

## BB1190 VT15 P4: Genteknik och molekylärbiologi

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### Instructor

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Doodle to sign up for laboratory week: <http://doodle.com/5xs9yu58zne4ku3a>

### Course Schedule

No.	Date	Time	Room	Lecture Title	Key Concepts	Preparatory Reading (before lecture)
1	M 23/03	08-10	FD5	Biology and biotechnology	-Early molecular biotech -Fundamentals	-Ch. 2 C&P DNA, RNA, Protein (p 33-58) -Zimmer: E.coli and the elephant (excerpt)
2	W 25/03	08-10	FD5	Gene structure and genome organization	-What is a gene? -Chromosomes and complexity	-Ch. 9 Strachan: Human genome (all) -Optional: Gregory 2014: Junk DNA
3	F 27/03	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 30/03	13-15	FD5	DNA cloning: building genes and genomes	-Cloning eukaryotic DNA -Cloning methods	
5	T 31/03	08-10	FD5	<b>In class problem 1:</b> Genome assembly	-Individual work (1 hr) -Peer review of answers (1 hr)	-Church 2009: Genome engineering
6	W 01/04	13-15	FD5	Genetic engineering of E.coli	-Plasmids -Homologous recombination -Laboratory strains	-Ch. 3 C&P Recombinant DNA (p 79-88) -Ch. 13 Brown: Proteins from cloned genes
7	T 14/04	13-15	FD5	Designing a cell factory	-Bioinformatics tools -Metabolic modeling	-Keasling 2009: Manufacturing molecules -Palsson 2010: Flux balance analysis
8	H 16/04	10-12	FR4	<b>In class problem 2:</b> Cell factory	-Group work (1 hr) -Peer-grading (1 hr)	-Ch. 13 C&P Pathway Eng. (p 371-385)
9	T 21/04	13-15	FD5	Molecular diagnostics <i>Lektor Peter Savolainen</i>	-SNP analysis -Forensic analysis	-Ch. 3 C&P Recombinant DNA (p. 63-73) -Ch. 24 C&P Forensics (all)
10	H 23/04	10-12	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)
11	M 27/04	15-17	FD5	<b>In class problem 3:</b> Antibody development	-Individual work (1 hr) -Peer review (1 hr)	

12	W 29/04	10-12	FD5	Protein engineering <i>Prof Per Åke Nygren</i>	-Rational protein engineering -Directed evolution of proteins	-Ch 11 C&P: Protein Engineering (all) - <i>Opt: Baker 2011 Prot eng overview</i>
13	M 04/05	10-12	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>
14	H 07/05	10-12	FD5	<i>Cancelled</i>		
15	M 11/05	10-12	FD5	Gene therapy	-Case: Glybera -Case: Zinc-finger nucleases	-Ch 17 C&P: Gene Therapy (all) -Ch 5 C&P: Ribozymes (p 152-168)
16	T 12/05	8-10	FD5	Synthetic biology	-Simple gene regulation -Genetic logic	-Alon 2007: Network motifs (p 450-455) - <i>Opt: Collins 2014, Synbio history</i>
17	W 13/05	13-15	FD5	Applied genomics <i>Lektor Anders Andersson</i>	- <i>Genome reconstruction</i> - <i>Case: Metagenomics Baltic Sea</i>	-Ch. 12 C&P: Environ. Biotech (all)
R1	M 18/05	10-12	FD5	<b>In class problem 4:</b> Synthetic biology	-Group work (1 hr) -Peer-grading (1 hr)	
R2	M 25/05	08-12	Q2	Review session	-Peer grading assigned problems	<b>Do the assigned problems</b>
Ex	W 03/06	14-19	FB 52-54	Exam		

### Laboratory

You will be provided with a laboratory manual (Uploaded)

Helpful texts (optional) for lab are from Brown: Ch 3 "Purification of DNA from cells," and Ch 5 "Introduction of DNA into cells." (Uploaded)

### Course reading materials

C&P text I assume you have. *Selections from others will be uploaded. Optional are not required but typically give more detail in an area.*

-C&P: Clark and Pazdernik **Biotechnology** (2<sup>nd</sup> ed, both 2009 and 2012 versions OK).

-Strachan and Read: Human molecular genetics (4<sup>th</sup> ed 2010)

-Brown TA: Gene cloning and DNA analysis (6<sup>th</sup> ed 2010)

-Glick, Pasternak, and Patten: Molecular Biotechnology (4<sup>th</sup> ed 2010)

### Grading

Final grade is the exam grade. Exam will be based on what we cover in class 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