

Prof. Dr. Peter Dieter, Department of Physiological Chemistry, Carl Gustav Carus Faculty of Medicine, TU Dresden,
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Introduction to the molecular mechanisms of cell function in the context of cutting-edge applications in bioengineering and medicine. Biological concepts include: molecular building blocks, energetics, reaction kinetics, nucleic acids and DNA repair, transcription, translation, regulation and cytoskeleton. Applications include bioenergy, biomanufacturing, antibiotics, diabetes, protein therapeutics, gene circuit engineering, & tissue engineering. Quantitative principles, computational methods, and experimental methods will be integrated into lectures and labs.

LECTURE/SEMINAR/EXAMINATION

Required Text: Essential Cell Biology, B. Alberts et. al. 2009

Tuesday 11.10 am–3 pm (auxiliary date: even weeks: Friday 9 am-2 pm)

Location (see map)

Room 108b: Building 40, Dekanatsgebäude; Hörsaal 2(HS2): Building 91, MTZ

Examination/Grading: Active Attendance / Written (different formats: MC-, open questions, etc.)

Exam Seminar 1: 24%

Exam Seminar 2: 32%

Exam Laboratory: 7%

Final Exam: 27%

Active Attendance: 10%

Week	Time	Topic	Room
	<u>April</u>		
15	Tue 08	CH1 (9) + CH2 (24)	108b
16	Tue 15	CH3 (16/1) + CH4 (24/4)	108b
17	Tue 22	CH5 (15/2) + CH6 (33/7)	HS2
18	Tue 29	EXAM SEMINAR 1: CH1-6	HS2
	<u>May</u>		
19	Tue 06	CH7 (38/7) + CH8 (20/3)	108b
20	Tue 13	CH9 (17/0) + CH11 (38/3)	108b
21	Tue 20	CH12 (25/6) + CH 13 (12/2) + CH14 (19/4)	109b
22	Tue 27	EXAM SEMINAR 2: CH7-14	108b
22	Fri 30	CH15 (22/3) + CH16 (32/3)	108b
	<u>June</u>		
26	Tue 24	CH17 (25/5) + CH18 (21/5)	108b
	<u>July</u>		
27	Tue 01	CH19 (15/1) + CH20 (29/4)	108b
28	Tue 08	EXAM LABORATORY	108b
29	Tue 15	FINAL EXAM: CH15-20	108b

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Labs will provide practical experience with current methods used in molecular/cell biology and biotechnology. The first half of the course will cover protein folding, bioenergetics, cell growth, and microscopy. The second half will be devoted to a single multi-week module on genetic engineering and gene regulation. Students will build a bacterial gene expression system, learning recombinant DNA technology, cloning and gene expression measurement techniques. Labs will emphasize the experimental and analytical skills required in modern engineering and scientific research.

LABORATORY

Required: Laboratory Manual – White Lab coat

Tuesday: 3.00 pm – 6.00 pm

Location: MTZ, Fiedlerstrasse 42 (map: Bld. 91)

Examination/Grading: Active Attendance / Written

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Day	Content	Discipline Responsibility	Location
April 08	Laboratory 1 Analysis of Simulated Epidemic and Hand Contamination and Cytological Studies	Microbiology Prof. Jacobs	Mikroskopiersaal
April 15	Laboratory 2 General Histology	Anatomy Prof. Kasper	Mikroskopiersaal
April 22	Laboratory 3 Quantitative Determination and Spectrums of Haemoglobins in Blood	Biochemistry Dr. Hempel	Institut für Physiologische Chemie
April 29	Laboratory 4 Determination of Activity of Lactate Dehydrogenase in Optical Test	Biochemistry Dr. Hempel	Institut für Physiologische Chemie
May 06	Laboratory 5 Molecular Biological Diagnosis of Cystic Fibrosis with the Help of PCR	Biochemistry Dr. Kreutzmann	Institut für Physiologische Chemie
May 13	Laboratory 6 Characterization of DNA using Restriction Endonucleases	Biochemistry Dr. Kreutzmann	Institut für Physiologische Chemie
May 20	Laboratory 7 – Group I Bacterial Transformation	Immunology Prof. Roers Anett Skupin	Institut für Immunologie
May 27	Laboratory 7 – Group II Bacterial Transformation	Immunology Prof. Roers Anett Skupin	Institut für Immunologie
June 03	Laboratory 8 – Group I Plasmid Preparation from <i>E. coli</i> and Sequencing of Plasmid DNA	Immunology Prof. Roers Anett Skupin	Institut für Immunologie
June 17	Laboratory 8 – Group II Plasmid Preparation from <i>E. coli</i> and Sequencing of Plasmid DNA	Immunology Prof. Roers Anett Skupin	Institut für Immunologie
June 24	Laboratory 9 – Group I Transient Transfection of Eukaryotic Cells Western Blotting Technique	Immunology Prof. Roers Anett Skupin	Institut für Immunologie
July 01	Laboratory 9 – Group II Transient Transfection of Eukaryotic Cells Western Blotting Technique	Immunology Prof. Roers Anett Skupin	Institut für Immunologie