linguistic Analysis  
- Visual and Performance Arts Analysis and Practice

**Foundations of Society and Culture**
- Historical Analysis  
- Social Analysis

**Foundations of Scientific Inquiry**
- Physical Science  
- Life Science  
  *With Laboratory or Demonstration Component must be 5 units (or more)*

2. Briefly describe the rationale for assignment to foundation area(s) and subgroup(s) chosen.

Drug-resistant pathogens have led to more deaths than AIDS in recent years. In this course, we will discuss the history of infectious diseases, the development of antimicrobial agents, the rise and causes of drug-resistant microbes, and possible counter-measures. We will introduce the causes and threat of the spread of antibiotic resistance which has led to much controversy among scientists and political figures, while exposing the students to current scientific research articles, including reviews and epidemiological studies.

3. "List faculty member(s) who will serve as instructor (give academic rank):
Elinne Becket, Teaching Fellow; Jeffrey H Miller PhD., faculty mentor

Do you intend to use graduate student instructors (TAs) in this course? Yes  
No

If yes, please indicate the number of TAs

3. Indicate when do you anticipate teaching this course over the next three years:

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012</td>
<td>N/A</td>
<td>YES</td>
<td>N/A</td>
<td>N/A</td>
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3. GE Course Units

Is this an existing course that has been modified for inclusion in the new GE? No

If yes, provide a brief explanation of what has changed.

Present Number of Units: N/A  
Proposed Number of Units: 5
3. Please present concise arguments for the GE principles applicable to this course.

- **General Knowledge**
  In order to tackle the current issues in the battle of drug resistance, students must first learn about microbes in general, antibiotic modes of action, and sources of resistance, therefore a good foundation for the material will be presented for each weekly topic.

- **Integrative Learning**
  Students will be covering areas from antibacterial resistance mechanisms to political bills and labor union issues, thus achieving a well-rounded education in the fight against antimicrobial resistance.

- **Ethical Implications**
  The students will be exposed to the careless use of antibiotics that has led to the emerging threat of antimicrobial resistance, as well as the political motivations behind suppressing the control of these drugs.

- **Cultural Diversity**
  Students will be exposed to the disparity in the spread of infectious diseases between modern and developing nations, and the different types of immediate threats in each.

- **Critical Thinking**
  There is a great deal of conflicting information on antimicrobial topics from sources that are biased in either direction, thus students will be urged to consider all material and question how far the bias extends, thus having both informed and comprehensive presentations and final research papers.

- **Rhetorical Effectiveness**
  Students will be presenting each week on a different topic from the syllabus; each topic covers a controversial issue, and the students will be expected to choose a side and defend it against the class in their presentation.

- **Problem-solving**
  Within their presentations, students will be urged to present possible solutions to the problems associated with their topic, and we will discuss the feasibility of these proposed solutions in class, as well as devise new ones as a group.

- **Library & Information Literacy**
  Students will be required to read new research articles on recent scientific and political developments. Some material may be more challenging, so they will likely need to confer with other literary sources to fully grasp the material, particularly for their research paper and presentation.

### (A) STUDENT CONTACT PER WEEK (if not applicable write N/A)

1. Lecture: 3 (hours)
2. Discussion Section: N/A (hours)
3. Labs: N/A (hours)
4. Experiential (service learning, internships, other): N/A (hours)
5. Field Trips: N/A (hours)

**A TOTAL Student Contact Per Week** 3 (HOURS)

### (B) OUT-OF-CLASS HOURS PER WEEK (if not applicable write N/A)

1. General Review & Preparation: 2 (hours)
2. Reading: 6 (hours)
3. Group Projects: N/A (hours)
4. Preparation for Quizzes & Exams: N/A (hours)
5. Information Literacy Exercises: N/A (hours)
6. Written Assignments: 1 (hours)
7. Research Activity: 3 (hours)

**B TOTAL Out-of-class time per week** 12 (HOURS)

**GRAND TOTAL (A) + (B) must equal at least 15 hours/week** 15 (HOURS)
MIMG 98T Syllabus – The spread of Drug Resistant Infections: Causes and Response

Description: Drug-resistant pathogens have led to more deaths than AIDS in recent years. In this course, we will discuss the history of infectious diseases, the development of antimicrobial agents, the rise and causes of drug-resistant microbes, and possible countermeasures.

Objectives: This course will introduce the causes and threat of the spread of antibiotic resistance, which has led to much controversy among scientists and political figures. The students will be exposed to material not normally presented in other courses, which focuses on the cutting-edge research and developments in the field of fighting antimicrobial resistance in the form of current research articles, including reviews and epidemiological studies.

