Microbiology: Syllabus

NOTE: The University will continue to issue more details about our situation and our syllabus and course activities may need to be adjusted after the start of the term.

I. Instructor & GE

Instructor: **Avinash D Singh Bala**, Ph.D. (avinash@uoregon.edu)

Office Hours: Mon 11 AM to 12 PM; Fri 10 AM to 11 AM. *Location*: Huestis 219/228

GEs: David Evarts (devarts@uoregon.edu) Last names (A-G)
Natanya Villegas (natanyav@uoregon.edu) Last names (H-P)
Jessica Puente Arroyo (jpuentea@uoregon.edu) Last names (R-Z)

Office Hours: TBD

II. Lecture Details

Content will be organized by week. Each week, a number of video lectures will be uploaded to Canvas. Students will view the lectures, discuss the content on canvas discussion boards, and complete assignments based on lecture content. Content videos will be 20 minutes each or shorter. All videos will be in mp4 format.

Where: All content, assignments, and discussions will occur on Canvas. Office hours will be either live – using the UO subscription of Zoom – or on Canvas, using the Chat feature.

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III. Course Description

Invisible creatures that are omnipresent and cause disease are the stuff of nightmares – such as the one we are living through in 2020! – and it was no surprise that their discovery immediately captured the public's interest when Anton van Leeuwenhoek peered into his home-made telescope. Life teeming everywhere, at a scale our species hadn't considered before! Many brilliant scientists helped us learn about microorganisms – that they are varied in structure and biology, that they don't appear out of thin air, and that they impact our lives directly, be it by fermenting wine or cheese or by causing disease. This course introduces students to the cell biology, physiology, evolution and ecology of microorganisms.

IV. Course Details and Learning Objectives

The course will be organized into 10 weekly modules, roughly paralleling the organization of the textbook. However, significant parts of the textbook will not be covered: please pay careful attention to the 'Schedule and Readings' page to make sure that your energy, time and attention are not wasted reading material that we won't be able to cover. Students will learn about classical experiments as well as recent discoveries to gain an appreciation for the diversity and elegance of microbial life strategies, the role of microorganisms in global processes, and microbial interactions with macroorganisms. We will explore how the scientific process is applied in microbiology and become familiar with modern experimental methods for studying microorganisms in the laboratory and in their natural habitats.

Week 1

- Introduction to technology and the remotely taught BI330 course
- What are prokaryotes? What sets them apart from eukaryotes?
- Microbial types: bacteria, archae, algae, protozoa, viruses

Week 2

- Bacterial classification: the Gram stain; Gram (+) and Gram (-) bacteria and their properties
- Implications of Gram subtypes on bacteria function, and on their control
- How antibiotics work

Week 3

- Students will learn about bacterial growth: how bacterial cells divide, and
- How populations grow, and how this growth can be controlled.
- Bacterial growth in nature and in the lab – autotrophy and heterotrophy

Week 4

- Microbial genetics

Week 5

- Acellular pathogens: Viruses
- Types of viruses
- Viral multiplication

Week 6

- Microbial metabolism and implications on microbial diversity

Week 7

- Biogeochemical cycles

Week 8

- Antimicrobial drugs

Week 9

- Mechanisms of pathogenicity

Week 10

- Disease and epidemiology
- Catch up on delayed content

Prerequisites

The prerequisites for this course are BI214 or BI252. The course assumes knowledge of biologically important macromolecules and familiarity with basic cellular processes such as DNA replication, transcription, translation, and regulation of gene expression.

Student Workload and Commitment

One undergraduate *credit* hour equals 30 *real* hours of student work, typically 10 hours in class and 20 hours outside of class. This is a 3 credit course which means you will be

spending a significant amount of time in preparing for class, review, self-study and learning through explorations and assignments (see UO Student Handbook, section Academic Success). Viewing video content, and diligent attention to reading material, combined with participation through Canvas discussions with your peers, and instructor interaction with the staff through Zoom and Canvas Chat are critical to your chances of success in this class, despite the disruption we are all experiencing in Spring 2020.

Course materials

Textbook: Microbiology (an OpenStax textbook), 2020.
https://openstax.org/details/books/microbiology

Website. Canvas (canvas.uoregon.edu) will be used to post all announcements, lecture notes, additional readings, media, and practice problems. It will also be the dominant method for contacting GEs and the instructor, for discussions with peers, and for completing assignments.

