GENERAL MICROBIOLOGY
3 Credits (CRN 60023)
WWW and Virtual Course
C19 and DB

INSTRUCTOR: Teena Michael PhD
OFFICE: Hale Palanakila 142
OFFICE HOURS In-person meeting by appointment only
Zoom meeting Topic: Micro Virtual Class and Office Hours
Join Zoom Meeting
https://hawaii.zoom.us/j/93283549152
Meeting ID: 932 8354 9152
Passcode: pandemic
TELEPHONE: (808) 236-9114 EMAIL: teena@hawaii.edu
EFFECTIVE DATE: Fall 2021

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 the Ko‘olau region of O‘ahu 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.

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)
• CA Agripharmatech: Required for Plant Biotechnology & Ethnopharmacognosy Tracks (http://windward.hawaii.edu/Academics/Agripharmatech_CA/)
• Elective for AS in Natural Sciences

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.
Activities Required at Scheduled Times Other than Class Times

1) Read the presentations and text/OER resource 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 assigned homework.
5) Complete extra credit “Outlines” for systems and diseases

STUDENT LEARNING OUTCOMES

As a result of taking this course, students can expect to attain the following outcomes:

- **Describe** and give examples of the main morphological characteristics, growth, reproduction and classification of algae, bacteria, fungi, protozoa, viruses and helminths.
- **Discuss** etiologies, reservoirs of infection, modes of transmission, signs, symptoms, and treatments and/or methods of prevention of common infectious diseases of humans.
- **Describe and discuss** the basic principles of molecular genetics as they relate to cell division, mutation, genetic engineering, protein synthesis, viral and 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 basic knowledge of introductory chemistry, though not required as a prerequisite, is strongly recommended.

The background for our studies this summer includes the pandemic and this will influence both the content and how we consider/apply the content to our lives, other classes and programs.

COURSE TASKS, ASSESSMENT AND GRADING

Note! The diversity of our assignments supports the successes of diverse learners.

Your final grade is based on:

1) OPTIONS:
   - Journal Assignments/Article/Movie Review/Reflections
     - See description below**
     - 25 points

2) Covid 19 Assignments
   - 30

3) Group or Individual Project OR Round Table
   - 30

4) Forums (4 at 10 points each)
   - 40

5) Worksheets (10 at 10 points each)
   - 100

6) Assignments (In Class 5 at 5 points each)
   - Discussions via *Zoom sessions (TBD)
   - 25

7) 3 exams at 100 points each
   - 300

8) Final exam
   - 125
   - Total 675

Students will receive a letter grade based on the following scale:

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

**I (incomplete) grade** is given at the instructor’s option when a student has failed to complete a small part of a course because of circumstances beyond student’s control. It is the student’s
responsibility to contact the instructor to make up the incomplete work with a minimum level (or better) of achievement. Failure to satisfactorily make up incomplete work within the appropriate time period will result in a grade change for “I” to the contingency grade identified by the instructor.

* Zoom sessions will be offered to discuss *the material and *news as relates to our class. We will schedule 2 sessions per week to accommodate diverse schedules/needs. Sessions that ARE the content lectures will be recorded and posted for review and/or for those that cannot attend.

** Elect activities that total 25 points. Requirements for each are described below and *declare your choices to me! The first journal OR other option is due *5 September in Laulima Assignments by midnight. The other work can be spaced out through the semester and could complement your project. All other work is due by 14 December at the latest (sooner is better!) in Laulima Assignments by midnight.

*Consistent attention to the lectures, resources, discussions and assignments/quizzes 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. The worksheets ARE basic study guides for the exams—the will be posted as Assignments and Due at the Exams. Please take the exams as scheduled.

* The last day to Withdraw (W) from class is 11/1/21.
* See catalog for specifics and calendar for dates in general and for I grades and NC grades. Taking this class as Credit/No credit is an option.

** Worksheets/Exams**

Worksheets in the style of the exams will be added as assignments 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 Google Drive documents and invite your friends/colleagues. Worksheets earn you points for good progress towards completion and are *important in understanding the material and *key to doing well on exams.

Note—I encourage you NOT to add multiple choice components of worksheets to common documents since if you (or I) see the correct answer—we will not go through the *steps of trying to figure it out—the steps of learning.

