

BSE 2004 – Introduction to Biological Systems Engineering Fall 2016

Instructor: Dr. Leigh-Anne Krometis

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Office Hours: 1130 am – 130 pm Wednesdays

Call or email to schedule appointments outside these times. Please reference your conflict with my regular office hours in the request.

GTA: Ms. Chelsea Corkins

Office: 207 Seitz Hall

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Office Hours: 830 – 1030 am Tuesdays

Call or email to schedule appointments outside these times. Please reference your conflict with my regular office hours in the request.

GTA: Mr. Mehdi Ketabchy

Office: 207 Seitz Hall

E-mail: kmehdi87@vt.edu

Office Hours: 830 – 1030 am Tuesdays

Call or email to schedule appointments outside these times. Please reference your conflict with my regular office hours in the request.

Course Meetings: Lecture: Monday 1:25-2:15 pm, 300 Seitz Hall

Lab: Wednesday 9:05-11:55 am OR Wednesday 1:25-4:15 pm, 108 Seitz Hall

Course Pre-requisites: ENGE 1024 (*min grade of C-*) OR ENGE 1215 (*min grade of C-*)

Catalog Description:

Introduction to the fundamental concepts of Biological Systems Engineering, including statistics, heat and mass balances, protein separation, microbial metabolism, and enzyme kinetics. Engineering design process, engineering problem-solving tools and techniques, development of oral and written communication skills, and the importance of teamwork and ethics in Biological Systems Engineering.

Required Text: none; Reading assignments will be made public on the Canvas site as needed.

Required Software: Microsoft Office package (Word, Excel, Powerpoint)

Learning Objectives: Having successfully completed this course, the student will be able to:

- Apply the engineering code of ethics to resolve ethical dilemmas;
- Apply engineering principles and concepts to biological systems;
- Apply the engineering design procedure to solve problems in biological systems;
- Demonstrate effective teamwork skills; and,
- Demonstrate improved technical communication skills.

Grading and Evaluation: Each student's grade in the course will be determined as follows:

Homework assignments	15%
Laboratory assignments	25%
Midterm	25%
Final exam	35%

Course Policies:

An overall grade of C- is required in this course to fulfill the requirements for an undergraduate BSE degree. It is expected that students will not disturb or distract others or in any way interfere with the ability of other students to learn the course material. Individuals whose actions create a distraction or disturb other students or the instructors will be asked to cease the disrupting activity or leave the classroom. Use of electronics (laptop, iPad, cell phone, etc.) is strictly prohibited in the class unless the students are otherwise notified.

Submitted Homework and Laboratory Assignments:

Homework and laboratory reports must be prepared and presented in a professional manner. Homework and laboratory reports that do not follow the writing guide will be returned ungraded. Due dates will be given on each assignment. Grades on late homework will be reduced by 10% of the total available points for that assignment, each day (24-hour period) that the assignment is late for a maximum of 50% of the final grade. Please refer to the lab report guidelines for preparing lab reports. Only one late assignment will be accepted per student each semester.

Excused Absences:

A significant portion of the course relies on experiential learning through guided lab assignments. Due to the time, space, and oversight required to complete these assignments, "make-ups" are not permitted. Should medical or family emergencies prohibit attendance, *it is the responsibility of the student to promptly request a formal excuse from the Dean of Students or Schiffert Health Center.* The instructor will be happy to facilitate the student's learning in the case of excused absences.

Disability Statement:

Reasonable accommodations are available for students who have a disability. Students should contact the Services for Students with Disabilities (SSD), 150 Henderson Hall, 231-3788 (V), 231-1740 (TTY); Susan P. Angle, spangle@vt.edu, www.ssd.vt.edu. "Students with disabilities are responsible for self-identification....To be eligible for services, documentation of the disability from a qualified professional must be presented to SSD upon request. Academic adjustments may include, but are not limited to: priority registration, auxiliary aids, program and course adjustment, exam modifications, oral or sign language interpreters, cassette taping of text/materials, notetakers/readers, or assistive technology."

Honor Code Statement:

The Honor Code will be strictly enforced in this course. All assignments submitted shall be considered graded work, unless otherwise noted. All aspects of your coursework are covered by the Honor System. A student who has doubts about how the Honor Code applies to any

assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. The following is the Honor Code written verbatim from the VT Honor System Constitution:

“As a Hokie, I will conduct myself with honor and integrity at all times. I will not lie, cheat, or steal, nor will I accept the actions of those who do.”

Commission of any of the following acts shall constitute academic misconduct. This listing is not, however, exclusive of other acts that may reasonably be said to constitute academic misconduct. Clarification is provided for each definition with some examples of prohibited behaviors in the Undergraduate Honor Code Manual located at: <https://www.honorsystem.vt.edu/>

- A. **CHEATING** Cheating includes the intentional use of unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise, or attempts thereof.
- B. **PLAGIARISM** Plagiarism includes the copying of the language, structure, programming, computer code, ideas, and/or thoughts of another and passing off the same as one's own original work, or attempts thereof.
- C. **FALSIFICATION** Falsification includes the statement of any untruth, either verbally or in writing, with respect to any element of one's academic work, or attempts thereof.
- D. **FABRICATION** Fabrication includes making up data and results, and recording or reporting them, or submitting fabricated documents, or attempts thereof.
- E. **MULTIPLE SUBMISSION** Multiple submission involves the submission for credit—without authorization of the instructor receiving the work—of substantial portions of any work (including oral reports) previously submitted for credit at any academic institution, or attempts thereof.
- F. **COMPLICITY** Complicity includes intentionally helping another to engage in an act of academic misconduct, or attempts thereof.
- G. **VIOLATION OF UNIVERSITY, COLLEGE, DEPARTMENTAL, PROGRAM, COURSE, OR FACULTY RULES** The violation of any University, College, Departmental, Program, Course, or Faculty Rules relating to academic matters that may lead to an unfair academic advantage by the student violating the rule(s).

