



Course Syllabus: Cell Structure, Development & Physiol. I - B 224

Division	Biological and Environmental Sciences & Engineering Division
Course Number	B 224
Course Title	Cell Structure, Development & Physiol. I
Academic Semester	Fall
Academic Year	2019/2020
Semester Start Date	08/25/2019
Semester End Date	12/10/2019
Class Schedule (Days & Time)	01:00 PM - 02:30 PM Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Christian Froekjaer Jensen	cfjensen@kaust.edu.sa	+966128082968	Level 3, R-3336, 2, Ibn Al-Haytham (bldg. 2)	Sun 15:00 - 16:00 or by appointment.
Jasmeen Merzaban	jasmeen.merzaban@kaust.edu.sa	+966128082383	4218, 2, Ibn Al-Haytham (bldg. 2)	Flexible but please make appointment.

Teaching Assistant(s)	
Name	Email

Course Information	
Comprehensive Course Description	The course will begin by covering fundamental cell biology (Cells, proteins, DNA, genomes) and proceed to cover more specialized topics including DNA replication, central dogma, epigenetics, nuclear architecture, gene expression control, cell motility, secretory membrane systems, and cell-cell signaling. The course is structured with one weekly lecture based on an assigned, contemporary review article on a given topic and one weekly discussion of an assigned, recent primary research article describing a fundamental scientific advance within that topic. The use of recent research papers in cell biology will introduce current topics of interest such as genetic engineering (e.g. CRISPR) and how cells and genomes can be manipulated. Additionally, for some of the lectures, KAUST faculty will give guest lectures to introduce their field of study and describe their own recent experiments and the techniques used in their laboratories. For example, KAUST faculty will discuss stem cell therapy and the use of super-resolution microscopy to study DNA replication and cell adhesion. In the final part of the course, students will present and lead classroom discussions of primary cell biology research papers.
Course Description from Program Guide	The scope of this course is to provide a comprehensive overview of eukaryotic cell structure and the fundamental functional aspects of membranes, organelles, nuclear architecture, genome and epigenome in the context of development, specialization, and integration with the environment.
Goals and Objectives	The goals and objectives for the course are to cover fundamental Cell Biology topics while teaching students to critically read, present, and discuss review articles and primary research papers. A further aim of the course is to expose students to scientific lectures from KAUST faculty research. In short, the goal of the course is to successfully transition students from undergraduate to graduate-level teaching and scientific inquiry.

Required Knowledge	The students are expected to have a basic undergraduate foundation in cell biology or developmental biology. Particularly, in all course work and exams, participants will be expected to be familiar with the major concepts and conclusions covered in the related reference textbook chapters from Alberts et al., Molecular Biology of the Cell, 6th edition as identified in the course schedule. Introductory Cell Biology (B102) will cover these topics on a coordinated schedule and can be taken concurrently.
Reference Texts	<ul style="list-style-type: none"> - Alberts et al., Molecular Biology of the Cell, 6th edition - Review papers assigned by instructors - Primary literature assigned by instructors
Method of evaluation	<p>30.00% - Final exam 20.00% - Oral presentation 20.00% - Exam 2 20.00% - Exam 1 10.00% - Attendance and Participation</p>
Nature of the assignments	<ol style="list-style-type: none"> 1) In-class participation will be assessed based on the discussion of review articles, primary literature, and questions for guest speakers. 2) The two exams are written exams covering the material from the preceding block of the lectures. The material covered by guest lectures will not be included in exams. 3) Oral presentations of groups of students will be assessed based on the level of preparation and critical review of the paper presented. 4) The final written exam will cover the entirety of the course, including assigned background textbook material, review articles, and primary literature discussed in class.
Course Policies	Attendance of classes is mandatory. Planned absence(s) needs to be discussed with the course instructors. A max. of 2 classes can be missed unexcused.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 08/26/2019 Thu 08/29/2019	Course introduction & expectations (Merzaban / Froekjaer-Jensen / Mette) Scientific literature - reading and publishing (Froekjaer-Jensen)
2	Mon 09/02/2019 Thu 09/05/2019	Cells and Genomes (Froekjaer-Jensen) Prof. Mo Li guest lecture: Stem Cells and Regeneration (Froekjaer-Jensen) Background reading MBC: Chapter 1 (Cells and Genomes)
3	Mon 09/09/2019 Thu 09/12/2019	Proteins (Froekjaer-Jensen) Primary literature discussion or faculty presentation (Froekjaer-Jensen) Background reading MBC: Chapter 3 (Proteins)
4	Mon 09/16/2019 Thu 09/19/2019	Genomes (Froekjaer-Jensen) Primary literature discussion or faculty presentation (Froekjaer-Jensen) Background reading MBC: Chapter 4 (DNA, Chromosomes, and Genomes)
5	Mon 09/23/2019 Thu 09/26/2019	University holiday Primary literature discussion or faculty presentation (Froekjaer-Jensen)
6	Mon 09/30/2019 Thu 10/03/2019	DNA replication, repair, and recombination Prof. Samir Hamdan: Single-molecule characterization of multi-protein nucleic acid binding machineries (Froekjaer-Jensen) Background reading MBC: Chapter 5 (DNA replication, repair, and recombination)
7	Mon 10/07/2019 Thu 10/10/2019	Gene expression (Froekjaer-Jensen) Primary literature discussion or faculty presentation (Froekjaer-Jensen) Background reading MBC: Chapter 6 (How cells read the genome: from DNA to protein) and Chapter 7 (Control of gene expression)
8	Mon 10/14/2019 Thu 10/17/2019	Tutorial (Froekjaer-Jensen) Mid-term exam 1 (20% of final grade)
9	Mon 10/21/2019 Thu 10/24/2019	Cytoskeleton and Cell Motility (Merzaban) Prof. Satoshi Habuchi: Super-resolution microscopy and motor proteins (Merzaban) Background reading MBC: Chapter 16 (Cytoskeleton and Cell Motility)
10	Mon 10/28/2019 Thu 10/31/2019	Mid semester break Secretory Membrane System (Merzaban) Background reading MBC: Chapter 12 (Intracellular Compartments and Protein Sorting) + 13 (Intracellular Membrane Traffic)
11	Mon 11/04/2019 Thu 11/07/2019	Cell-Cell/Cell-Matrix Adhesion and Signaling (Merzaban) Primary literature discussion or faculty presentation (Merzaban) Background reading MBC: Chapter 19 (Cell Junctions and the Extracellular Matrix) + 15 (Cell Signaling)
12	Mon 11/11/2019 Thu 11/14/2019	Tutorial Mid-term exam 2 (20% of final grade)
13	Mon 11/18/2019 Thu 11/21/2019	Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban) Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban)
14	Mon 11/25/2019 Thu 11/28/2019	Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban) Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban)
15	Mon 12/02/2019 Thu 12/05/2019	Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban) Student primary literature presentations and discussion (Froekjaer-Jensen/Merzaban)
16	Mon 12/09/2019	Final exam (30%)

Note

The instructor reserves the right to make changes to this syllabus as necessary.