** Extra Credit Outlines**

Outlines for specific diseases of human 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, Helminthes, viruses and prions (for example). The following chapters are excellent references for projects and are the focus of *the extra credit outlines!
OPTIONS to mix and match (25 points). Turn your work in to Laulima Assignments
*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. Two options are listed here but you can make your own options that come out of your own focus.

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).

OPTION 2. How has this pandemic, exposed disparities in who might get or survive Covid19, and/or health care in general?

OPTION 3. Racial disparities is medicine—what are they and how do they manifest? Please see this (or other) URL to learn about or more about discoveries by black microbiologists.
https://medicine.umich.edu/dept/immunology/events/202009/black-micro-week-vibrant-celebration-black-microbiologists

Is YOUR ethnicity represented fully in medicine and/or society? USE this journal as a chance to find microbiologists that represent your culture or ethnicity.

*Reflections 5 points each

**I highly recommend that you do at least one reflection in the first week of class!

Five reflections on class content are options. With your notes open or not open (!) write the story of the class including examples and dilemmas—what *you understand and *do not yet understand. Five points will be assigned for each reflection with 5 points being complete and exploratory or thoughtful, 3 points being a collection of information, 1 point contains some information but not complete or thoughtful.

*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
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
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

Audiobooks! IF you have a monthly subscription to Audible.com then these are two (of many) options. The first is 30 minutes and the second is huge so choose a couple of viruses (or more) and use those for your 2 pages of facts.
*Audible Books can be used for the book option. I include two only here for people that subscribe to Audible.com. Other audiobooks are options! listed here--not comprehensive!

Soldiers of Science; An Interview with Dr. Anthony Fauci by Alan Alda, Dr. Anthony Fauci, Kate Rope 30 minutes
Viruses, Plagues, and History; Past, Present and Future by Michael B.A. Oldstone 13.5 hours

Publisher's Summary: The story of viruses and humanity is a story of fear and ignorance, of grief and heartbreak, and of great bravery and sacrifice. Michael Oldstone tells all these stories as he illuminates the history of the devastating diseases that have tormented humanity, focusing mostly on the most famous viruses.

Oldstone begins with smallpox, polio, and measles. Nearly 300 million people were killed by smallpox in this century alone and the author presents a vivid account of the long campaign to eradicate this lethal killer. Oldstone then describes the fascinating viruses that have captured headlines in more recent years: Ebola, Hantavirus, mad cow disease (a frightening illness made worse by government mishandling and secrecy), and, of course, AIDS. And he tells us of the many scientists watching and waiting even now for the next great plague, monitoring influenza strains to see whether the deadly variant from 1918 - a viral strain that killed over 20 million people in 1918-1919 - will make a comeback. For this revised edition, Oldstone includes discussions of new viruses like SARS, bird flu, virally caused cancers, chronic wasting disease, and West Nile.

Viruses, Plagues, and History paints a sweeping portrait of humanity's long-standing conflict with our unseen viral enemies. Oldstone's book is a vivid history of a fascinating field, and a highly reliable dispatch from an eminent researcher on the front line of this ongoing campaign.

©2010 Michael B. A. Oldstone (P)2018 Tantor

*25 points will be assigned if you turn in 2 single spaced pages of bulleted facts by the last day of our class.*

*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.*

*Podcast (10 points each) Listen to a podcast that pertains to our class and write a ONE page reflection on what you learned and your thoughts on the subject. Examples of podcasts that pertain to our class during the pandemic can be found at: https://www.vulture.com/article/coronavirus-podcasts.html*

*Movie (15 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, Outbreak, Monsters Inside Me (Discovery channel). A movie reflection is 15 points and should be 1 or more single-spaced typed pages. Include information and your reactions to the information--your thoughts are important.*

*Grey’s Anatomy newest season is also an option in that the show is addressing the pandemic from both medical and human perspectives...*

The most recent seaseon of The Good Doctor is also an option in that the show is addressing the pandemic from both medical and human perspectives...
**PROJECT Guidelines**

Class project/presentation (individual or group)! Work alone or in groups of 2-3 to develop and present a project in zoom during virtual class discussions or outside of virtual class with Dr. M that will be posted in Resources of laulima for others to view. Each student will write and include at least 3 questions that will be on the exam that follows your presentation. All questions will be added to a common google doc and other students can also add questions. Directions will be given on the document.

