General Education Course Information Sheet

Please submit this sheet for each proposed course

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 subgroups(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	
With Laboratory or Demonstration Component must be 5 units (or more)	
• 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:

2011-2012	Fall Enrollment	N/A	Winter Enrollment	**YES**	Spring Enrollment	N/A	

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 tackles 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 counter-measures.

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:

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

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:

Wenzel, RP (2004) "The antibiotic pipeline – challenges, costs, and values." *N Eng J Med* 351(6):523-526.

Supplementary Reading:

Yoneyama H and Katsumata R (2006) "Antibiotic Resistance in Bacteria and its future for novel antibiotic development." *Biosci Biotechnol Biochem* 70(5):1060-1075.

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-continentally.

Required Reading:

Klevens RM, et al (2007) "Invasive Methicillin-Resistant *Staphylococcuse aureus* infections in the United States." *JAMA* 298(15)1763-1771.

Supplementary Readings:

Moellering RC Jr (2010) "NDM-1 – A cause for worldwide concern." *N Eng J Med* 363(25):2377-2379.

Kumarasamy KK, *et al* (2010) "Emergence of a new antibiotic resistance mechanism in India, Pakistan, and the UK: a molecular, biological, and epidemiological study." *Lancet Infect Dis* 10:597-602.

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:

McNulty CAM, *et al* (2007) "The public's attitudes to and compliance with antibiotics." *J Antimic Chemo* 60:i63-i68.

Supplementary Reading:

Pechere J-C, *et al* (2006) "Non-compliance with antibiotic therapy for acute community infections: a global survey." *Int'l J Antimicr Agents* 29:245-253.

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:

Sapkota AR, *et al* (2007) "What do we feed to food-production animals? A review of animal feed ingredients and their potential impacts on human health." *Envir Health Persp* 115(5):663-670.

Supplementary Readings:

Ferber D (2002) "Livestock feed ban preserves drugs' power." *Science* 295:27-28.

Mathew A, et al (2007) "Antibiotic Resistance in bacteria associated with food animals: a United States perspective of livestock production." *Foodborne Path and Dis* 4(2):115-133.

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:

Larsson DGJ and Fick J (2009) "Transparency throughout the production chain – a way to reduce pollution from manufacturing of pharmaceuticals?" *Reg Tox and Pharm* 53:161-163.

Supplementary Reading:

Kummerer K (2009) "Antibiotics in the aquatic anvironment – a review – Part I." *Chemosphere* 75:417-434.

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:

Srikanth CV and McCormick BA (2008) "Interactions of the intestinal epithelium with the pathogen and the indigenous microbiota: a three-way crosstalk." *Interdis Persp on Infect Dis* 2008.

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:

Marshall BM, *et al* (2009) "Commensals: Underappreciated reservoir of antibiotic resistance." *Microbe* 4(5):231-238.

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:

Miedzybrodzki R, *et al* (2007) "Phage therapy of Staphylococcal infections (including MRSA) may be less expensive than antibiotics treatment." *Postepy Hig Med Dosw* 61:461-465.

Supplementary Reading:

Housby JN (2009) "Phage Therapy." *Drug Disc Today* 14(11-12):536-540.

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:

Zagursky RJ and Anderson AS (2008) "Application of genomics in bacterial vaccine discovery: a decade in review." *Current Op in Pharm* 8:632-638.

New Course Proposal

Microbiology, Immunology, & Molecular Genetics 98T Spread of Drug-Resistant Infections: Causes and Response

Course Number	Microbiology, Immunology, & Molecular Genetics 98T
Title	Spread of Drug-Resistant Infections: Causes and Response
Short Title	DRUG RESIST INFECT
Units	Fixed: 5
Grading Basis	Letter grade only
Instructional Format	Seminar - 3 hours per week
TIE Code	SEMT - Seminar (Topical) [T]
GE Requirement	Yes
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	Name	Title
	Elinne C. Becket	Teaching Fellow

Quarters Taught: ☐ Fall ☑ Winter ☐ Spring ☐ Summer

Department: Microbiology, Immunology, & Molecular Genetics

Contact	Name	E-mail
	CATHERINE GENTILE	cgentile@oid.ucla.edu

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

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Comments or questions? Contact the Registrar's Office at
cims@registrar.ucla.edu or (310) 206-7045