

Course Schedule for MCB 503 GENETICS (13 November 2003)

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CREDIT Four quarter hours. Offered through the Molecular and Cell Biology Program in the Winter quarter. The course meets for 2 hours twice per week, Tuesdays 1:00 – 3:00 PM and Thursdays 9:30 – 11:30 AM for 12 weeks. **All classes will be held in room A2052.**

OBJECTIVES The students are expected to develop a basic knowledge of classical genetics and an extensive understanding of molecular genetics. Course material includes experimental approaches to genomic analysis and the mechanisms of transmission, expression, and manipulation of genetic information. This course is a graduate level course that will emphasize the experimental approaches used to address genetic questions in prokaryotic and eucaryotic systems.

TEXTS

1. Required text:
Molecular Genetics of Bacteria 2nd Edition – Larry Snyder & Wendy Champness
ASM Press, Washington, DC; ISBN: 1-55581-204-X
Price: \$99.95
<http://www.asmpress.org/browse/bound/index.asp?SelectedItem=10020>
2. Instructors will also make reading assignments from the primary literature.
3. Students are encouraged to purchase any general genetics textbook as an additional reference and for background material. One recommended genetics textbook is:
Genes VII – Benjamin Lewin (1999)
Oxford University Press; ISBN: 019879276X
Price: \$89.95 (available at www.amazon.com)
4. Genetics textbooks available on-line at PubMed Books
(<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books>):
An Introduction to Genetic Analysis 7th ed. (1999)
Anthony J.F. Griffiths, Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin,
and William M. Gelbart

Modern Genetic Analysis (1999)

Anthony J.F. Griffiths, William M. Gelbart, Jeffrey H. Miller, and Richard C. Lewontin

Molecular Biology of the Cell 3rd ed. (1994)

Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, and James D. Watson

Molecular Cell Biology 4th ed. (1999)

Harvey Lodish, Arnold Berk, S. Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James E. Darnell

5. The following books will be available **on reserve in the MCB library (C2095)**:

An Introduction to Genetic Analysis 6th Edition, Griffiths, et al, (1996)

Genes & Genomes – M. Singer and P. Berg (1991)

Basic Genetics – D.L. Hartl (1991)

EXAMS

Student performance will be evaluated based on two section examinations.

Date	Lecture Topic	Instructor
1. Tuesday, Nov. 18	CLASSICAL GENETICS Genetics and genetic methods The concept of a gene The genetic material	S. Haynes Biochemistry
2. Thursday, Nov. 20	PROKARYOTIC GENETICS I Mutagenesis and Mutant Isolation	A. Maurelli Microbiology
3. Tuesday, Nov. 25	PROKARYOTIC GENETICS II Gene Transfer and Mapping	A. Maurelli Microbiology
4. Tuesday, Dec. 2	PROKARYOTIC GENETICS III Mobile Genetic Elements	A. Maurelli Microbiology
5. Thursday, Dec. 4	PROKARYOTIC GENETICS IV Recombination Types of recombination Mechanisms of site-specific recombination Mechanisms of non-homologous recombination	S. Stibitz CBER/FDA
6. Tuesday, Dec. 9	PROKARYOTIC GENETICS V Transposable Elements – applications as genetic tools	A. Maurelli Microbiology
7. Thursday, Dec. 11	PROKARYOTIC GENETICS VI Strategies for analysis of biosynthetic pathways	P. Rick Microbiology
8. Tuesday, Dec. 16	PROKARYOTIC GENETICS VII Structural Genomics Mining genomes Mechanisms of genome evolution Functional Genomics Comparative genomics Transcriptomes Proteomes	W. Day USAMRIID
9. Thursday, Dec. 18	PROKARYOTIC GENETICS VIII Negative Regulation <i>lac</i> operon Bacteriophage lambda Attenuation	G. Ji Microbiology
10. Tuesday, Jan. 6	PROKARYOTIC GENETICS IX Positive Regulation <i>ara</i> operon cAMP	G. Ji Microbiology

11. Thursday, Jan. 8	PROKARYOTIC GENETICS X Post-transcriptional control Post-translational control proteolysis -- SOS pathway anti-sense RNA mRNA turnover Global regulation Signal transduction Quorum sensing	G. Ji Microbiology
12. Tuesday, Jan. 13	SECTION EXAMINATION	
13. Thursday, Jan. 15	YEAST GENETICS I Experimental strategies to elucidate a biochemical pathway Application of results to higher eucaryotes Advantages to using yeast as a model eucaryote	T. Dunn Biochemistry
14. Tuesday, Jan. 20	YEAST GENETICS II	T. Dunn Biochemistry
15. Thursday, Jan. 22	YEAST GENETICS III	T. Dunn Biochemistry
16. Tuesday, Jan. 27	ACTIVATION AND REPRESSION OF EUKARYOTIC GENE TRANSCRIPTION I Basic Principles The Gene Promoter Sequences Involved in Basal and Activated Transcription Transcription Factor IID and the RNA Polymerase II Complex DNA Binding by Transcription Factors Methods for Studying Gene Expression and Transcription Factors	J. Harmon Pharmacology
17. Thursday, Jan. 29	ACTIVATION AND REPRESSION OF EUKARYOTIC GENE TRANSCRIPTION II Mechanisms of Transcriptional Activation and Repression Regulation of Transcription Factors ATP-dependent and -independent chromatin remodeling	J. Harmon Pharmacology
18. Tuesday, Feb. 3	VIRAL VECTORS FOR EXPRESSION OF EUKARYOTIC GENES	J. Giam Microbiology
19. Thursday, Feb. 5	REARRANGEMENTS OF GENETIC MATERIAL	C. Snapper Pathology

20. Tuesday, Feb. 10	FUNGAL GENETICS – ASPERGILLUS	X. Xiang Biochemistry
21. Thursday, Feb. 12	DROSOPHILA GENETICS I	S. Haynes Biochemistry
22. Tuesday, Feb. 17	DROSOPHILA GENETICS II	S. Haynes Biochemistry
23. Thursday, Feb. 19	MOUSE GENETICS I History, Classical approaches Jackson Laboratory Research resources Transgenics and knockouts Experimental questions which can be addressed Complications of interpretation Tissue specific expression	W. Gause Microbiology
24. Tuesday, Feb. 24	SECTION EXAMINATION 9:00 – 11:30 AM, Room TBA	