

Winter 2017

**MB 399, Aquatic Microbiology** (3 credits)

MWF 2:00 to 2:50 PM

*Please carefully review the syllabus. It contains important information on course requirements, grading, etc. Save the syllabus for reference during the term.*

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**Course Description:** MB 399 This course is a survey of the diversity, ecology, and physiology of microbes in aquatic systems, with emphasis on their roles in food webs, chemical cycling, and human health. This course will provide students with the background knowledge and quantitative/analytical skills to interpret and critique current and historical research in the fields of general aquatic microbiology.

**Prerequisites:** CH 231, CH 232, and CH 233 or CH 121, CH 122, and CH 123.

**Canvas:** This course requires that you use Canvas to answer quizzes and additional resources and assignments. Canvas is accessed by logging in to: <http://my.oregonstate.edu>. Details on how to access Canvas are available from Ecampus: <http://ecampus.oregonstate.edu/services/start/default.htm>. The course will only appear in Canvas to those who have registered for it. All course materials (lectures, assignments, exams) are distributed online via the Canvas system. For technical assistance, call 1- 800-667-1465 or go to <http://ecampus.oregonstate.edu/services/technical-help.htm>. Although every effort has been made to ensure that course materials are compatible with a variety of hardware and platforms, internet access and Canvas compatibility is the responsibility of the student. Extensions for missed deadlines due to personal computer or internet access issues will not be granted. If your computer or internet connection fails, simply go to a campus computer lab or your local library to access the course in Canvas.

**Instructor**

**Dr. Andrew Thurber**, Assistant Professor

Office: Burt 214

E-mail: [athurber@coas.oregonstate.edu](mailto:athurber@coas.oregonstate.edu)

**Office hours:**

Please email prior to showing up to office hours. Wed 11-12am – other times by appointment (via email).

**Textbook and Other Resources**

- **Textbook:** Freshwater Microbiology by David C. Sigeo. 2005, ISBN0-471-48528-4
  - a. **This book is available on Kindle Versions and a variety of other options.**
- Additional resources (on course reserve in the Library or would be good for your collection):
  - a. David Kirchman - Processes in Microbial Ecology
  - b. Colin Munn – Marine Microbiology: Ecology and Applications

**Required software:** To view and print the lecture handouts, you will also need a current version of Adobe Reader (which is free) and some sort of word processing software it needed for the term paper.

### **Learning Outcomes:**

After successful completion of MB 399 students will know how to:

- Define aquatic microbiology and identify important topics in the field
- Articulate and communicate the scientific principles and foundations of aquatic microbiology
- Recognize the complex roles that microbes play in marine, freshwater, global, and human systems
- Acquire information from primary and secondary literature about microbiology
- Analyze and evaluate the validity and flaws of scientific data from different sources
- Recognize the importance of microbial metabolism and diversity in ecosystem functioning and health
- Compare and Contrast the processes that microbial communities perform in different habitats
- Recommend new experiments to clarify and/or explore concepts and questions in aquatic microbiology

**Course Organization:** Students in MB399 will have three lectures a week, periodic quizzes (timing announced in class), a midterm, a final, and a project. There will be assigned readings based in the textbook, in addition to primary literature and additional texts that will be available online (in Canvas) or in course reserves.

*Quizzes:* The quizzes will be announced in class and expected to be carried out in Canvas. Some of these may be “surprise quizzes” in which case they will be given in class without announcement. They will focus on reading material and lecture material. Online quizzes will have a time limit of 35 minutes and while you are allowed to use your book you are expected to work by yourselves. These must be taken in **Canvas**. Surprise quizzes will have a 10 minute time limit.

*Exams:* There is one mid-term and one final. The material covered in the class, including lecture, lab, guest lectures, and readings will be on the tests. The final is comprehensive and will cover material from throughout the course. Exams will include multiple choice, true falls, fill in the blank and short answers.

*Project:* Group projects will focus on different aquatic ecosystems and discussion of the different microbial processes that occur in those ecosystems. Each member of the group will write a 1 page (LIMIT) essay on the topic **that must include at least 3 references to primary literature published within the last decade**. The group as a whole will come up with a 10-minute presentation about the topic and present it to the class. Groups will be assigned in class and the group size will be dependent on enrollment. 80% of the grade will be the essay and 20% the presentation.

**All deadlines are exact and late work is not accepted:** If you have a conflict with an exam, quiz, or presentation you must make this conflict known – by email– within the first week of class. Otherwise, I will follow University guidelines concerning family and health emergencies. You

may “make up” one quiz by attending a seminar on campus that focuses on any facet of aquatic microbiology and turning in a write up on it within 3 days of attending. You can only replace one quiz score with this assignment.