Throughout the course, students will develop their presentation and written skills, as well as exchange ideas among peers. Students will also learn how to respond to supportive criticisms and how to adjust accordingly.

Oral Assignments: With the exception of Week 1, two students a week will each give a 30 minute presentation based on the topic designated for that week. During the first class meeting, students will be given the list of topics and will sign up for their presentation times and sub-topic on which to present (I will urge the students from scientific disciplines to sign up for sub-topics that have a double asterisk**). Students will meet with me individually for a short (~10 minute) meeting in which we will discuss key points to be included in their presentations.

Written Assignments: Each week students will be given 2 questions for each of the assigned readings, to be turned in during class the following week. The questions are meant to guide the students through the readings in order to give them sufficient background for the upcoming presentations. Additionally, students must pose a question on each topic to ask the speakers each week.

By Week 3, students should email me for approval in the topic on which the final research paper will be based. A rough draft of the 15-18 page paper will be due on Week 6 to allow time for revision before the final paper is due on Monday of finals week.

Grading:

<table>
<thead>
<tr>
<th>Class Discussion:</th>
<th>15%</th>
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<tbody>
<tr>
<td>Class Presentation:</td>
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<tr>
<td>Research Paper:</td>
<td>45%</td>
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<tr>
<td>Take-home questions:</td>
<td>10%</td>
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</table>
**Week 1.** Introduction to antibiotic resistance; background on mechanisms of acquired resistance
   Topic sign-up.

**Week 2.** History of antimicrobial drug development
   **Sub-topic 1:** Timeline and development of antimicrobials since the discovery of penicillin; history of microbial outbreaks and the world’s response, from the Black plague to modern times after the advent of antibiotics.
   **Sub-topic 2:** Recent drug development – drug companies creating antibiotic analogues as opposed to novel classes of drugs; ceasing production of less profitable lifesaving drugs

*Required Reading:*

*Supplementary Reading:*

**Week 3.** The spread of drug resistant microbes
   **Sub-topic 1:** Incidence of MRSA and other drug-resistant bacteria in current infections
   **Sub-topic 2:** The contribution of globalization on the rapid spread of drug resistant microbes; tracking isolates inter-continentially.

*Required Reading:*

*Supplementary Readings:*

**Week 4.** Sources of the spread of multidrug resistant microbes 1: Misuse by individuals
   **Sub-topic 1:** Use of antibiotics against viral infections; prescription misuse; the public’s attitude and doctors’ compliance.
   **Sub-topic 2:** Antibiotics in household products

*Required Reading:*

*Supplementary Reading:*
Week 5. Sources of the spread of multidrug resistant microbes 2: Farming and agriculture

**Sub-topic 1**: The use of antibiotics as growth promoters in farming and agriculture; yes, even in organic foods!
**Sub-topic 2**: Farmers lobby and resistance to governmental regulation; changes in the occurrence of drug-resistant infections in countries with regulations imposed

*Required Reading:*

*Supplementary Readings:*

Week 6. Sources of the spread of multidrug resistant microbes 3: Negligence of drug companies

**Sub-topic 1**: Genetic methods producing a source of drug resistance?
**Sub-topic 2**: Selection of drug-resistance from wastewater contamination.
Development of tests to detect trace levels of drugs in environmental and food samples; the discrepancy between different governmental allowable levels

*Required Reading:*

*Supplementary Reading:*

Week 7. The fight against the spread of multidrug resistant microbes 1: The human microbiome

**Sub-topic 1**: Characterization of the human microbiome – gut, skin, teeth, etc.
**Sub-topic 2**: Microbiome as a protective niche? Probiotics; crosstalk between beneficial bacteria to prevent colonization of pathogenic bacteria

*Required Reading:*

Week 8. Antibiotic reservoirs: Drug resistant genes in non-pathogenic bacteria

**Sub-topic 1**: Drug resistant bacteria in the human gut; transfer of drug resistance to pathogenic bacteria
**Sub-topic 2**: Drug resistant bacteria in soil; ability to use antibiotics as a food source
Required Reading:

Week 9. The fight against the spread of multidrug resistant microbes 2: Phage therapy
Sub-topic 1: Background and concepts behind phage therapy; potential uses and disadvantages/safety
Sub-topic 2: History of the development of phage therapy and therapeutic efficiency

Required Reading:

Supplementary Reading:

