

**Micro 130**  
**General Microbiology CRN 61036**

3 units Hale 'Imiloa 123

MW 1:00 – 2:15 pm

**INSTRUCTOR:** Teena Michael PhD  
**OFFICE:** Hale 'Imiloa 130  
**OFFICE HOURS:** M & W 9:45 to 10:45 and by appointment  
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**EFFECTIVE DATE:** Spring 2016

### **WINDWARD COMMUNITY COLLEGE MISSION STATEMENT**

*Windward Community College offers innovative programs in the arts and sciences and opportunities to gain knowledge and understanding of Hawai'i and its unique heritage. With a special commitment to support the access and educational needs of Native Hawaiians, we provide O'ahu's Ko'olau region and beyond with liberal arts, career and lifelong learning in a supportive and challenging environment — inspiring students to excellence.*

### **CATALOG DESCRIPTION**

Fundamentals of microbiology: growth, development, and classification of bacteria, viruses, protozoa, fungi and algae; roles of microorganisms in the environment and human affairs; medical microbiology, immunology, and applied microbiology for food sanitation and public health.

#### **Activities Required at Scheduled Times Other Than Class Times**

- 1) Read the presentations and/or text chapter before class.
- 2) Do the worksheets that are written in the style of the exams.
- 3) Complete "Options" and Project development as described.
- 4) Complete Mastering Microbiology homework.
- 5) Complete extra credit "Outlines" in preparation for "Quiz"
- 6) Complete Take Home exercise (see schedule).

### **STUDENT LEARNING OUTCOMES**

Upon completion of the course, the student will be able to:

- Describe the main morphological characteristics, growth, reproduction and classification of algae, bacteria, fungi, protozoa, viruses and helminthes.
- Discuss etiologies, reservoirs of infection, modes of transmission, signs, symptoms, and treatments and/or methods of prevention of common infectious diseases of humans.
- Describe the basic principles of molecular genetics as they relate to cell division, mutation, genetic engineering, protein synthesis, bacterial virulence, and antibiotic resistance.
- Describe pathogenicity, immunity and allergies.

## COURSE CONTENT

The course is designed to introduce the fundamentals of microbiology, growth, development and classification of microorganisms, role of microorganisms in relation to environment and human affairs. The course also acquaints the students to medical microbiology, microbial genetics, immunology, molecular biology and, applied microbiology for food, sanitation and public health. A successful completion of this course fulfills natural science requirements for AA degree (WCC) and for arts and science BA programs (UHM). A basic knowledge of introductory chemistry, though not required as a prerequisite, is strongly recommended.

## ASSESSMENT TASKS AND GRADING

Your final grade is based on:

<i>Journal Assignments/Article/Movie Review/Reflections</i>	<b>**20 points</b>
<i>Group Project</i>	<b>30 points</b>
<i>Homework &amp; Participation</i>	<b>50 points</b>
<i>3 exams at 100 points each</i>	<b>300 points</b>
<i>Open Book "Quiz"</i>	<b>75 points</b>
<i>Final exam</i>	<b>125 points</b>
<i>Total</i>	<b>600 points</b>

You will be graded according to percentage:

A = 90-100% B = 80-89% C = 70-79% D = 60-69%

**\*\* Elect activities that total 20 points. Requirements for each are described below and \*declare your choices to me! The first journal OR other option is due \*27 January. The other work can be spaced out through the semester and could complement your project. All other work is due at the final or \*before.**

\*Consistent attendance is necessary to learn the information and to perform well in exams.

\*Tests will be made up of objective questions, short answer and short essays; sample questions will be provided throughout the lecture classes. Specific questions will be announced throughout the class that students will appear on the final. Please take the exams as scheduled.

### **Worksheets/Exams**

Worksheets in the style of the exams will be handed out throughout the course.

Successful performance on the exams will require that you can recall, analyze, problem solve and understand the information presented in class. The worksheets are designed to aid you in these processes.

\*I encourage you to work with each other in Google drive (for example). Worksheets will be added to Google documents and you will have open access to work with each other. To do this you need to agree to be constructive (not delete or hamper the work of each other) and contribute! I am available to interact with the class also on Google drive. You can also set up your own good drive documents and invite you friends/colleagues. Worksheets are not graded but are \*important in understanding the material and \*key to doing well on exams.

