



College of Engineering

Engineering Faculty Document

No.: 47-26

10/21/25

TO: The Engineering Faculty

FROM: The Faculty of the Weldon School of Biomedical Engineering

RE: New 200 level course – BME 20300: Cell Biology For Biomedical Engineers

The Faculty of the Weldon School of Biomedical Engineering has approved the following new 200-level course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM:

BME 29500: Cell Biology For BMEs

Semesters offered: Fall

Total number of credits: 3 (3 lecture credits)

Major Restriction: Biomedical Engineering only

TO:

BME 20300: Cell Biology For Biomedical Engineers

Semesters offered: Fall

Total number of credits: 3 (3 lecture credits)

Prerequisites: None

Major Restriction: Biomedical Engineering and Biological Engineering only

COURSE DESCRIPTION:

BME 20300 Cell Biology for Biomedical Engineers introduces students to the fundamental principles of cellular and molecular biology with a focus on biomedical engineering applications. This course examines the structure and function of prokaryotic and eukaryotic cells, cellular energetics, biomolecular interactions, and signaling pathways. Through lectures, assignments, and collaborative research, students will critically analyze primary literature, apply cellular biology concepts to the development of biomedical technologies, and predict cellular behavior in complex biological systems. Emphasis is placed on integrating cell biology with biomedical innovation areas such as tissue engineering, drug delivery, and diagnostics.

RATIONALE:

This course was created to provide Biomedical Engineering students with the foundational cell biology knowledge necessary for the rest of their curriculum.

BME students need the biological foundations from this course to understand how engineered biomolecules and biomedical devices interact with cells and tissues in health

and disease.

This course is replacing BIOL 23000 Cell Biology which BME students previously took in the Biology department. This newly proposed course largely follows the topics of BIOL 23000 but additionally provides important Biomedical Engineering context and examples for each topic.

Since this is a foundational course, students will take it in the fall semester of their sophomore year, and this course will be a prerequisite for BME 22000 Biomolecules: Structure, function and Engineering, another vital course that supports students in their labs in the 3rd-5th semesters.

Signed by:

A handwritten signature in black ink that reads "Kevin Otto". The signature is written in a cursive style with a loop at the end of the last name.

Kevin Otto, Ph.D.

Dane A. Miller Head and Professor
Weldon School of Biomedical Engineering

Link to Curriculog entry: [BME - 20300 - Cell Biology For BMEs | Curriculum](#)

BME 20300: Cell Biology for BMEs

Fall 2025

Course Information

Course: BME 20300 Cell Biology for BMEs

Meeting days and times: M/W/F

12:30 pm – 1:20 pm

LILY G126

Instructional modality: Face-to-Face

Course credit hours: 3 CR

Prerequisites: N/A

Corequisites: N/A

Honors Contracts: Honors Contracts are available for this class, see course instructor.

Instructor Contact Information

Instructor: Sunghee (Estelle) Park

Office location: MJIS 2096

Email: park1713@purdue.edu

(The best way to contact me is to email me with the subject line **BME295 Student Question.**)

Office hours: Fridays 1:30 pm – 2:30 pm

BME 20300: Cell Biology for BMEs – Estelle Park's Course Schedule (WL)

