Course Information (Catalog):

Course ID:

BMES 202

Course Title:

Programming and Modeling for Biomedical Engineers ll

Course - Description:

The course aims to introduce students to advanced programming concepts and tools to solve numerical problems in bioengineering. lt provides the foundation for biosimulation and biocomputation classes. This course introduces advanced programming methods and computational tools for numerical analysis, model design and graphics. Higher level level lunctionality in Matlab such as SIMULINK, symbolic processing and CAD related tools are discussed.

Course Credits:

3.0 Credits (2.0 Lec + 2.0 Lab)

Prerequisites:

1. BMES 201

Instructor Information:

Dr Joseph J Sarver <joseph.j.sarver@drexel.edu>
Office: Bossone 612 {TBP}
Hours: TBP {see BBL site for details}

Student Learning Information:

Term:

Term 4 (Sophomore, Fall & Spring)

Course Purpose within a Program of Study:

This course continues student learning in basic programming using the MATLAB language. The course focuses on writing software to process (import, segment, analyze and export) data commonly encountered in biomedical engineering. This includes data taken from laboratories that students will encounter later in the program, such as: biological tissue mechanical data (BMES 301), electrophysiological (ECG) data (BMES 302) and images taken from histological staining (BMES 475).

Course Learning Objectives (CLOs):

1) Apply a mathematical description to an engineering problem
2) Decompose a problem into components that can be formulated with known physical/mathematical/biological models
3) Use computers and computer software for analyzing and solving problems
4) Write software as a series of separate functions, with each team member writing different functions
5) Import, segment and analyze data, as well as, report results to meet end user needs
6) Write software for readability, including variable names and commenting

Course Materials:

Required and Recommended Texts, Readings, & Resources

There is no textbook for this course, however all reading materials will be accessible through bblearn

Required and Supplemental Materials and Technologies:

1) All students will be required to bring their laptops with the latest version of MATLAB installed (see https://drexel.edu/it/computers-software/software/)
2) Links to supplemental materials (such as videos) will be provided through Drexel's Learning Management Software (currently BBLearn)

Course Schedule:

Course Calendar:

WK	Day 1	Type	Task	Day 2	Type	Task	
1	Mon, 09/21	Lect	Class Intro / Define CA.1	Wed, 09/23	Code	Build/Test Code	
2	Mon, 09/28	Lect	Define CA.2	Wed, 09/30	Code	Build/Test Code	
3	Mon, 10/05	Code	Build/Test Code	Wed, 10/07	Lect	Define CA.3	
4	Mon, 10/12	***H***	***HOLIDAY***	Wed, 10/14	Code	Build/Test Code	
5	Mon, 10/19	*Review*	Review CX.1	Wed, 10/21	**CX.1**	**Coding Exam 1**	
6	Mon, 10/26	Lect	Define CA.4	Wed, 10/28	Code	Build/Test Code	
7	Mon, 11/02	Lect	Define CA.5	Wed, 11/04	Code	Build/Test Code	
8	Mon, 11/09	Lect	Define CA.6	Wed, 11/11	Code	Build/Test Code	
9	Mon, 11/16	*Review*	Review CX.2	Wed, 11/18	**CX.2**	**Coding Exam 2**	
10	Mon, 11/23	Lect	Define CA.7 / EX	Wed, 11/25	***H***	***HOLIDAY***	

* syllabus is subject to change

Assignments, Assessments, and Evaluations:

Graded Assignments and Learning Activities:

Code	#	Item	Type	Weight
CA	6	Coding Assignment	Weekly: write software in team (n=<4) in 'lab' and at home to solve a problem in biomedical engineering. (GRADE = 60% Ind + 40% Grp)*	30%
CX	3	Coding Exam	In-Class: Write software to solve a simpler problem	60%
Part	4	Participation	Assessment of your work by your team-mates & Instructors (including participation and attendance)**	10%
CP	1	Coding Project - Extra	Team can choose to complete a coding project (solution not defined) for extra credit (1% trying + 1% product)	2%

			TOTAL	**102%**
		*** Group Grade will be modulated (+3% < -6%) based on peer assessments**		
		** If students complete AEFIS course evaluation, best 5 coding assignments will be averaged		

Grading Matrix:

#	ID	Title	Pts	(%)	WK	Date	Dur
1	CA.1	Math Functions	10	5	2	Mon 09/28	7
2	CA.2	Fit - Linear Data	10	5	3	Wed 10/07	9
3	CA.3	Fit - Non-linear Data	10	5	5	Mon 10/19	12
4	CA.4	Image Analysis (Shapes)	10	5	7	Mon 11/02	7
5	CA.5	Image Analysis (Cells)	10	5	8	Mon 11/09	7
6	CA.6	Image Analysis (Motion)	10	5	9	Mon 11/16	7
7	CA.7	Coding Project - Extra Credit**	10	2	11	Wed 12/02	9
8	**CX.1**	**in-Class / Coding Exam 1**	**20**	**30**	5	Wed 10/21	~
9	**CX.2**	**in-Class / Coding Exam 2**	**20**	**30**	9	Wed 11/18	~
10	**CX.3**	**in-Class / Coding Exam 3***	**~**	**~**	12	Mon 12/07	~
11	PA.1	Team Assessment - "A"	5	2.5	6	Mon 10/26	35
12	PA.2	Team Assessment - "B"	5	2.5	12	Mon 12/07	42
13	IA	Instructor / Attendance	10	5	~~	~~	~~
14	AEFIS	AEFIS - End-of-term Eval	0	0*	12	Mon 12/07	7

Grading Scale:
Standard Letter Grades:

A	B	C	D	F
A+ (>97)	B+ (>87)	C+ (>77)	D+ (>67)	F (<60)
A (>93)	B (>83)	C (>73)	D (>60)	~
A- (>90)	B- (>80)	C- (>70)	~	~

Academic Policies:

Academic Integrity, Plagiarism, Dishonesty and Cheating Policy
http://www.drexel.edu/provost/policies/academic_dishonesty.asp

Disability Statement:
http://drexel.edu/oed/disabilityResources/students/

Course Drop Statement:
http://www.drexel.edu/provost/policies/course-add-drop

Course Withdrawal Policy:
http://drexel.edu/provost/policies/course-withdrawal

Appropriate Use of Course Materials

It is important to recognize that some or all of the course materials provided to you may be the intellectual property of Drexel University, the course instructor, or others. Use of this intellectual property is governed by Drexel University policies, including the IT-1 policy found here: https://drexel.edu/it/about/policies/policies/01-Acceptable-Use/

Briefly, this policy states that course materials, including recordings, provided by the course instructor may not be copied, reproduced, distributed or re-posted. Doing so may be considered a breach of this policy and will be investigated and addressed as possible academic dishonesty, among other potential violations. Improper use of such materials may also constitute a violation of the University's Code of Conduct found here: https://drexel.edu/cpo/policies/cpo-1/ and will be investigated as such.

Course Policies:

1) **It is the prerogative of the faculty member to change the course during the term at his, or her, discretion. However all changes will be communicated to the students through bblearn (or other University Systems)**
2) Each team member is expected to produce work in a timely manner.
3) Attendance is part of your grade. Absence will only be excused if communicated to the instructor beforehand.
4) Team members must assess themselves through the provided form.
5) Group grades can be modulated based on peer assessment data