### **Outlines**

Outlines for Chapters 21-26 (specific diseases of humans systems) are extra credit (2 points each).

Outlines should be about one page and in a style that complements your learning style and objectives.

Completion of all outlines before the Open Book Quiz is important since you can use them for the exam along with a hard copy of the book.

**Twenty point options to mix and match. Turn your work in to DROP BOX.**

**\*Journal 10 points each**

Options for problems or questions for journal entries will be discussed in class. You will be evaluated on: 1) your handling and understanding of basic information; 2) analysis of the problems; 3) inventiveness and 4) correct citing of your reference(s) with in text citing and listing at the end. Each journal is 10 points and should be 1 or more *single-spaced* typed pages.

OPTION 1. How has war influenced medicine? Choose a war that interest you, compile information, refer to your reference(s) as you write and think about the information adding your own thoughts/opinions. List your reference(s).

**\*Reflections \*\*I highly recommend that you do at least one reflection in the first 2 weeks of class!**

Five reflections on class content are options. Three points will be assigned for each reflection with 3 being complete and exploratory or thoughtful, 2 being a collection of information, 1 contains some information but not complete or thoughtful.

**\*Books** You may choose to read a book for 20 points including (but not limited to):

Cook, R. Toxin. 1998

De Kruif, P. Microbe Hunters; the Classic Book on the Major Discoveries of the Microscopic World. 2002

Dixon, B. Animalcules: the Activities, Impacts, and Investigators of Microbes. 2009

Hotez, P. Forgotten People, Forgotten Diseases: the Neglected Tropical Diseases and their Impact on Global Health and Development. 2013

Kaplan, M. Medusa's Gaze and Vampire's Bite: The Science of Monsters. 2012

<http://www.npr.org/2012/10/26/163712865/medusas-gaze-and-vampires-bite>

Karlen, A. Man and Microbes: Disease and Plagues in History and Modern Times. 2003

Klarsfeld, A. & F. Revah. The Biology of Death: Origins of Mortality. 2003

Potten, C. & J. Wilson. Apoptosis: the Life and Death of Cells. 2004

Preston, R. The Hot Zone (1998), Cobra Event (1998), The Demon in the Freezer. 2002

Raymond, B. A Chronology of Microbiology in Historical Context. 2000

Reilly, P. Is it in your Genes? 2004.

Sherman, I. Twelve Diseases That Changed Our World (2007), The Elusive Malaria Vaccine: Miracle or Mirage? 2009

Walters, M. J. Six Modern Plagues and How We Are Causing Them. 2003

Wills, C. Yellow Fever Black Goddess, The Coevolution of People and Plagues. 1996

(Turn in 2 pages of bulleted facts)

**\*Literature** (10 points/short article, 15 points long article). Each student is to choose one or more “short” articles (e.g. Science News) at 10 points each or one “long” article (e.g. Scientific American, 15 points) from any area of microbiology and write a review. The first paragraph will summarize the information, the second will summarize or point out the merits of a web site or other resource that addresses the topic and the third is for you to develop your own thoughts on the information and/or subject. The article(s) may be used to help you prepare for your class project presentation.

**\*Movie** (5 points) Watch a movie and explain/explore the microbiology OR the biology that is relevant to microbiology involved in the movie. Examples include (but are not limited to!) *Food Inc.*, *Emerald Forest*, *Boys from Brazil*, *Gattaca* and *Outbreak*. A movie review is 5 points and should be 1 or more single-spaced typed pages.

### ***Project Guidelines***

Class project/presentation (group) Work in groups of 2-4 to develop and present a project. Each student is to choose a topic near the beginning of the semester, form a group then develop and present a PowerPoint or other presentation form to the class. The starred (\*) topics on the schedule are project areas and presentation dates. For full credit (30 points), you will need to show your understanding of the agent(s) and disease(es) you choose relative to:

- How does the disease/disorder manifest in the body? What is the basic anatomy and physiology of the system that is impacted by the pathogen(s)?
- How is the system protected from pathogens and how is the system is vulnerable to pathogens?
- What are diseases and disease-causing agents of the system?
- How do the disease-causing agents (viral and/or bacterial and/or helminthes and/or other eukaryotes) infect and interact with the system and the host?
- What are signs, symptoms and disease development as well as mechanism of treatment?
- What do the treatments do at the level of the cells and molecules? Can you invent a treatment or cure based on your understanding of molecules and cells?