Week	Date	Topic	Textbook reading
1	8/25/25 (Mon)	Intro to the class / What is a cell?	Chp 1 (pp. 1-10)
	8/27/25 (Wed)	Cells	Chp 1 (pp. 14-28)
	8/29/25 (Fri)	Studying model systems	Chp 1 (pp. 31-39)
	8/31/25 (Sun)	Homework #1 due 11:59 pm	Week 1 material
2	9/1/25 (Mon)	No Class – Labor Day	
	9/3/25 (Wed)	Organelles through the lens of industry innovation	Lecture slides
	9/5/25 (Fri)	Chemical bonds	Chp 2 (pp. 44-53)
	9/7/25 (Sun)	Homework #2 due 11:59 pm	Week 2 material
3	9/8/25 (Mon)	Small molecules & Macromolecules	Chp 2 (pp. 54-67)
	9/10/25 (Wed)	Scientific literacy: law vs. theory	Lecture slides
	9/12/25 (Fri)	Exam #1 (covers lecture material 8/25/25 – 9/8/25)	
4	9/15/25 (Mon)	Bioenergetics	Chp 3 (pp. 86-92)
	9/17/25 (Wed)	Enzymes	Chp 3 (pp. 93-116) & Chp 4 (pp. 151-160)
	9/19/25 (Fri)	Glycolysis and metabolism	Chp 13 (pp. 446-469)
	9/21/25 (Sun)	Homework #3 due 11:59 pm	Week 4 material
5	9/22/25 (Mon)	Mitochondria and energy production	Chp 14 (pp. 474-493)
	9/24/25 (Wed)	Other means of energy production	Chp 14 (pp. 496-510)
	9/26/25 (Fri)	Protein structure and function	Chp 4 (pp. 123-150)
	9/28/25 (Sun)	Homework #4 due 11:59 pm	Week 5 material
6	9/29/25 (Mon)	How proteins are studied	Chp 4 (161-167)
	10/1/25 (Wed)	Membrane structure	Chp 11 (pp. 382-398)
	10/3/25 (Fri)	Scientific literacy: The conversation of science (using mitochondrial theory to discuss the evolution of scientific theories, the importance of peer review, and the challenges of studying a living field)	Chp 14 (pp. 507-510)
		Project #1 due 11:59 pm	
7	10/6/25 (Mon)	Exam #2 (covers lecture material 9/15/25 – 10/1/25)	
	10/8/25 (Wed)	Cytoskeleton	Chp 17 (pp. 595-624)
	10/10/25 (Fri)	TA review/study session	
	10/12/25 (Sun)	Homework #5 due 11:59 pm	Week 7 material

8	10/13/25 (Mon)	No Class – Fall break	
	10/15/25 (Wed)	Cell motility and local interaction with ECM	Lecture slides
	10/17/25 (Fri)	Muscle contraction	Chp 17 (pp. 625-630)
	10/19/25 (Sun)	Homework #6 due 11:59 pm	Week 8 material
9	10/20/25 (Mon)	Signal transduction & cell signaling	Chp 16 (pp. 554-590)
	10/22/25 (Wed)	Transmembrane transport	Chp 12 (pp. 405-419)
	10/24/25 (Fri)	Ion channels and nerve cell signaling	Chp 12 (pp. 419-441)
10	10/27/25 (Mon)	Exam #3 (covers lecture material 10/8/25 – 10/24/25)	
	10/29/25 (Wed)	The immune response	Lecture slides
	10/31/25 (Fri)	Cell cycle & Mitosis	Chp 18 (pp. 635-673)
	11/2/25 (Sun)	Homework #7 due 11:59 pm	Week 10 material
11	11/3/25 (Mon)	Meiosis	Chp 19 (pp. 677-689)
	11/5/25 (Wed)	Embryogenesis	Lecture slides
		Project #2 due 11:59 pm	
	11/7/25 (Fri)	Stem cells	Chp 20 (pp. 735-745)
	11/9/25 (Sun)	Homework #8 due 11:59 pm	Week 11 material
12	11/10/25 (Mon)	TA review/study session	
	11/12/25 (Wed)	Stem cells & tissue families	Lecture slides
	11/14/25 (Fri)	Stem cell technology	Lecture slides
	11/16/25 (Sun)	Homework #9 due 11:59 pm	Week 12 material
13	11/17/25 (Mon)	Cancer 1	Chp 20 (pp. 745-755)
	11/19/25 (Wed)	Cancer 2	Chp 20 (pp. 745-755)
	11/21/25 (Fri)	Review session	
14	11/24/25 (Mon)	Exam #4 (covers lecture material 10/29/25 – 11/19/25)	
	11/26/25 (Wed)	No Class – Thanksgiving break	
	11/28/25 (Fri)	No Class – Thanksgiving break	
15	12/1/25 (Mon)	The genome	Chp 5 (pp. 180-201)
	12/3/25 (Wed)	Transcription & translation	Chp 7 (pp. 238-273)
	12/5/25 (Fri)	Replication and repair of genes	Chp 6 (pp. 210-234)
	12/7/25 (Sun)	Homework #10 due 11:59 pm	Week 15 material
		Project #3 due 11:59 pm	
16	12/8/25 (Mon)	Control of gene expression	Chp 8 (pp. 277-303)
	12/10/25 (Wed)	Genetic variation	Chp 9 (pp. 308-340)
	12/12/25 (Fri)	Genetic technology	Chp 10 (pp. 346-376)
	12/15/25 (Mon)	Exam #5 (covers lecture material 12/1/25 – 12/12/25)	8 am – 10 am @ SMTH 108

Textbook readings

Alberts's Essential Cell Biology 6th edition