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 via zoom. 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?

*Any aspect of the pandemic could be the subject of your presentation!

Students before you have successfully carried out other project approaches including:

- 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!

**NOTE!** WHAT is going on in the news? THIS could be your project! Try to know more about what our world/society/cultures are facing during out time together. What is the agent that ‘causes’ the disease? What basket is the agent in? Prok? (Gram positive or negative?) Euk? (Protista that is animal-like, plant-like or fungus-like? OR a Helminth = worm? OR a fungus? OR a plant?) OR a non-living ‘agent’ (Virus? if so RNA or DNA virus? PRION?). This could be your project!

**LEARNING RESOURCES and LEARNING ACTIVITIES**

**TEXTBOOK:** Ideally I would like for us all to have the following excellent text which is electronic and you would purchase a subscription to the ebook for $9.99/month with a 4 month minimum subscription (so ~$40 for our semester).
I want you to be prepared by setting up strong foundations...and for you to succeed.

IF for any reason you prefer to have a hard copy--I encourage you to go to the internet and purchase an OLD EDITION of any edition of Microbiology by Tortora (due to affordability).

NOTE-- we will NOT use Mastering Microbiology for this semester--do NOT purchase the ebook or a text with the Mastering Microbiology.

*Microbiology – An Introduction. Pearson, 13th edition--recommended eText, $44.99 HOW do you subscribe to it? Go to this URL!*
https://www.pearson.com/store/p/microbiology-an-introduction/P100000797731

This *Open Educational Resource (OER) text is an additional resource for us:*
https://openstax.org/details/books/microbiology?Book%20details and you can register to use the book online.

*Worksheets in the style of the exam will be given throughout our semester that will both give you specific guidance on what is important and support your mastery of our subject via foci on recall, analytical thinking and understanding. And doing the worksheets supports doing well on the exams and earns you points.*

**DISABILITIES ACCOMMODATIONS**

If you have a physical, sensory, health, cognitive, or mental health disability that could limit yourability to fully participate in this class, you are encouraged to contact the Accessibility Counselor to discuss reasonable accommodations that will help you succeed in this class. Roy Inouye can be reached at (808) 235-7448, rovinouy@hawaii.edu, or you may stop by Hale Kāko’o 106 for more information.
SEX DISCRIMINATION AND GENDER-BASED VIOLENCE RESOURCES (TITLE IX)

Windward Community College is committed to providing a learning, working, and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking.

If you or someone you know is experiencing any of these, WCC has staff and resources to support and assist you. To report an incident of sex discrimination or gender-based violence, as well as receive information and support, please contact one of the following:

- UH Confidential Advocate
  Phone: (808) 348-0663
  Email: Advocate@hawaii.edu

- Karla K. Silva-Park, Title IX Coordinator
  Phone: (808) 235-7468
  Email: karlas@hawaii.edu
  Office: Hale
  Kākoʻo 128

As a member of the University faculty, I am required to immediately report any incident of sex discrimination or gender-based violence to the campus Title IX Coordinator. Although the Title IX Coordinator and I cannot guarantee confidentiality, you will still have options about how your case will be handled. My goal is to make sure you are aware of the range of options available to you and have access to the resources and support you need.

For more information regarding sex discrimination and gender-based violence, the University’s Title IX resources and the University’s Policy, Interim EP 1.204, go to manoa.hawaii.edu/titleix/

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.

