King Fahd University of Petroleum & Minerals
College of Chemicals and Materials, Bioengineering Department
BIOE 503: Concepts in Bioengineering (3-0-3)
Syllabus - Term 25A

Catalog Course Description: Introduction to engineering calculations, conservation laws in biological systems, bioreactor configurations, drug delivery, stem cell and tissue engineering. Biomechanics, biomaterials, bioinstrumentation, bioimaging, biosignals, biosensors. Bioengineering ethics and entrepreneurship.

Course Prerequisite: Graduate Standing **Co-requisite:** N/A

Textbooks:

1. Bioengineering Fundamentals, 2nd edition. (2018) Ann Saterbak, Ka-Yiu San, Larry V. McIntire. Pearson.
2. Biomedical Engineering: Bridging Medicine and Technology. (2015) 2nd Edition. W. Mark Saltzman. Cambridge University Press.
3. Introduction to Biomedical Engineering. (2005) 2nd Edition. John D. Enderle. Elsevier Academic Press.

Instructor: Prof. Ibraheem Al-Naib / B7, R126-1 / Phone: 5518 / ibraheem.naib@kfupm.edu.sa

Office Hours: UTR 10:00 A.M.-11:00 A.M and by appointment

Course Learning Outcomes:

1. Explain engineering concepts and their application in biological systems.
1.Describe concepts of various fields of biotechnology and their application in the real world.
2.Apply bioengineering tools in solving problems in medical and bioengineering fields.
3.Observe ethical values in the field of bioengineering and related topics.

Course Topics:

Week #	Topic
1	Engineering calculations
2	Conservation laws
3	Bioreactor design and operation
4-5	Biomechanics
6	Bioinstrumentation (Flipped class)
7	Biosensor and biosignals (Flipped class)
8-9	Biomaterials
10	Bioimaging
11	Drug delivery
12	Stem cell and tissue engineering
13	Bioinformatics (Flipped class)
14	Regulatory, ethics, and entrepreneurship
15	Presentations

Grading Policy:

Quizzes:	**15%**
Assignments:	**15%**
Major Exams:	**40% (W#6 and W#11)**
Final (comprehensive):	**30% (TBA by the registrar)**

Important Notes:

- The students are **encouraged** to use any AI tool, provided they highlight the parts written by such a tool and can answer any questions about it. A proper citation for the exact name and version of the tool should be given.
- Each student must be vigilant about academic integrity at all times.
- Only official excuses obtained from the Deanship of Students Affairs are accepted.
- If a student reaches more than 20% of unexcused absence (6 absences of the 30-lecture class), a DN grade will be issued.
- Excuses for officially authorized absences must be presented no later than one week following the resumption of class attendance.
- **No makeup will be accommodated for missed quizzes or exams.**
- Late assignments will not be accepted.
- A student caught cheating in any of the assignments will get ZERO in all assignments, and other proper action will be taken that may eventually lead to the transfer of the student to student affairs.
- The instructor reserves the right to modify the course outline and policies mentioned in this syllabus at any time during the semester.
- Refer to the registrar website for the academic calendar and important deadlines: https://registrar.kfupm.edu.sa/academic-calendar/current-semester/