Winter 2027 TA – Department of Bioengineering

Specific qualifications for BIEN courses

(January 5, 2027- April 24, 2027)

Position Summary:

- A Teaching Assistant is a Graduate Student employed to assist a Course Supervisor.
- Assist Professor in preparing, grading, and reviewing HW sets & other assignments, quizzes, exams.
- Prepare, conduct, and lead tutorials
- Reading course materials
- Communication with students regarding MyCourses

BIEN 203, Introduction to Statistics and Data Science, 180 hours, 2 positions

BIEN 221/220, Introduction to Mechanics for Bioengineers, 180 hours, 3 positions

- Knowledge of AutoCAD and Autodesk Fusion 360 is essential.
- Current active grad students
- Good Communication skills.
- Experience navigating MyCourses and conducting tutorials.
- Understanding of topics related to mechanics, bio inspired materials is preferable.

BIEN 267- Bioanalytical Methods in Bioengineering, 180 hours, 7 positions

- Familiar with experimental work in the following disciplines Synthetic Biology and Metabolic Engineering. These include DNA extraction, cloning, protein expression, microbial transformation, metabolite extraction methods, advanced chromatography (gas or liquid chromatography), mass spectrometry.
- Experience in Yeast/ bacteria manipulation is an as asset
- Demonstrated experience in wet lab research, particularly for cloning, DNA extraction, sequencing, microbial transformations
- Experience with plasmid design and use of DNA analysis tools, such as Benchling or Snapgene.
- Additional experience considered an asset:
- Knowledge in Transcriptome data analysis including de novo or reference-based transcriptome assembly, differential expression analysis, nanopore sequencing.

- Familiar with bioinformatics tools such as FastQC, CutAdapt, Trimmomatic, MultiQC, Salmon, Trinity, RNA STAR, DESeq
- Coding languages such as R or C++, familiar with bioinformatics using Galaxy is an asset

BIEN 280, Thermodynamics in Bioengineering, 180 hours, 1 position

- Deep understanding of thermodynamics (laws and applications), chemical and physical equilibrium
- Problem-solving skills

BIEN 320, Molecular, Cellular and Tissue Biomechanics, 180 hours, 1 position

- Applicants must have taken and passed BIEN 320 or a similar course before or have extensive (theoretical and/or hands on) knowledge of at least three of the following techniques: soft matter rheology, magnetic tweezers, optical tweezers, traction force microscopy.
- Applicants must also be highly familiar with the cellular cytoskeleton, physics, basic cell biology, solid mechanics, biophysics, physical concepts and conservation laws. Applicants should be familiar with literature in the field and read articles as needed to prepare course materials

BIEN 330, Tissue Engineering and Regenerative Medicine, 160 hours, 1 position

- Engineering concepts used in regenerative medicine and tissue engineering
- Selection of biomaterials, material structure-function relationships, material design, product lifecycle, and biocompatibility
- Understanding of manufacturing and fabrication of TERM devices.
- Understanding of ethical considerations and the current role of govt regulations
- Knowledge of inclusive engineering design, product development, and industry standards

BIEN 340, Transport Phenomena in Biological Systems 2, 180 hours, 1 position

- Expert knowledge in transport phenomena, including mass-transport with (bio)chemical reactions, conservation relations and constitutive equations, dimensional analysis for mass, heat and momentum transport.
- Differential equations, numerical analyses and proficiency with MathLab tools.
- Good knowledge of biological systems for application of transport phenomena (ex: physiological transport systems in the human body and bioreactor operations.
- Lead 2-hour weekly tutorial
- Applicants must be familiar with the course content (please consult the eCalendar)

BIEN 360, Physical Chemistry for Engineers, 150 hours, 1 position

- Applicants must be familiar with the course content (please consult the eCalendar)
- Proficiency in English is required
- Deep understanding of thermodynamics (laws and applications), chemical and physical equilibrium
- Lead 2-hour weekly tutorial

BIEN 361, Materials for Bioengineering, 160 hours, 1 position

- Extensive coursework in Materials Science, Advanced Materials, and Bioengineering
- Proven experience in designing interactive course materials
- Teaching experience and proficiency in integrating real-world bio applications into courses is an asset.