*Other project approaches have been successfully carried out by students before you, include:*

- How have diseases impacted the Hawaiians (past and/or present)?
- What are diseases of poverty?
- What are microbial diseases that have lead to malpractice lawsuits in Hawaii?
- Did Chagas disease kill Darwin?
- What are cancers caused by viruses?
- What is the microbiology of Food Inc.?
- What is the microbiology of sushi?
- What are diseases of prostitution?
- When did *the plague* hit Oahu and what happened?
- What are nosocomial infections?
- What is Ebola and where did it come from?
- What are fecal transplants and how are they used?

## **LEARNING RESOURCES**

TEXTBOOK: Microbiology: An Introduction; 11th edition. Tortora, Funke and Case. The Benjamin/Cummings Publishing Co., Inc. 2013. \*Other editions of this text are ok to use.\*

MASTERING MICROBIOLOGY is our on-line homework site. This is included in the present text (bookstore). It is ok to use an older book and purchase the access separately.

OPTIONAL RESOURCE BOOK: The Microbiology Coloring Book. Alcano and Alcano. Benjamin/Cummings Publishing Co., Inc. 1997 or other year.

### **DISABILITIES ACCOMMODATION STATEMENT**

*If you have a physical, sensory, health, cognitive, or mental health disability that could limit your ability to fully participate in this class, you are encouraged to contact the Disability Specialist Counselor to discuss reasonable accommodations that will help you succeed in this class. Ann Lemke can be reached at 235-7448, [lemke@hawaii.edu](mailto:lemke@hawaii.edu), or you may stop by Hale 'Akoakoa 213 for more information.*

### **Nondiscrimination and Affirmative Action**

*The University of Hawaii is committed to a policy of non-discrimination on the basis of race, sex, age, religion, color, national origin, ancestry, disability, marital status, arrest and court record, sexual orientation, or veteran status in all of its programs, policies, procedures, or practices. This policy covers admission and access to, participation, treatment and employment in university program and activities.*

**Spring 2016 LECTURE SCHEDULE**

Date	Lecture	Textbook Chapter(s)
Jan 11	Introduction to the Course & Scope	1
13	History of Microbiology Before and After Pasteur	1
18	HOLIDAY	
20	Microbiology Pasteur On and NOW	
25	Chemistry and the Cell	2
27	Chemistry and the Cell *First Journal or other option DUE <i>in drop box</i> by midnight	2
Feb 1	Microscopy & Cells	3, 4
3	Eukaryotic and Prokaryotic Cells	4
8	Prokaryotic and Eukaryotic Cells	4
10	Microbial Metabolism	5
15	Holiday	
17	Microbial Metabolism	5
22	<b>EXAM 1</b>	
24	Microbial Growth & Control	6 & 7
29	Microbial Control	7 (20)
March 2	Genetics	8
7	Genetics	8
9	Biotechnology and Recombinant DNA	9
14	<b>EXAM 2</b>	
16	Classification of Microbes→Eukaryotes	10, 12
21&23	Holiday	
28	Classification of Microbes→Eukaryotes	March 29 Withdraw Date! 12
30	Classification of Microbes→Prokaryotes	11
April 4	Classification of Microbes→Prokaryotes	11
6	Viruses and Prions	13
11	<b>EXAM 3</b>	
13	Disease and Epidemiology	14
18	Microbial Mechanisms of Pathogenicity <b>Open Book Quiz Chapters 21-26 in library or as announced</b>	15
20	Non-Specific Defenses of the Host	16
25	Specific Defenses of the Host	17-19
27	*Nervous, *Skin & Eye	21, 22
	*Cardiovascular/Lymphatic, *Respiratory	23, 24
May 2	*Food and Waterborne, Digestive Infections	25
4	*Urinary and Sexually Transmitted	26
9	<b>FINAL EXAM 1:00 – 3:00 pm</b>	

Note: The order of the topics will remain although the schedule may be modified as we proceed. I will announce any changes ahead of time.\*Presentation dates by topic. The schedule for presentations will be finalized as the projects develop. Have a great semester!