

# GENOMICS, DEVELOPMENT and MEDICINE

BIO SCI D145, Course Code: 05570

Quarter: Winter Quarter 2017

Tu/Th 2-3:20 Steinhaus 174

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Required text – Introduction to Genomics, 2<sup>nd</sup> edition, Arthur M. Lesk, Oxford University Press, 2012  
ISBN 978-0-19-956435-4

Supplementary text (not required), - Gene Cloning and DNA Analysis, T.A. Brown, 2010  
ISBN 978-1-4051-8173-0

[Link to academic honesty policy](#)

Date	Topic	Reading
1/10	<b>Organization, structure and mapping of genomes</b> Model organisms, genome size and complexity, reassociation kinetics, Implications of split genes for functional diversity of proteins	79-89, 98-104
1/12	<b>Presentation and discussion of week 1 papers</b>	Riann
1/17	<b>Genomic mapping continued, introduction to sequence analysis</b> Comparative genomics, synteny, genome evolution	115-148
1/19	Presentation and discussion of week 2 papers	Students
1/24	<b>Sequence methods and strategies</b> Automated sequencing, large scale genomic sequencing, nextgen sequencing	90-103 215-233
1/26	Presentation and discussion of week 3 papers	Students
1/31	<b>Sequencing and individual variation</b> Nextgen sequencing and understanding individual variation and disease.	115-153 191-211
2/2/	Presentation and discussion of week 4 papers, <b>term paper outlines due</b>	Students
2/7	<b>Introduction to microarray analysis</b> microarray analysis, types of microarrays and applications of each	265-293
2/9	<b>Midterm examination</b>	<b>Weeks 1-5</b>
2/14	<b>In depth analysis of gene expression</b> Whole genome analysis of mRNA and protein expression,	293
2/16	Presentation and discussion of week 6 papers	Students
2/21	<b>Introduction to gene networks and epigenetic analysis</b> Chromatin immunoprecipitation, DNA and protein methylation analysis	Class notes and papers
2/23	Presentation and discussion of week 7 papers	Students
2/28	<b>Comprehensive mutant libraries</b> High throughput gene knockout, gene targeting, gene trapping, genome-wide mutagenesis	Class notes and papers
3/2	Presentation and discussion of week 8 papers	Students
3/7	<b>Mapping protein interactions</b> Methods – two hybrid, phage display, mass spectrometry.	297-308, 322-328
3/9	Presentation and discussion of week 9 papers – <b>TERM PAPERS DUE</b>	Students
3/14	<b>'Omics and the importance of the microbiome</b> Metagenomics and impact of the microbiome on other aspects of physiology	351-360
3/16	Presentation and discussion of week 10 papers	Students
3/23	<b>Final examination – (covers only weeks 6-10)</b>	1:30 - 3:30

Grading criteria: Midterm (35%), Paper (10%), Presentation (10%), Class participation (10%), Final exam (35%)