While group work on homework is encouraged to facilitate cooperative learning, each student is expected to complete each homework assignment him/herself and to turn in his/her own individual work. Copying of another student's work (currently or previously enrolled students) is not allowed. Laboratory exercises are conducted in groups and a single group laboratory report may be submitted; however, each group member is expected to contribute to each laboratory exercise and report. Copying (either direct cut and paste or slight

rewording) of written material, such as from the internet or another student's work, is strictly forbidden. All exams should be solely and completely the work of the individual student.

Violations of the Honor Code will be turned over to the Honor Court. At a minimum, a grade of "double-F" for the assignment will be requested. Additional sanctions, including community service, "academic integrity sanctions" listings on official transcripts, or dismissal may be recommended given the seriousness of the infraction.

Virginia Tech's Principles of Community:

Virginia Tech is a public land-grant university, committed to teaching and learning, research, and outreach to the Commonwealth of Virginia, the nation, and the world community. Learning from the experiences that shape Virginia Tech as an institution, we acknowledge those aspects of our legacy that reflected bias and exclusion. Therefore, we adopt and practice the following principles as fundamental to our on-going efforts to increase access and inclusion and to create a community that nurtures learning and growth for all of its members:

- We affirm the inherent dignity and value of every person and strive to maintain a climate for work and learning based on mutual respect and understanding.
- We affirm the right of each person to express thoughts and opinions freely. We encourage open expression within a climate of civility, sensitivity, and mutual respect.
- We affirm the value of human diversity because it enriches our lives and the University. We acknowledge and respect our differences while affirming our common humanity.
- We reject all forms of prejudice and discrimination, including those based on age, color, disability, gender, national origin, political affiliation, race, religion, sexual orientation, and veteran status. We take individual and collective responsibility for helping to eliminate bias and discrimination and for increasing our own understanding of these issues through education, training, and interaction with others.
- We pledge our collective commitment to these principles in the spirit of the Virginia Tech motto of *Ut Prosim* (That I May Serve).

BSE 2004: Introduction to Biological Systems Engineering
FALL 2016; Dr. Leigh-Anne Krometis (v1.0)
Lecture/Laboratory Schedule

Week		Topic	Assignments
1 (Aug 22)	<i>Lecture</i>	What is a Biological Systems Engineer?	
	<i>Lab</i>	Academic Advising (Ms. Priscilla Baker)	Hmwk #1: Career Building
2 (Aug 29)	<i>Lecture</i>	Laboratory safety training (Mr. Donald Conner)	
	<i>Lab</i>	Analyzing Data: Dealing with Error, Applying Statistics, and Communicating Clearly	Hmwk #2: Sig Figs & Statistics
3 (Sept 5)	<i>Lecture</i>	**LABOR DAY – NO CLASSES**	
	<i>Lab</i>	LAB1: Basic measurements	LAB1
4 (Sept 12)	<i>Lecture</i>	Introduction to mass balance (Dr. Krometis)	Hmwk #3: Mass Balance
	<i>Lab</i>	Ethics Part I/Teamwork	Hmwk #4: Ethics Video
5 (Sept 19)	<i>Lecture</i>	Protein Separation (Dr. Mike Zhang)	
	<i>Lab</i>	LAB2: Protein Separation	LAB2
6 (Sept 26)	<i>Lecture</i>	Water Quantity and the Hydrologic Cycle (Dr. Tess Thompson)	
	<i>Lab</i>	LAB3: Rainfall Simulator	LAB3
7 (Oct 3)	<i>Lecture</i>	Mass and Energy Balances Part II (Dr. Krometis)	
	<i>Lab</i>	LAB4: Energy balance	LAB4
8 (Oct 10)	<i>Lecture</i>	MIDTERM EXAM	
	<i>Lab</i>	**FALL BREAK**	
9 (Oct 17)	<i>Lecture</i>	In-stream Hydrology (Dr. Durelle Scott)	
	<i>Lab</i>	LAB5: Stream Tracer	LAB5
10 (Oct 24)	<i>Lecture</i>	Mobile Genetic Elements (Dr. Xueyang Feng)	
	<i>Lab</i>	LAB6: Plasmid DNA extraction	LAB6
11 (Oct 31)	<i>Lecture</i>	Ethics II	
	<i>Lab</i>	LAB7: Public Health Microbiology (Dr. Krometis)	LAB7
12 (Nov 7)	<i>Lecture</i>	Introduction to the design process	
	<i>Lab</i>	Engineering design	LAB8: FINAL PROJECT
13 (Nov 14)	<i>Lecture</i>	Design Communication	
	<i>Lab</i>	Engineering design	
14 (Nov 21)	<i>Lecture</i>	**THANKSGIVING BREAK NOV 19th – 27th**	
	<i>Lab</i>		
15 (Nov 28)	<i>Lecture</i>	Emerging Issues in BSE/Advice from Seniors	
	<i>Lab</i>	Engineering design	
16 (Dec 5)	<i>Lecture</i>	Review	
	<i>Dec 7th</i>	--	

Cumulative Final Exam: Friday, December 9th 2016; 105-305 pm, Seitz 300