

## **ENG BE 209 COURSE SYLLABUS**

**Course Instructor:** Prof. Dr. Peter Dieter, Department of Physiological Chemistry, Faculty of Medicine Carl Gustav Carus, TU Dresden

### **Course Objective:**

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. 2014

**Lecture:** once a week at 180 minutes

**Discussion:** once a week at 90 minutes

**Examination/Grading:**

**Active Attendance / Written (different formats: MC/open questions, etc.)**

**Exam Seminar 1: 24%,**

**Exam Seminar 2: 32%,**

**Exam 3: 27%,**

**Exam Laboratory: 7%,**

**Active Attendance: 10%**

**Lecture Chronology:**

Session	Topic
1	CH1 (10/0)+CH2 (24/0)+CH 3(18/1)
2	CH4 (27/4)+CH5 (18/2)+CH6(32/6)
3	EXAM SEMINAR 1: CH 1-6
4	CH7 (42/7)+CH8 (21/3)
5	CH9 (23/1)
6	CH11 (32/4)+ CH12(32/5)
7	CH13(15/2) + CH 14 (26/4)
8	EXAM SEMINAR 2: CH 7 – 14
9	CH15 (24/2)+CH 16 (35/3)
10	CH17 (32/6) + CH 18 (26/5)
11	CH 19 (19/1) + CH 20 (31/4)
12	EXAM LABORATORY
13	FINAI EXAM CH 15 - 20

Lab Chronology:

Required: Laboratory Manual – White Labcoat

Lab	Content
Laboratory 1	Analysis of Simulated Epidemic and Hand Contamination and Cytological Studies
Laboratory 2	General Histology
Laboratory 3	Quantitative Determination and Spectrums of Hemoglobins in Blood
Laboratory 4	Determination of Activity of Lactate Dehydrogenase in Optical Test
Laboratory 5	Basic Properties of Biological Membranes
Laboratory 6	Metabolism and Indirect Calorimetry while at Rest and under Stress
Laboratory 7	Molecular Biological Diagnosis of Cystic Fibrosis with the Help of PCR
Laboratory 8	Characterization of DNA using Restriction Endonucleases
Laboratory 9	Bacterial Transformation
Laboratory 10	Plasmid Preparation from <i>E. coli</i> and Sequencing of Plasmid DNA
Laboratory 11	Transient Transfection of Eucaryotic Cells Western Blotting Technique