BIOSC 1280 MICROBIAL GENETIC ENGINEERING
SPRING TERM 2003
COURSE SYLLABUS AND POLICIES

Lecturers

Dr. Graham Hatfull
378 Crawford Hall
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phone: 624-6975
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Dr. Karen Arndt
269 Crawford Hall
office hours: Mon. 12:00 (and by appointment)
phone: 624-6963
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Lecture schedule

Mon., Wed., Fri. 11:00 – 11:50 a.m.
Langley Hall, Room A214

Prerequisites

Completion of BIOSC 1850 Microbiology, with a grade of C or better. Please consult with the instructors if you have not satisfied this requirement or the prerequisites for BIOSC 1850.

Course Objectives

The goal of this course is to instruct students in the theory and application of classical and molecular genetic analysis of prokaryotic and eukaryotic microorganisms. Case studies will be presented to demonstrate how modern approaches in microbial genetic engineering impact human health and society.

Textbooks

Molecular Genetics of Bacteria, second edition (2003), by Larry Snyder and Wendy Champness. Published by ASM Press. This textbook contains readings and problems that are **required** for successful completion of the prokaryotic section of the course. This book is on reserve in Langley Library.

An Introduction to Genetic Analysis, seventh edition (2000), by Anthony J. F. Griffiths, Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin, and William M. Gelbart. Published by W. H. Freeman and Company. This textbook contains chapters on Mendelian inheritance, mitosis and meiosis, genetic interactions, and tetrad analysis. **These chapters, or those from a similar standard genetics textbook, will supplement but not substitute for material presented in class.** This book is on reserve in Langley Library.

Examinations

Two Mid-term Examinations will be given during regular class meetings. The dates of these exams are listed on the syllabus. The **Final Examination** will be given on Wednesday April 23, 2003 from 12:00 to 1:50 p.m. **The Final Exam will include material from the entire course.**

Problem Sets Problem sets will be provided at various times throughout the course but will not contribute to the final grade. However, answers to problem sets will be discussed in class and will provide useful preparation for exams.

Final Grade Your final grade will be based on two mid-term exams and one comprehensive final exam. Each mid-term exam will contribute 25% and the final exam 50% to the final grade. Each exam will contain multiple-choice, true-or-false, short answer, and long answer questions.

Make-up Policy Make-up exams will only be provided if a legitimate excuse is given for missing an exam; specific arrangements should be made with the instructors prior to the scheduled exam. A doctor's notice is required for a medical excuse.

Academic Integrity

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity: Student Obligations. These obligations can be found at the University web site http://www.pitt.edu/~provost/aistudcode1.html. *Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include the confiscation of an examination of any individual suspected of violating University Policy.*

BS1280 MICROBIAL GENETIC ENGINEERING: SPRING 2003

Drs. Arndt and Hatfull

Mon., Wed., Fri., 11:00-11:50am Langley A214

Day	Date	Topic	Instruct.	Chapter (p)
Mon.	1/6	Introduction: Essentials of Genetics	GFH/KMA	(1-10)
Wed.	1/8	Fundamentals of gene expression and its regulation	GFH/KMA	2/12
		Part I: Bacterial Genetics		
Fri.	1/10	Bacteria and bacterial growth	GFH	1 (28-46)
Mon.	1/13	Mutations, mutants and mutagenesis	GFH	3 (113-135)
Wed.	1/15	Fundamentals of genetic analysis	GFH	3 (136-148)
Fri.	1/17	Plasmids	GFH	4
Mon.	1/20	**Dr. Martin Luther King's Birthday. No class**		
Wed.	1/22	Conjugation	GFH	5
Fri.	1/24	Transformation	GFH	6
Mon.	1/27	Phage systems: Lytic phages and their uses (Transduction)	GFH	7
Wed.	1/29	Phage systems: Lytic phages and their uses/ Temperate phage	GFH	7/8
Fri.	1/31	Phage systems: Temperate phages and their uses	GFH	8
Mon.	2/3	Transposons and transposon mutagenesis	GFH	9
Wed.	2/5	Site-specific recombination	GFH	9
Fri.	2/7	General recombination: Models and applications	GFH	10
Mon.	2/10	Bacterial genomes: the power and limitations of genomics	GFH	1 (54)
Wed.	2/12	Bacterial genetics up-close – Hughes Lab.	GFH	
Fri.	2/14	Catch-up & Review session	GFH/KMA	
Mon.	2/17	**First Mid-term Exam**		
		Part II: Yeast Genetics		
Wed.	2/19	Introduction and life cycles	KMA	
Fri.	2/21	Genome organization and plasmids	KMA	
Mon.	2/24	Mendelian inheritance/ mitosis and meiosis	KMA	2-4*
Wed.	2/26	Tetrad analysis: the basics	KMA	5-6*(176-186)
Fri.	2/28	Tetrad analysis: gene mapping	KMA	5-6*(176-186)
3/2 - 3/9		**Spring Recess. No Class.**		
Mon.	3/10	Mutant hunts and cloning genes	KMA	
Wed.	3/12	Mutant hunts and cloning genes	KMA	
Fri.	3/14	Genetic interactions	KMA	4*
Mon.	3/17	Genetic interactions	KMA	4*
Wed.	3/19	Homologous recombination and gene conversion	KMA	19*
Fri.	3/21	Transposable elements	KMA	20*(614-617)
Mon.	3/24	Genomics of a model eukaryote: putting it to work	KMA	
Wed.	3/26	Yeast genetics up-close --- Hughes Lab	KMA	
Fri.	3/28	Catch-up & Review session	GFH/KMA	
Mon.	3/31	**Second Mid-term Exam**		
		Part III: Microbes and Man		
Wed.	4/2	Biotechnology	KMA	1/2
Fri.	4/4	Biotechnology	KMA	1/2
Mon.	4/7	Yeast as a model human: the cell cycle	KMA	
Wed.	4/9	Yeast as a model human: understanding human diseases	KMA	
Fri.	4/11	Regulation of bacterial pathogenesis genes	GFH	13 (457-463)
Mon.	4/14	Dissecting the genetic basis of *M. tuberculosis* pathogenesis	GFH	

Wed.	4/16	Microbes as bioweapons	GFH	
Fri.	4/18	Defense against bioweapons	GFH	2/7

FINAL EXAM 4/23 12:00 – 1:50pm

Guide to listed chapters

Textbooks for BS1280 Microbial Genetic Engineering are on reserve in Langley Library.

"Molecular Genetics of Bacteria", second edition (2003), by Larry Snyder and Wendy Champness, published by ASM Press, Washington, D.C.

*"An Introduction to Genetic Analysis", seventh edition (2000), by Anthony J. F. Griffiths, Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin, and William M. Gelbart, published by W. H. Freeman and Company, New York