Microbiology Syllabus- MI505
Thomas Jefferson College of Graduate Studies
2008

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Course Overview and Objectives

- *To describe the structural and biochemical characteristics of prokaryote cells*
- *To illustrate the diversity of biochemical reactions in prokaryote cells*
- *To illustrate the mechanisms for control of gene expression*
- *To describe the basis of microbial variation and change*
- *To relate the nutritional and growth characteristics of organisms to disease processes*
- *To describe the relevance of microbes to the balance of ecosystems(water and soil)*
- *To apply bioinformatics to the study of genomics of key microorganisms*
- *To relate the biochemistry and genetics of microorganisms to the diagnosis of disease*
- *To describe host microbe relationships in pathogens and to delineate mechanisms of pathogenicity*

Lecture

- *The Text used for the class is Microbiology – Prescott, Harley, and Klein.(7th edition) The Text is Comprehensive.*
- *Readings from current journals will be used to supplement the text. Most journal articles are available through PubMedCentral or ASM.*
- *Computer access is important to utilize web page resources, download worksheets, and stay up to date on assignments and quizzes.*
- *Notes will be provided in a PowerPoint format or outline for each Chapter or Topic.*
- *There will be four major tests scheduled. Two tests will be in the class period. Two tests will be online.*

Grading

- *Test (4) – 60%*
- *Pathogen Research - 15%- Report and Class Presentation. Focus on Pathogenic organism (genomics, biochemistry, and pathogenicity factors)*
- *Homework – 10% - This includes critical thinking, worksheets, and online review.*
- *Essay – 10% - Current research. Analysis of journal article*
- *Participation Grade. - 5%- This grade reflects active participation in all phases of class. Students are encouraged to attend all classes*

********The Syllabus is subject to change. All changes will be posted on the web page prior to any change as well as announced in class.*

Microbiology – Lecture Schedule- Fall 2008

- *Appendix. I. A Review of the Chemistry of Biological Molecules – Reference*
- *Appendix II. Common Pathways. Reference*

Class	*Chapters (Readings)*	*Lecture Outlines or PowerPoints*	*Homework or Tests*
1 – Sept 8	*Chapter 19– Overview of the Three Domains –Emphasis on the Prokaryotes - Bacteria and Archaea Chapter 3 – The Prokaryote Cell*	• *Prokaryote Cells* • *Classification. Emphasis on current research*	*Readings-Chapters 3 Prokaryote Cells (39-77) and 19 (489-501) Classification -Carl Woese*
2 – Sept 15	*Chapter 3(con) and Readings Chapter 5 – Microbial Nutrition*	• *Cytoskeleton, sporogenesis, movement, chemotaxis, and secretion.* • *Nutrition (comparison of nutritional types* • *Significance of growth requirements and implications for pathogens*	*Reading- Chapters 3 Conclusions to Prokaryotes – (39-77)*
3-Sept. 22	*Chapter 6-Growth*	• *Growth characteristics of bacteria.* • *Growth patterns* • *Biofilms* • *Quorum sensing and pathogenicity*	*Chapter 6-(101-116) Biofilms and Growth- (119-142) Pathogen Research Report Assigned*
4- Sept.29	*Chapters 8 – Introduction to Biochemistry*	• *Basics of Biochemistry Reactions. Key reactions for metabolism* • *Biochemistry and pathogenicity*	*Test 1 Chapters 19, 3,and 5. New Work- Chapter 8 -Basics (167-181)*
5 – Oct. 6	*Chapter 8-9-35- Biochemistry and Clinical Microbiology Examples of biochemical reactions from specific microbes*	• *Catabolism. Overview of Reactions and Diagnostics*	*Enzymes and Catabolism (167-181) Chapter 35 – (868-869)*
6- Oct. 13	*Chapter 10- Biosynthesis Examples of biochemical reactions from specific microbes*	• *Biosynthesis and Anabolism.* • *Unique reactions of Pathogens* • *Applications of Biochemistry to industry*	*Test 2- Growth and Basic Biochemistry (ONLINE TEST) New Topics - Biochemistry Anabolism Diagrams and Readings-(225-242)*

7- Oct. 20	*Chapter 11 – Microbial Genetics – Genes Revisited*	• *Emphasis on the processes and regulations* • *New View of bacterial chromosomes*	*DNA and Replication (247-276)* *Translation and Gene Expression* *RNAs* *(276-301)*
8 – Oct. 27	*Chapter 11 Continued* *Chapter 12 - Operons and global regulatory systems*	• *Gene regulation*	*Diagrams and Readings- Chapter 12- (292-314)*
9- November 3	*Chapter 13 – Genetic Variations* *Mechanisms of Genetic Variation* *Technology*	• *Creating Genetic variation* • *Mutations, transposons, and horizontal gene transfer*	*Study Diagrams* *Review Questions* *Chapter 13 -New Reading – (317-356)*
10- November 10	*Chapter 15- Genomics* *Chapter 17 – Viruses of Bacteria and Archaea*	• *Microbial Genomics* • *Phages and phage therapy*	*TEST 3. Genetics* *Chapter 11-12* *New Reading-* *15- (383-402)* *17- (427-444)*
11- November 17	*Chapter 33 – Pathogenesis of Microorganisms*	• *Pathogenicity – Mechanisms, Genetics, and Host Microbe Relationships*	*Readings and Review Questions-Chapter 33 (-815-832)* *Research article – Current issues in microbiology*
12- November 24	*Chapter 38. Human Diseases (of bacterial origins)*	• *Overview of Pathogens* *Key Organisms*	*Chapter 38- (947-995)*
13- December 1	*Chapter 35 – Clinical Microbiology*	• *Key Biochemical and Diagnostic Tests leading to the diagnosis of bacterial diseases*	*ONLINE TEST 4* *Genetics- complete by (Dec 5)* *New Reading for Discussion on Diagnosis* *35– (859-871)*