Week 10. The fight against the spread of multidrug resistant microbes 3: Vaccine development
Sub-topic 1: History of vaccine development against bacteria: successes and failures
Sub-topic 2: Using genomics as a new method for vaccine development

Required Reading:
# New Course Proposal

**Microbiology, Immunology, & Molecular Genetics 98T**

**Spread of Drug-Resistant Infections: Causes and Response**

<table>
<thead>
<tr>
<th><strong>Course Number</strong></th>
<th>Microbiology, Immunology, &amp; Molecular Genetics 98T</th>
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<tbody>
<tr>
<td><strong>Title</strong></td>
<td>Spread of Drug-Resistant Infections: Causes and Response</td>
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<tr>
<td><strong>Short Title</strong></td>
<td>DRUG RESIST INFECT</td>
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<td><strong>Units</strong></td>
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<td><strong>Grading Basis</strong></td>
<td>Letter grade only</td>
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<td><strong>Instructional Format</strong></td>
<td>Seminar - 3 hours per week</td>
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<td><strong>TIE Code</strong></td>
<td>SEMT - Seminar (Topical) [T]</td>
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<td><strong>GE Requirement</strong></td>
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**Major or Minor Requirement** No

**Requisites** Satisfaction of entry-level Writing requirement. Freshmen and sophomores preferred.

**Course Description** Seminar, three hours. Enforced requisite: satisfaction of Entry-Level Writing requirement. Freshmen/sophomores preferred. Drug-resistant pathogens have led to more deaths than AIDS in recent years. Discussion of history of infectious diseases, development of antimicrobial agents, rise and causes of drug-resistant microbes, and possible countermeasures. Letter grading.

**Justification** Part of the series of seminars offered through the Collegium of University Teaching Fellows.

**Syllabus** File MIMG 98T.doc was previously uploaded. You may view the file by clicking on the file name.

**Supplemental Information** Professor Jeffrey Miller is the faculty mentor for this seminar.

**Grading Structure**
- Class Discussion: 15%
- Class Presentation: 30%
- Research Paper: 45%
- Take-home questions: 10%

**Effective Date** Spring 2012

**Discontinue Date** Summer 1 2012

**Instructor**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Elinne C. Becket</td>
<td>Teaching Fellow</td>
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**Quarters Taught**
- [ ] Fall
- [✓] Winter
- [ ] Spring
- [ ] Summer

**Department** Microbiology, Immunology, & Molecular Genetics

**Contact**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>CATHERINE GENTILE</td>
<td><a href="mailto:cgentile@oid.ucla.edu">cgentile@oid.ucla.edu</a></td>
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**Routing Help**

**ROUTING STATUS**

**Role:** Registrar's Office

**Status:** Processing Completed

**Role:** Registrar's Publications Office - Hennig, Leann Jean (lhennig@registrar.ucla.edu) - 56704
Status: Added to SRS on 5/25/2011 11:37:56 AM
Changes: Title, Description
Comments: Edited course description into official version; corrected title.

Role: Registrar's Scheduling Office - Bartholomew, Janet Gosser (jbartholomew@registrar.ucla.edu) - 51441
Status: Added to SRS on 5/20/2011 11:27:36 AM
Changes: Short Title
Comments: Added a short title.

Role: FEC School Coordinator - Soh, Michael Young (msoh@college.ucla.edu) - 65282
Status: Returned for Additional Info on 5/19/2011 11:06:51 AM
Changes: No Changes Made
Comments: Routing to Registrar's Office

Role: FEC Chair or Designee - Knapp, Raymond L (knapp@humnet.ucla.edu) - 62278
Status: Approved on 5/19/2011 7:42:15 AM
Changes: No Changes Made
Comments: No Comments

Role: L&S FEC Coordinator - Soh, Michael Young (msoh@college.ucla.edu) - 65282
Status: Returned for Additional Info on 5/18/2011 5:28:13 PM
Changes: No Changes Made
Comments: Routing to FEC Chair Ray Knapp for approval

Role: CUTF Coordinator - Gentile, Catherine (cgentile@oid.ucla.edu) - 68998
Status: Approved on 5/12/2011 5:00:03 PM
Changes: No Changes Made
Comments: on behalf of Professor Kathleen Komar, chair, CUTF Faculty Advisory Committee

Role: Initiator/Submitter - Gentile, Catherine (cgentile@oid.ucla.edu) - 68998
Status: Submitted on 5/12/2011 4:58:48 PM
Comments: Initiated a New Course Proposal