ALTERNATE CONTACT INFORMATION

If you are unable to contact the instructor, have questions that your instructor cannot answer, or for any other issues, please contact the Academic Affairs Office:

- Location: Alakaʻi 121
- Phone: (808) 235-742
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<thead>
<tr>
<th>WEEK 1</th>
<th>Aug 23-29</th>
<th>Introduction to the Course &amp; Scope 1</th>
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<tr>
<td></td>
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<td>Agents We Study in Micro--similarities and differences and why these are important. Covid19 Issues and News</td>
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<tr>
<th>WEEK 2</th>
<th>Aug 30-Sept 5</th>
<th>History of Microbiology Before Pasteur 1</th>
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<tr>
<td></td>
<td>Microbiology Pasteur On and NOW</td>
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<td>“If I set out to prove something I am no real scientist-- I have to learn to follow where the facts lead me-- I have to learn to whip my prejudices...” – Spallanzani</td>
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<td></td>
<td>The first journal OR other option is due *5 September in Laulima Assignments by midnight.</td>
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<th>WEEK 3</th>
<th>Sept 6-12</th>
<th>Chemistry &amp; the Cell 2</th>
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<td>“Scientists working on the origin of life deserve a lot of credit; they have attacked the problem by experiment and calculation, as science should. And although the experiments have not turned out as many hoped, through their efforts we now have a clear idea of the staggering difficulties that would face an origin of life by natural chemical processes. In private many scientists admit that science has no explanation for the beginning of life.” – Michael Behe</td>
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<th>WEEK 4</th>
<th>Sept 13-19</th>
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<td>Microscopy &amp; Cells</td>
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<td>Eukaryotic &amp; Prokaryotic Cells</td>
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<td>“We cannot fathom the marvelous complexity of an organic being; but on the hypothesis here advanced this complexity is much increased. Each living creature must be looked at as a microcosm—a little universe, formed of a host of self-propagating organisms, inconceivably minute and as numerous as the stars in heaven.” – Charles Darwin</td>
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<th>WEEK 5</th>
<th>Sept 20-26</th>
<th>EXAM 1 in Laulima or testing center (to be announced) and based on presentations, discussions, homework and worksheet for Chapters 1-4</th>
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<tr>
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<td>Microbial Metabolism and Cells (4)5</td>
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<th>WEEK 6</th>
<th>Sept 27-Oct 3</th>
<th>Microbial Metabolism 5</th>
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<tr>
<th>WEEK 7</th>
<th>Oct 4-10</th>
<th>Microbial Growth &amp; Control 6 &amp; 7</th>
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<td>The cause of nutrition and growth resides not in the organism as a whole but in the separate elementary parts—the cell. – Theodor Schwann</td>
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<th>WEEK 8</th>
<th>Oct 11-17</th>
<th>Microbial Growth &amp; Control 6 &amp; 7</th>
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<td>EXAM 2 based on presentations, discussions, homework and worksheet for Chapters 5-7</td>
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<th>WEEK 9</th>
<th>Oct 18-24</th>
<th>Genetics 8</th>
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<td>“In microbiology the roles of mutation and selection in evolution are coming to be better understood through the use of bacterial cultures of mutant strains.” – Edward Tatum</td>
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| WEEK 10 | Oct 25-31 | Genetics & Recombinant DNA, Horizontal Gene Transfer 8 & 9 |
### WEEK 11
**Nov 1-7**  
Viruses & Prions  

“For comparison, tap out a single grain of salt from a shaker. You could line up about ten skin cells along one side of it. You could line up about a hundred bacteria. Compared to viruses, however, bacteria are giants. You could line up a thousand viruses alongside that same grain of salt.”  
— Carl Zimmer, *A Planet of Viruses*

### WEEK 12
**Nov 8-14**  
**EXAM 3** in Laulima and based on presentations, discussions, homework and worksheet for Chapters 8(9), 13  

*Classification/Diversity of Microbes ➔ Eukaryotes (projects) 10, 12*

### WEEK 13
**Nov 15-21**  
*Classification/Diversity of Microbes ➔ Prokaryotes (projects) 11*

**Outlines for 21-26 in Laulima (Extra Credit)** are DUE in Assignments 11-21-2021  

*Disease 14*

### WEEK 14
**Nov 22-28**  
*Epidemiology & PROJECT Proposal to TM 15*  

Project Proposal due 29 Nov by midnight in drop box!

### WEEK 15
**Nov 29-Dec 5**  
*Microbial Mechanisms of Pathogenicity & Host Defense PROJECTS! 15-19 (selections)*

### WEEK 16
**Dec 6-9**  
PROJECTS!

**13-17**  
**FINAL EXAM**

*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. Have a great semester!*
Windward Community College is an equal opportunity, affirmative action institution.