*Courtesy:* Class starts on time and ends on time. Please be respectful of your fellow students as showing up late and packing up early disrupts the course. Talking also disrupts the lecture and impedes the ability of your fellow students to learn.

**Course Requirements and Grading:** There are 4 quizzes, one midterm, a cumulative final exam (during finals week), and a group project. These are weighted according to the following table:

Weekly quizzes (4 @ 15 points each)	60	(15%)
Midterm Exam #1	100	(25%)
Project	100	(25%)
Final Exam	140	(35%)
Total Points	400	

**Course Grades:** Final grades are based on your point total according to the following scale:

A	≥ 92% of points possible	B-	≥ 80% of points possible	D+	≥ 68% of points possible
A-	≥ 90% of points possible	C+	≥ 78% of points possible	D	≥ 62% of points possible
B+	≥ 88% of points possible	C	≥ 72% of points possible	D-	≥ 60% of points possible
B	≥ 82% of points possible	C-	≥ 70% of points possible	F	<60% of points possible

If, at any time, you are concerned about how you are doing in the course, send me an email.

**Incompletes:** Final grades are based on the work completed at the end of the term. Students should not expect an incomplete if the course is not completed by the end of the term except in extreme and unusual circumstances and even then only if the following two conditions are met: 1) the student has a passing grade at the time the request for an incomplete is made and 2) the student has completed at least 75% of the coursework with a passing grade.

**You will need to put effort into this class to do well.** This class is designed for people who want to learn, are willing to take responsibility for their learning, and understand how this course relates to their education, their degree program, and their personal goals. More information on **what you need to do to complete each of the course requirements is found in the following sections.**

**Lectures:** Full lecture notes are not provided for this course. You are expected to show up, take notes, and complete the lecture handouts provided. If you miss a lecture it is up to you to get the lecture notes from a fellow student.

**Discussion Board:** On Canvas, there is a discussion board which will be available to ask and answer questions. This is an excellent place to ask questions about course material and improve your understanding of the course by answering your fellow student’s questions. Please use complete sentences when asking and answering questions. Any inappropriate responses – including rude or worse will be deleted and if they continue will result in disciplinary actions.

**Turn in only your own work in your own words** on all course assignments, including the quizzes. To do otherwise is plagiarism and will not be tolerated. Answers copied word for word from lectures will receive a zero because they demonstrate no understanding of the material on the part of the student. You would also be cheating yourself of a valuable learning opportunity to get feedback on your comprehension of the material before the exams. Plagiarism in any form on the term paper will result in a zero on it.

**Exams:** The time limit for the midterm is 55 minutes, and 110 minutes for the final. After the first week of class, the dates are firm. Exams are based on the lectures, the reading, and student presentations. Exams are closed book/ closed note and you are not allowed to access the internet.

**Preparing for Quizzes and Exams:** Take notes on the lectures, guided by the objective and review questions included with each lecture and at the end of the chapters. Make sure your notes answer these questions. Then, practice, practice, practice for quizzes and exams until you are able to answer the objective and review questions in each lecture without help from your notes, the lectures, or the textbook. If you can answer the review questions without using your notes, the lecture slides, or textbook, you have mastered the material and will do well on the quizzes and exams. If you cannot, make sure you can do so before the quiz or exam if you want to do well in the class. When preparing for an exam also make sure to review your weekly quizzes. If you are struggling with the material, form a study group. Your instructor is also there to clarify information. Ask questions in class. Go to office hours with well thought out questions.

**Email:** I will use your OSU ONID email address to contact you should the need arise, such as a problem with your quiz. If you have not done so, set up your ONID email account using your OSU ID number and pin at <http://onid.oregonstate.edu/docs/gettingstarted/signup.shtml>. If you do not regularly check your ONID email account, set it to automatically forward emails to your preferred email address (see frequently asked questions on the ONID web page). Not receiving course emails is not an excuse.

**Responsibilities of Students and Instructor:** Teaching and learning are a partnership between student and instructor. Both student and instructor have certain responsibilities in this partnership that they must fulfill for the teaching (what the instructor does) and learning (what the student does) to be successful. If either student or instructor fails to carry out their responsibilities in this partnership, the student will not be successful in the class. Following is a partial list illustrating these responsibilities.

