BB1190 VT16 P4: Genteknik/ Gene Technology
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Instructor
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Course Schedule

No.	Date	Time	Room	Lecture Title	Key Concepts	Preparatory Reading (before lecture)
1	T 29/3	10-12	FD5	Biology and biotechnology	-What is a gene? -Background on gene expression	-Ch. 1 C&P Intro Biotech. (p 1-28) -Ch. 2 C&P DNA, RNA, Protein (p 33-58) -*Optional: Zimmer: E.coli and the elephant (excerpt)*
2	W 30/3	13-15	FD5	Genome features and organization	-Chromosomes and complexity	-Ch. 8 C&P: Genome (231-250) -*Optional: Gregory 2014: Junk DNA*
3	F 1/4	10-12	FD5	DNA synthesis and sequencing	-PCR theory and application -DNA sequencing	-Ch. 4 C&P DNA Synthesis (all) -*Opt: Ch 9 Brown: PCR* -*Opt: Ch 10 Brown: DNA Seq*
4	M 4/4	13-15	FD5	DNA cloning: building genes and genomes	-Cloning eukaryotic DNA -Cloning methods	-Ch. 3 C&P Recombinant DNA (p. 63-73)
5	T 5/4	15-17	FD5	**Homework 1:** Genome assembly	-Go over homework	-*Opt: Gibson 2009, Gibson 2010 Nature Methods*
6	T 12/4	10-12	FD5	Genetic engineering of E.coli *First lab week begins*	-Plasmids -Homologous recombination -Laboratory strains	-Ch. 3 C&P Recombinant DNA excerpt (p 79-88) -Ch. 13 Brown: Proteins from cloned genes
7	W 13/4	13-15	FD5	Synthetic biology	-Simple gene regulation -Genetic "logic"	Alon 2007: Network motifs (p 450-455) -*Opt: Collins 2014, Synbio history*

8	M 18/4	15-17	FD5	Molecular Diagnostics *Peter Savolainen KTH*	-SNP analysis -Forensic analysis	-Ch. 8 C&P: Genome (231-250) -Figure 8.16, 8.17
9	M 25/4	15-17	FD5	**Homework 2:** Synthetic Biology *KS, MJ*	-Genetic oscillators -Genetic "logic"	-Do Homework 2 -*Opt: Elowitz Nature 2000*
10	W 27/4	13-15	FD5	*CANCELLED*		
11	M 2/5	13-15	FD5	Designing a cell factory	-Bioinformatics tools -Metabolic modeling	-Ch. 13 C&P Pathway Eng. (p 371-385) -Palsson 2010: What is Flux balance analysis
12	W 4/5	13-15	FD5	**Homework 3:** Cell factory	-Building a metabolic model	-*Opt: Forster et al 2003* -*Opt: Feist and Palsson 2008*
13	M 9/5	15-17	FD5	Antibody engineering	Antibody diversity in the genome -Natural antibody libraries	-Ch 6 C&P: Antibodies (p 173-191) -*Opt: Ch 10 Glick, Antibodies (p 399-422)*
14	W 11/5	15-17	FD5	Vaccine creation	-Case study: Influenza vaccines -Case study: HIV vaccines	-Ch 6 C&P: Vaccines (p 191-201) -*Opt: Ch 12 Glick, Vaccines (p. 460-472)*
15	M 16/5	13-15	FD5	**Homework 4**: Antibody development	-Assays for antibody engineering	
16	W 18/5	15-17	FD5	Gene therapy	-*Case: Glybera* -Case: Zinc-finger nucleases	-Ch 17 C&P: Gene Therapy (all) -Ch 5 C&P: Ribozymes (p 152-168)
17	H 19/5	15-17	FD5	**Homework 5:** Gene therapy	-Directed evolution -Aptamers	
	M 23/5	13-17	FD5	*Practice*		
	T 7/6	14-19	FB52	*EXAM*		

Laboratory
You will be provided with a laboratory manual that includes all relevant deadlines.
Helpful texts for understanding the lab are from Brown: *Ch 3 "Purification of DNA from cells,"* and Ch 5 *"Introduction of DNA into cells."* (Uploaded)
Lab weeks: wk 16 (18 Apr), wk 17 (26 Apr), wk 19 (10 May), wk 20 (17 May)

Course reading materials
Lecture notes and reading will be uploaded. Optional are not required but give more detail in an area.
-C&P: Clark and Pazdernik **Biotechnology** (2nd ed, both 2009 and 2012 versions OK).
-Brown TA: **Gene cloning and DNA analysis** (6th ed 2010)
-Glick, Pasternak, and Patten: **Molecular Biotechnology** (4th ed 2010)

Grading
The 5 homeworks will be graded on a 3-point scale (2, 1, 0 points) and must be handed in at the **beginning** of the lecture. These points will be added to the exam grade.
Final exam will be graded on a 0-100 scale.
Exam will be based on what we cover in class, homeworks, and the assigned reading, unless explicitly written as *Optional.*
Grading rubric: <50 F, 50-60 E, 60-70 D, 70-80 C, 80-90 B, 90-100 A