

**ST: The Human Microbiome****Course Number:** MB 436**Instructor:** Thomas Sharpton

Spring 2017

**Number of credits:** 3**Enrollment size:** 30**Lecture times:** 2:00 – 3:20 pm on Tuesdays & Thursdays**Classroom:** Nash 204**Office Hours:** 3:30-4:30 on Thursdays, or by appointment**Office Hour Location:** Nash 530**Catalog Description of the Course:**

Students will learn about the biodiversity, function, and medical importance of the communities of microorganisms that inhabit the human body. A diverse array of topics will be discussed, including how the human microbiome is studied, case studies of specific aspects of the human microbiome, and emerging theories of how the microbiome influences human health.

**Course Format:** Tuesday and Thursday class session which include roughly 50-minute lectures and 30 minutes of group discussion or activities. These 30-minute discussion periods will include question/answer sessions, group assessments of scientific media coverage of microbiome research, group discussion of primary literature, and educational games. Students will be assigned homework and reading material.

**Prerequisites, Co-requisites, and Enforced Prerequisites**

BI 314 or MB 302

**Learning objectives:**

Upon completion of this course, students will be able to:

1. Define what the human microbiome is and how it is studied
2. Identify examples of how human physiology or the environment can influence the microbiome, or vice versa
3. Describe unifying concepts and theories about microbiome ecology
4. Critically evaluate popular press coverage of the microbiome

**Evaluation of Student Performance:**

Students will be graded on a A-F scale based on their performance across the following items:

1. Homework assignments (25%, 100 points)
2. In-class discussions/group participation (25%, 100 points)
3. Midterm examination (25%, 100 points)
4. Final examination (25%, 100 points)

**University and Departmental Policies:**

**Students with Disabilities:** Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS 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 DAS should contact DAS immediately at 737-4098.

**Expectations for Student Conduct:** The Department of Microbiology follows the university rules on civility and honesty. These can be found at:

<http://oregonstate.edu/studentconduct/http://%252Fforegonstate.edu/studentconduct/code/index.php> Behaviors disruptive to the learning environment will not be tolerated and will be referred to the Office of Student Conduct for disciplinary action. Cheating or plagiarism by students is subject to the disciplinary process outlined in the Student Conduct Regulations.

## **Schedule (2017)**

### **Week 1: What is the microbiome?**

Lecture 1 (4-4): Course overview and a brief history of the microbiome

*Discussion topic: Why are you interested in the human microbiome?*

Lecture 2 (4-7): Biodiversity and biogeography of the human microbiome

*Activity: Literature discussion:*

*How microbes defend and define us. Carl Zimmer. New York Times. July 12, 2010*

*(<http://www.nytimes.com/2010/07/13/science/13micro.html>)*

### **Week 2: Methods of investigation**

Lecture 3 (4-11): Environmental DNA Sequencing

*Activity: Statistical sampling*

Lecture 4 (4-13): Animal models and clinical investigations

*Activity: Literature discussion:*

*Smith et al. Gut microbiomes of Malawian twin pairs discordant for kwashiorkor. Science. 2013*

*<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3667500/>*

**Take home assignment 1, due 4-18 (25 points)**

### **Week 3: The gut microbiome**

Lecture 5 (4-18): The gut microbiome part 1

*Activity: Open Discussion*

Lecture 6 (4-20): The gut microbiome part 2

*Activity: Gut Check, the microbiome game (<http://microbe.net/gutcheck/>)*

### **Week 4: Dysbiosis and Disease**

Lecture 7 (4-25): Microbiome Dysbiosis

*Activity: Gut Check*

Lecture 8 (4-27): The therapeutic potential of the microbiome

*Activity: Avoiding microbiome snake oil*

**Take home assignment 2, due 5-2 (25 points)**

### **Week 5: Mechanisms of Diversification**

Lecture 9 (5-2): Microbial community dynamics

*Activity: Open discussion*

Lecture 10 (5-4): Mechanisms of diversification

*Activity: Literature discussion*

*Drugging the microbiome may treat heart disease.*

*<https://www.sciencedaily.com/releases/2015/12/151217130328.htm>*

### **Week 6: The oral microbiome and Midterm Exam**

**Lecture 11 (5-9): Midterm Examination (100 points)**

*No Activity*

Lecture 12 (5-11): The oral microbiome

*Activity: Open discussion*

## **Week 7: The vaginal microbiome and reproduction**

Lecture 13 (5-16): The vaginal microbiome

*Activity: Literature discussion:*

*The Superhero in the Vagina*

<https://www.theatlantic.com/health/archive/2016/10/the-superhero-in-the-vagina/503720/>

Lecture 14 (5-18): The infant microbiome

*Activity: The hygiene hypothesis*

[Take home assignment 3, due 5-23 \(25 points\)](#)

## **Week 8: The skin microbiome**

Lecture 15 (5-23): The skin microbiome part 1

*Activity: Open discussion*

Lecture 16 (5-25): The skin microbiome part 2

*Activity: Literature discussion:*

*Study Finds Men's Beards Contain 'Poop Particles'*

<http://www.esquire.com/style/grooming/a34770/mens-beards-contain-poop-particles/>

*Your Beard is Covered in Bacteria (So is everything else. Don't fall for the latest viral freak-out)*

[http://www.slate.com/articles/health\\_and\\_science/science/2015/05/beards\\_are\\_as\\_dirty\\_as\\_a\\_toilet\\_germ\\_phobia\\_debunked\\_by\\_a\\_microbiologist.html](http://www.slate.com/articles/health_and_science/science/2015/05/beards_are_as_dirty_as_a_toilet_germ_phobia_debunked_by_a_microbiologist.html)

## **Week 9: Environment-microbiome interactions**

Lecture 17 (5-30): The built microbiome

*Activity: Misconceptions and strange truths about the built microbiome*

Lecture 18 (6-1): Industrialization and the microbiome

*Activity: Open Discussion*

[Take home assignment 4, due 6-6 \(25 points\)](#)

## **Week 10: Microbiome Evolution**

Lecture 19 (6-6): Animal evolution and the microbiome

*Activity: Microbiome evolution*

*Lecture 20 (6-8): Open discussion*

## **Week 11: Finals Week**

[Final Exam: Tuesday, June 13 at 12:00 pm \(100 points\)](#)