Lecture content. Weekly content will comprise short (up to 20 minute) videos, to facilitate download and/or online play. Each upload will comprise a slide show with annotations and a voice-over. Each upload will be accompanied by a list of short questions or discussion topics. Students are encouraged to participate in these discussions prior to watching the next video. All video uploads will be completed by Thursday of the week. Assessments based on weekly content will be available on Fridays ('Homework') and Sundays ('Weekly quiz').

Lecture notes. Lecture notes are the outline of each week's content posted on the weekly content pages. These notes are merely an outline of what is to be discussed in content videos; they are not a substitute viewing lecture materials.

Readings and media: Additional materials required for the class, if any, will be posted with the lecture notes on Canvas. Quizzes, discussion topics, and problem sets will also be posted each week to help guide learning and self-assessment in preparation for weekly quizzes.

Canvas discussions:
Participation will be tracked using Canvas Discussion boards, both class-wide discussions as well as discussions in smaller groups. You will receive credit for both posting questions as well as answering them.

V. Course Policies

Accessibility

The University of Oregon is working to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please let me know as early as possible, in person or via email. For accommodations to aid in your participation, please contact Accessible Education Services as early as possible, in 164 Oregon Hall, by phone at (541) 346-1155 or uoaec@uoregon.edu. I welcome the chance to help you learn, and will work with you, even in this unusual term.

Peer and Staff Interaction Etiquette

Please observe protocols for asking questions during online discussions, chats, or live office hours/lectures. Be polite, particularly when communicating in writing. These are habits that will serve you will in your later professional careers.

Academic integrity

All students are expected to conform to the Student Conduct Code. Unless otherwise instructed, or for group projects, assignments are to be completed alone. Please note that Instructors are required to report academic misconduct with the Director of Student Conduct and Community Standards. Students are encouraged to discuss class material with one another. However, all submitted work including the weekly homework and the writing assignment must be the original work of each student. Distribution of course materials, including exams, problem sets, quizzes, outside of those enrolled in the Spring 2020 Microbiology BI330 class is strictly prohibited.

Out of Class – Office Hours, and Email Etiquette:

Instructor and GEs will be available online during designated times, and will make accommodations for students whose schedules preclude office hour attendance. The best method of holding office hours in the Spring 2020 term will be determined by our collective experience, but in general, there will be video office hours (through Zoom). These will be password-protected, and students may not share these with anyone else. In general, longer questions are best asked live, over audio or video chat, where comprehensive and specific answers are possible.

Emails: We will respond to emails as expediently as possible during working hours (M-F, 9 to 5). Emails must include 'BI330' in the subject line, and being part of the academic interaction, must be respectful and professional in tone. Questions regarding course content or comprehension **must** first be posted on the Discussion boards. Students are assigned to a GE, to whom emails can then be addressed, if the question has not been adequately answered in the discussion board.

- Last name starts with A - G – email David (devarts@uoregon.edu)
- Last name starts with H - P – email Natanya (natanyav@uoregon.edu)
- Last name starts with R - Z – email Jessica (jpuentea@uoregon.edu)

Questions requiring comprehensive (or just long) answers will be answered during office hours.

VI. Grading

Student Assessments

Since all teaching is remote, I will ask you all to certify that your assignments are your work, completed without assistance, unless collaboration is required. The University will continue to issue more details about our situation and our syllabus and course activities may need to be adjusted after the start of the term. I will be mindful of the many impacts the unfolding events related to COVID-19 may be having on you. During this unusual time, if you are not able to do an assignment, please communicate with your GE and we will try

to create some alternatives. We will try out a few ways to allow you to participate in a different way – for example, by returning drawings to us.