Responsibilities of Instructor:

- Make clear statements of course and lesson objectives
- Provide course materials (lectures, readings, etc.) directly related to these objectives and keep the course materials as current as possible with ongoing revisions and updates
- Provide assessments (quizzes, exams) and other graded activities (discussion, etc.) that have clear connections to the course objectives and provide students different ways to demonstrate the degree to which they understand the content covered in the course
- Provide feedback on graded work that is both useful and timely
- Be accessible and available to students who ask questions

### Responsibilities of Students:

- Be familiar with the course structure and the policies by which the course is taught
- Become personally invested in their education (time, money, commitment) and accountable
- Dedicate regular amounts of time to the class on an ongoing basis throughout each week
- Complete all assignments on time and always put forth their best effort. Review the results of graded work and learn from both successes and failures
- Ask the instructor questions when clarification is needed

**Students with Disabilities:** Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

**Academic Conduct:** Your conduct in this class and in your interactions with your fellow students must promote a respectful learning environment. You will submit your own work in all your assignments and communications. **All quizzes, exams, and assignments in this course are individual assessments**, excluding the group presentation. Academic dishonesty, which includes aiding or receiving aid from other students on quizzes and exams, is not tolerated.

**Academic dishonesty also includes plagiarizing** the work of others and passing it off as your own on quizzes, exams, or on the writing assignments. Plagiarizing will also not be tolerated. The first offense will (likely) result in an F on the assignment. The ultimate decision of the punishment is the decision of the Dean of the College, with a zero on the assignment among the lesser of the options. This will also likely include a notation of academic dishonesty on your transcript. Severe incidents of academic dishonesty, such as cheating on an exam, may result in an F for the course even if it is the student's first offense. Link to OSU Statement of Expectations for Student Conduct: <http://oregonstate.edu/admin/stucon/achon.htm> Please do not cheat.

**Course Evaluation:** We encourage you to engage in the course evaluation process each term – online, of course. The evaluation form will be available towards the end of each term, and you will be sent instructions. You will login to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.

### How to do well in this class

Although we all have different ways to learn, I suggest the following for this material:

- Pay attention in class and annotate the lecture notes.
- Do the readings soon (hours to a day) before a given lecture.
- Add to your class notes based on the readings.
- Lastly (very important) organize the material in your own mind.
- Most of us learn best by listening, reading, writing, and speaking the material we are trying to learn. This class has been structured for you do to just that.

Only when you have structured complex information on your own, have you started to learn. Try explaining the information to your friends.

**Winter 2017; M, W, F Time TBA**  
**All readings are from Sigeo. Check Canvas for Additional Readings.**

<u>Date</u>	<u>#</u>	<u>Topic</u>	<u>(Readings)</u>
M, Jan 9		Introduction, Overview, Primary Literature	
W, Jan 11		Fundamentals of Microbiology (Diversity, Key Taxa – Reading <b>1.2-1.3</b> )	
F, Jan 13		Aquatic ecosystems-Lakes to Rivers ( <b>Reading B. Ecosystems and 2a -c</b> )	
M, Jan 16		NO CLASS – HAPPY MLK Day	
W, Jan 18		Ecosystems continued –Estuaries through Oceans ( <b>2d-e</b> )	
F, Jan 20		Algae 1 - Who are they ( <b>3a-c</b> )	
M, Jan 23		Algae 2 – What they do ( <b>3d-e</b> )	
W, Jan 25		Light – Photosynthesis ( <b>4-4.5</b> )	
F, Jan 27		Light 2 – Competition and dynamics of gaining light in fluid systems ( <b>4.6-4.10</b> )	
M, Jan 30		Nutrients – N and P ( <b>Chapter 5</b> )	
W, Feb 1		Bacterial and Archaeal Metabolisms I ( <b>6.6-6.8</b> )	
F, Feb 3		Bacterial and Archaeal Metabolisms II – case studies	
M, Feb 6		Bacteria ‘communication’ and Biofilms ( <b>6.11</b> )	
W, Feb 8		Viruses ( <b>Chapter 7</b> )	
F, Feb 10		Review for Midterm	

M, Feb 13	<b>MIDTERM</b>
W, Feb 15	Fungi – What are they and what do they do? ( <b>Chapter 8</b> )
F, Feb 17	Aquatic Microbial Parasites
M, Feb 20	Protazoa – an introduction ( <b>9.1-9.6</b> )
W, Feb 22	Food webs (1.C & <b>9.7-9.13</b> )
F, Feb 24	Eutrophication ( <b>Chapter 10</b> )
M, Feb 27	Aquatic Dynamics – Flow, boundary layers, stress
W, Mar 1	Symbiotic Associations ( <b>Munn Ch. 10</b> )
F, Mar 3	The Carbon Cycle and Microbes ( <b>Munn Ch. 8</b> )
M, Mar 6	Disease ( <b>Munn Ch.11</b> )
W, Mar 8	Metagenomics
F, Mar 10	<b>Term Paper Due</b>
M, Mar 13	<b>Class Presentations</b>
W, Mar 15	<b>Class Presentations</b>
F, Mar 17	Wrap Up, Review for the Final
	<b>Final Examination, University Schedule</b>