Micro 130
General Microbiology CRN 62027

3 units Hale ‘Imiloa 123
M & W 2:30 –3:45

INSTRUCTOR: Teena Michael PhD
OFFICE: Hale ‘Imiloa 118
OFFICE HOURS: M & W 2:30—1:30 and by appointment
EMAIL: teena@hawaii.edu
EFFECTIVE DATE: Spring 2018

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 Open Book Quiz

REQUIREMENT COURSE SATISFIES

Successful completion of this course fulfills natural science requirements for AA degree (WCC) and for arts and science BA programs (UHM).
AT WCC: (HTTP://http://windward.hawaii.edu/Courses/MICR130/)

- Associate in Arts – Biological Sciences (DB, DY)
- Certificate of Achievement in Agripharmatech: Required for Plant Biotechnology & Ethnopharmacognosy Tracks (http://windward.hawaii.edu/Academics/Agripharmatech_CA/)

At UHM:

- Bachelor of Science Degree Program in Plant and Environmental Biotechnology.
- Accepted as an elective for the following specializations: Plant Biotechnology, General Biotechnology and Environmental-Microbial Biotechnology.

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.

Successful completion of this course fulfills natural science requirements for AA degree (WCC) and for arts and science BA programs (UHM).

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 basic knowledge of introductory chemistry, though not required as a prerequisite, is strongly recommended.

ASSESSMENT TASKS AND GRADING

Your final grade is based on:

OPTIONS:

Journal Assignments/Article/Movie Review/Reflections	***25 points*
Book, PhotoEssay	
Group Project Development and Presentation	*30*
Homework, Exercises & Participation	*100*
3 exams at 100 points each	*300*
Open Book Exam	*75*
Final exam	*125*
Total	*655 points*

You will be graded according to percentage:
A = 90-100% B = 80-89% C = 70-79% D = 60-69%

** Options: Elect activities that total 25 points. *Requirements for each are described below. The first journal OR other option is due *17 January. The other options can be spaced out through the semester and could complement your project. . IF you choose to read a book, let me know and the deadline is extended. All other work is due 4 May or *before.*

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

*Tests will be made up of jeopardy, objective questions (multiple choice, short answer, short essays and drawings). 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.

*See catalog for specifics and calendar for dates in general and for I grades and NC grades.
The last day to withdraw with "W" grade is April 2, 2018.

Worksheets/Exams

Worksheets in the style of the exams will be added to resources, 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). 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.

Extra Credit Outlines
Outlines for Chapters 21-26 (specific diseases of humans systems) are *extra credit* (3 points each). Outlines should be about one page and in a style that complements your learning style and objectives. Include basic aspects of the system and examples of diseases that are 'caused' by bacteria, Protista, Helminths, viruses and prions (for example).

Twenty five 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 to fulfill your 25 points. Five points will be assigned for each reflection with *5* being complete and exploratory or thoughtful, *3* being a collection of information, *1* contains some information but not complete or thoughtful.

****PhotoEssay*** You may choose a subject related to our class eg. Disease and make a photo essay. See me if you choose this option which can be up to 25 points of the options.

****Books*** You may choose to read a book for 25 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
Kaplin, 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 single spaced 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 you your class project presentation.

****Movie*** *(10 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!) *Cowspiracy, Food Inc., Emerald Forest, Boys from Brazil*, *Gattuca* and *Outbreak.* A movie review is 10 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 topic, agent(s) and/or disease(es) you choose relative to:

- How does 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?

The following chapters are excellent references for projects and are the focus of *the extra credit outlines as well as Open Book Exam!

*Skin & Eye, *Nervous	**21, 22**
*Cardiovascular/Lymphatic, *Respiratory	**23, 24**
*Food and Waterborne, Digestive Infections	**25**
*Urinary and Sexually Transmitted	**26**

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.? OR What is the microbiology of sushi?
- What are diseases of prostitution? OR What are emerging diseases?
- 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? OR Microbiome! OR Zika!

LEARNING RESOURCES

TEXTBOOK: Microbiology: An Introduction; 12th edition. Tortora, Funke and Case. The Benjamin/Cummings Publishing Co., Inc. 2013. *EBook with Mastering Microbiology Recommended or other editions of this text are ok to use with separate purchase of Mastering Microbiology.

MASTERING MICROBIOLOGY is our on-line homework site. See Announcement!

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, or you may stop by Hale 'Akoakoa 213 for more information.

Nondiscrimination and Affirmative Action

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Spring 2018 LECTURE SCHEDULE

Date	Lecture	Textbook Chapter(s)
Jan 8	Introduction to the Course & Scope	**1**
10	History of Microbiology Before & After Pasteur	**1**
15	HOLIDAY Martin Luther King	
17	Microbiology Pasteur On and NOW	**1**
22	Chemistry & the Cell	**2**
24	Chemistry & Cells **First OPTION Due in drop box*	**2**
29	Microscopy & Cells	**3, 4**
31	Eukaryotic & Prokaryotic Cells	**4**
Feb 5	Prokaryotic & Eukaryotic Cells	
7	Prokaryotic & Eukaryotic Cells ***EXAM 1 in library Feb 7 through 9***	**4**
12	Microbial Metabolism	**5**
14	Microbial Metabolism	**5**
19	HOLIDAY	**5**
21	Microbial Growth & Control	**6 & 7**
26	Microbial Growth & Control →Genetics	**6 & 7**
28	Genetics ***EXAM 2 in library March 28 through 30***	**8**
March 5	Genetics	**8**
7	Genetics & Recombinant DNA Horizontal Gene Transfer	**8 & 9**
12	Genetics, Biotechnology &Recombinant DNA	**8 & 9**
14	Genetics, Viruses& Prions	**13**
19	Viruses& Prions	**13**
21	***EXAM 3 in library March 19 through 23***	
26-28	HOLIDAY	
April 2	*Classification of Microbes→Eukaryotes	**10 & 12**
4	*Eukaryotes & Prokaryotes *as pathogens*	**12 & 11**
9	*Eukaryotes & Prokaryotes *as pathogens* *Disease & Epidemiology *& (projects)*	**12 & 11** **14, 15**
11	*Microbial Mechanisms of Pathogenicity & Host Defense	**15, 16**
16	*Host Defense ***Open Book Quiz Chapters 21-26***	**17-19**
18	*Nervous, *Skin & Eye *(projects)*	**21, 22**
23	*Cardiovascular/Lymphatic *(projects)*	**23**
25	*Respiratory *(projects)*	**24**
30	*Food & Waterborne, Digestive Diseases *(projects)*	**25**
May 2	*Urinary and Sexually Transmitted Diseases *(projects)*	**26**
May 9	**FINAL EXAM 2:30 – 4:30 am**	

*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!*