Grading will be based on a set of assessments worth 150 points, out of which 1/3rd can be dropped to give you the best chance for a higher grade:

1. 50 points: 9 weekly Canvas Quizzes 10 points each, starting week 2. Lowest 4 scores are dropped. *Due on Mondays at 11:59 pm*.
2. 20 points: One cumulative Canvas Final. Exam is divided into 3 units (Unit 1 – covers weeks 1-4; Unit 2: weeks 5-7; unit 3: weeks 8-10) of 10 points each. Lowest scoring unit is dropped.
3. 20 points: 10 Canvas homework assignments (can't be dropped). *Due on Mondays at 11:59 pm*
4. 5 points: Term Write-up (can't be dropped)
5. 5 points: Participation on Canvas discussion boards

Your grade will be calculated as follows:

- Write-up (5) + Participation (5) + Homework (20) + 2 units from final (20) + 5 best Quizzes (50) = 100 total

Weekly Canvas Quizzes (weekly; 50% = best 5 of 9) will be administered over canvas . Weekly tests will cover material from previous week's lectures, and will be higher order learning assessments, and may require longer answers or ask you to illustrate your answers (provided we can figure out methods for assessing illustrations). Make-up tests will not be offered, since the 4 lowest scoring quizzes will be dropped - missed quizzes will grade a 0, and will count among your dropped quizzes. There will not be a weekly Quiz during week 1. Quizzes will be posted on Saturday nights, and must be completed by 11:59 pm Monday (about 48 hrs later).

Canvas homework assignments (weekly 2% ea;20% total) are essentially short-answer quizzes, but are named so to differentiate them from weekly quizzes. Regular low-stakes assessments are designed to help you keep up with your reading, and to prepare you for in-class quizzes and the final. These will be posted online each Friday at 6 pm, and must be completed by 11:59pm on Monday. There will be short-answer questions (MCQ, True/False, Fill-in-the-Blanks), and will be graded automatically. Weekly problem sets – not graded – will help you prepare for higher order assessments like the Weekly Quizzes and the Final.

Final Exam (20%) **Tuesday, June 9**. The final exam will follow a format similar to the quizzes. It will test your ability to apply knowledge and synthesize concepts learned throughout the quarter. The final will be organized in 3 sections worth 10 points each, and the lowest scoring section will be dropped. Exam will be open-book, but timed.

Participation. (5%): This grade will reflect participation in Discussions on Canvas. In general, each student must post one substantive question, and one substantive answer to someone else's question to register participation for the week to earn the participation points for the week. An 80% participation score (8 of the 10 weeks) will get you 100% of the participation credit. If your participation score is below 80%, you will get that %age of 5 points as your participation grade. NOTE: Discussion boards will be monitored. These are

official discussion boards for class, so content on these boards will be considered as a reflection on your academic performance. Therefore, please be careful about your tone and language on these boards. Participation for each week will be assessed at *11:59 pm on the following Monday*.

Write-up. (5%): At the end of week 5, you must submit a topic – reflecting on one aspect of the novel coronavirus that has caused the worldwide 2019-20 epidemic – and by week 10, you must submit a *short*, *polished* write-up of that topic via Canvas (max 500 words). More details will be available on the Canvas assignment page.

Practice Problem Sets will not be graded but are composed of example quiz questions to prepare you for higher-order assessments in quizzes and final exam. These will be addressed, when necessary, during office hours.

Course Grade: End-of-quarter point totals will be adjusted on a curve, if class average is significantly lower than recommended. Letter grade assignments will approximate standard cutoffs (90% A-, 80% B-, 70% C- (also P)…), but will ultimately be determined by gaps in the grade distribution. Grade totals displayed in Canvas through term will *not* reflect the final adjustment, but are intended to be an estimate of your current performance at any time. NOTE: For Spring term 2020, students may change their grade assignment from letter grade to Pass/NoPass at any time during term, or even after term until Jul 16, 2020.

VII. Technology

The Spring 2020 version of the course is an extraordinary one, but I am committed to making it as good and successful an experience as possible. This course will give me, and in particular, you, familiarity with skills that will serve us well – such as remote interviewing, text, voice and video collaboration, and familiarity with a number of technologies.

Since content will be on Canvas, please become familiar with it, and make sure your computer and browser are compatible. Note that companies are increasing access at this difficult time – for example, Comcast has made all its WiFi hotspots available to all, and cell service providers are increasing data limits and also allowing for tethering other devices to cell phones for internet access. In many (but not all) cases, content should be viewable on your cell phones, including the video lectures.

If you feel challenged by tools this term, or have difficulties with access, please reach out to your GEs or me.