Name of course: DENT 5225- Bacteriology and Oral Infectious Diseases.
Number of credits: 3

Time to be offered: Spring 2024.
From 02/06/2024 to 04/30/2024. Tuesday, and Thursday 10:00am – 12:00pm.

Location: TBD, in person, students must attend all lectures and seminars.

Not open for students taking Oral Microbiology DENT5300Q.
Limited enrolment of 50 students.

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Brief description of the course:
The course in bacteriology and oral infectious diseases is intended for Ph.D or master students, mainly students in the pre-dental program that are interested in microbiology and oral biology, and require microbiology for their dental school applications. Two-thirds of the course will be oral presentations given by the instructors and will cover fundamentals in bacteriology, microbial pathogenesis, biofilms, and oral infectious diseases. The last third of the class will be self-learning seminars in which students will be assigned manuscripts that will be presented and discussed in class.

Course goals:
To learn basic principles of bacteriology, microbial pathogenesis, microbial biofilms, and oral infectious diseases. To understand the etiologies of major bacterial-mediated oral diseases.

The course lectures will cover basic aspects in bacteriology and methods in microbiology research; microbial cell structure; microbial genetics and horizontal gene transfer; bacterial growth and control; basic diagnostic methods in microbiology; main classes of antibiotics; mechanisms involved in antibiotic resistance; key aspects of biofilm development, oral biofilms, biofilm-driven antimicrobial resistance, and biofilm control. Students will learn about the mechanisms of bacterial pathogenesis and the bacteria that are associated with the oral microbiome, dental plaque, caries, and periodontal disease. The course will also cover tooth anatomy and the development of caries, periodontal disease, as well as the host response to infection.

In the seminar section, students will be assigned manuscripts which represent evidence-based research regarding: **(1) Caries:** plaque ecology and the specific bacteria that colonize tooth surfaces; transmission of caries-associated bacteria, understand the complex interaction of etiological factors that result in caries and are important for mitigating caries risk. (**2) Periodontal disease:** plaque ecology and shifts in the plaque ecology that result in inflammation in and damage to the periodontal tissue, understand the role of the immune system in periodontal disease and the link between inflammatory processes and tissue damage, understand the links between oral and general health.

Contact hours:

Lecture: 15 two-hour lectures:	30
Seminar: 6 two-hour seminars:	12
Exams: 2 two-hour exams:	4
Total:	**46**

Recommended text:

Brock Biology of Microorganisms.15th Edition by Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley, W. Matthew Sattley, David A. Stahl. ISBN-13: 978-0134261928 / ISBN-10: 9780134261928

Reading material:

Assigned class manuscripts will be provided by the course director.

Criteria for assessing student learning:

1. Midterm exam: 40% of student grade.
2. Final exam, cumulative knowledge of all material covered in class: 40% of student grade.
3. Seminar and class attendance, seminar participation, and presentation: 20% of student grade.

Seminar requirement:

The course will consist of lectures and small group seminar sessions. Prior to the seminars, students will be assigned manuscripts to review with questions. In each seminar, individual students will be asked questions regarding the manuscript they were assigned, which include, study methodology, results, and conclusions. Students will be required to read all of the manuscripts to be presented and are expected to contribute information and participate in the seminar discussions. Student presentations and participation will be graded and included in the final course grade.

Academic Integrity:

Principles of academic integrity require that every Rutgers University student:

• Properly acknowledge and cite all use of the ideas, results, or words of others.
• Properly acknowledge all contributors to a given piece of work.
• Make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of unsanctioned materials or unsanctioned collaboration.
• Treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.

Violations of academic integrity will be treated in accordance with university policy, and sanctions for violations may range from no credit for the assignment, to a failing course grade to (for the most severe violations) dismissal from the university.

For more information, please see Rutgers academic integrity website (http://academicintegrity.rutgers.edu)

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Tentative schedule for spring 2024

	Hours	Topic	Lecturer	Lecture/Seminar
1. 2/6	2h	Introduction to microorganisms. Microbial cell structure I- Cell wall, Gram-positive and Gram-negative	Kadouri	Lecturer
2. 2/8	2h	Microbial cell structure II- Capsule, EPS and membrane proteins	Kadouri	Lecturer
3. 2/13	2h	Microbial cell structure III- Pili, fimbriae and flagella	Kadouri	Lecturer
4. 2/15	2h	Prokaryotic Molecular Biology I	Kadouri	Lecturer
5. 2/20	2h	Prokaryotic Molecular Biology II- Horizontal gene transfer and microbial diagnostics	Kadouri	Lecturer
6. 2/22	2h	Microbial growth and control	Kadouri	Lecturer
7. 2/27	2h	Antibiotics and antibiotic resistance	Kadouri	Lecturer
8. 2/29	2h	Biofilms I- Biofilm formation, tools in biofilm research	Kadouri	Lecturer
9. 3/5	2h	Biofilms II- Oral and medical biofilms, biofilm resistance and control	Kadouri	Lecturer
10. 3/7	2h	Mechanisms of bacterial pathogenesis	Kadouri	Lecturer
11. 3/12	2h	Midterm		-
12. 3/14	2h	Tooth biology, anatomy, and dental caries	Markowitz	Lecturer
13. 3/19	2h	Viridans streptococci, dental caries and *Staphylococcus*	Kadouri	Lecturer
14. 3/21	2h	The human microbiome	Cugini	Lecturer
15. 3/26	2h	The oral microbiome, periodontal pathogens and periodontitis- I	Cugini	Lecturer
16. 3/28	2h	Periodontal pathogens and periodontitis- II	Cugini	Lecturer
No class on 4/2/2023 and 4/4/2023				

17. 4/9	2h	Caries Seminar I- Microbial etiology	Kadouri Cugini Students	Seminar/ Assigned Papers
18. 4/11	2h	Caries Seminar II- Saliva and caries	Kadouri Cugini Students	Seminar/ Assigned Papers
19. 4/16	2h	Caries Seminar III- Diet and caries	Kadouri Cugini Students	Seminar/ Assigned Papers
20. 4/18	2h	Periodontal disease seminar I- Bacteria and periodontitis	Kadouri Cugini Students	Seminar/ Assigned Papers
21. 4/23	2h	Periodontal disease seminar II- Host response	Kadouri Cugini Students	Seminar/ Assigned Papers
22. 4/25	2h	Periodontal disease seminar III- Periodontitis and systemic infection	Kadouri Cugini Students	Seminar/ Assigned Papers
23. 4/30	2h	Final Exam		-