

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) <i>-Optional: E.coli and the elephant (excerpt)</i>
2	W 30/3	13-15	FD5	Genome features and organization	-Chromosomes and complexity	-Ch. 8 C&P: Genome (231-250) <i>-Opt: Chen 2013: Why are genes on the lagging strand?</i> <i>-Opt: Gregory 2014: Junk DNA</i>
3	F 1/4	10-12	FD5	DNA synthesis and sequencing	-PCR theory and application -DNA sequencing	-Ch. 4 C&P DNA Synthesis (all) <i>-Opt: Ch 9 Brown: PCR</i> <i>-Opt: Ch 10 Brown: DNA Seq</i>
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) <i>- Opt: Gibson 2009/2010 "Gibson assembly method"</i>
5	T 5/4	15-17	FD5	Homework 1: Genome assembly	-Two ways of building	
6	T 12/4	10-12	FD5	Genetic engineering of E.coli <i>*First lab week begins</i>	-Plasmids -Homologous recombination -Laboratory strains	-Ch. 3 C&P Recombinant DNA excerpt (p 79-88) <i>-Opt: Ch. 13 Brown: Proteins from cloned genes</i>
7	W 13/4	13-15	FD5	Synthetic biology	-Simple gene regulation -Genetic "logic"	Alon 2007: Network motifs (p 450-455) <i>-Opt: Collins 2014, Synbio history</i>

8	M 18/4	15-17	FD5	Molecular Diagnostics <i>Peter Savolainen KTH</i>	-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 <i>KS, MJ</i>		- <i>Opt: Elowitz 1999</i>
10	W 27/4	13-15	FD5	<i>CANCELLED</i>	-Environmental genomics	
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		- <i>Opt: Forster et al 2003</i> - <i>Opt: Feist and Palsson 2008</i>
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) - <i>Opt: Ch 10 Glick, Antibodies (p 399-422)</i>
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) - <i>Opt: Ch 12 Glick, Vaccines (p. 460-472)</i>
15	M 16/5	13-15	FD5	Homework 4: Antibody development		
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) - <i>Opt: Perez 2008 Gene editing of HIV</i> - <i>Opt: Carrol 2014 Review gene editing tools</i>
17	H 19/5	15-17	FD5	Homework 5: Gene therapy		
	M 23/5	13-17	FD5	<i>Review, practice exam</i>		
	T 7/6	14-19	FB52	<i>EXAM</i>		

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