BIEN 420, Biodevices Design for Diagnostics and Screening, 180 hours, 3 positions

- Knowledge of diagnostics and high throughput screening devices for biomedical applications
- Experience in microfluidics, microfabrication and surface engineering will be an asset

BIEN 440, Information Storage and Processing in Biological Systems, 85 hours, 1 position

- Prior coursework or relevant experience in storage and processing of information in biological systems, both natural and artificially-created, ranging from biomolecules, cells, and populations of cells.
- Superior knowledge of information storage in DNA and DNA computation; molecular surfaces of proteins; computation with motile biological agents in networks; and biological and biologically-inspired algorithms
- Applicants must be familiar with the course content (please consult the eCalendar)

BIEN 462, Engineering Principles in Physiological Systems, 85 hours, 1 position

- Applicants must be familiar with the fundamentals of continuous and discrete-time signals and systems; linear-time invariant systems; ordinary differential equation and difference equation system representations; frequency domain analysis and Fourier transforms in continuous and discrete-time; sampling; filtering; Laplace and Z transforms; feedback systems and basics of control; programming in Matlab.
- Preferred applicants will have a strong interdisciplinary background and experience related to the application of signals and systems theory to the analysis of biomedical systems.

BIEN 470, Bioengineering Project Design, 35 hours, 1 position

- Familiarity with Capstone Projects in BIEN or other engineering programs
- Familiarity or ability to become familiar with grade entry and management in MyCourses
- Ability to manage email communications

BIEN 514, Fundamentals and Rheology of Biological Fluids, 160 hours, 1 position

- Expertise in fluid mechanics and rheology through coursework or research
- Expertise in coding (Matlab and /or Python)
- Preferably have taken the course before

BIEN 530, Imaging and Bioanalytical Instrumentation, 170 hours, 1 position

- Have taken BIEN 530 beforehand, or an equivalent course on microscopy
- Familiarity with ImageJ and either MatLab or python.
- Lead 1-hour weekly tutorial

BIEN 535, Electron Microscopy and 3D Imaging for Biological Materials, 60 hours, 2 positions

- The applicant has taken BIEN 535.
- The applicant has hands-on experience with operating SEM and microCT (being an authorized autonomous operator of SEM is an advantage), and with lab-based specimen preparation including fixation, staining and embedding.
- The applicant must have high proficiency in 3D image processing in the Dragonfly software.
- Lab safety training is obligatory.
- Understanding of wave optics is an asset.

BIEN 545, Diagnostic Devices at the Point-of-Care, 160 hours, 1 position

- Expertise and skills in microfluidics, biosensor design, biochemistry, diagnostics assay
- Applicants must be familiar with the course content (please consult the eCalendar)

BIEN 580, Synthetic Biology, 80 hours, 1 position and 120 hours, 1 position

- Expertise and skills in Synthetic Biology including genome editing, synthetic organisms and pathways construction and/ or prior TA experience in a Synthetic Biology course.
- The TA should also be familiar with the following disciplines Molecular Biology, Genetic Engineering, Biotechnology, Enzymology.
- Lead 2-hour weekly tutorial

BIEN 590, Cell Culture Engineering, 180 hours, 1 position

- Robust quantitative understanding of biology.
- Ideally the applicant should have previously taken the course.
- Theoretical or practical experience in one or more of the following areas: cell culture, bioprocess engineering, quantitative biology.
- Experience or interest in becoming familiar with Matlab, SuperPro Designer, Cell Designer, and other bioprocess modeling and bioinformatics tools is an asset.

BIEN 602, RNA technology for biomanufacturing, 180 hours, 1 position

- Knowledge of RNA technology for biologics manufacturing, Application of mRNA technology for vaccination, and related mRNA product purification is a must.

BIEN 680, Bioprocessing of Vaccines, 180 hours, 1 position

- Robust quantitative understanding of biology.
- Ideally the applicant should have previously taken the course.
- Theoretical or practical experience in one or more of the following areas: vaccine research, cell culture, bioprocess engineering.
- Experience or interest in becoming familiar with MatLab, SuperPro Designer, and other bioprocess modeling and bioinformatics tools is an asset.

BIEN 685, Gene and Cell Therapy Viral Vectors Biomanufacturing, 180 hours, 1 position

- Knowledge in Cell culture, viral production for cell and gene therapy, and non-viral delivery of genomic material is a must.

BBME 600 Seminar series, 45 hours, 1 position

- Excellent oral and written communication skills
- Current graduate student in BBME or Biomanufacturing program