CBEE 102 (3 Cr.) – Engineering Problem Solving and Computations

Winter Quarter 2016
School of Chemical, Biological, and Environmental Engineering
Oregon State University
2016.01.31

COURSE SYLLABUS

Instructor: Travis Walker
Email: travis.walker@oregonstate.edu
Phone: 541.737.7244
Office: Gleeson Hall 211
Office Hours: Wednesdays 1100-1200 and by appointment

Graduate Teaching Assistants:

Richard Hilliard
Email: hilliarr@oregonstate.edu
Office: Owen 406
Office Hours: Mondays 1200-1300

Shujie Li
Email: lishuj@oregonstate.edu
Office: Graf 307A
Office Hours: Mondays 1400-1500

Ian Reddick
Email: reddicki@oregonstate.edu
Office: TBA
Office Hours: Fridays 1300-1400 in Gleeson GTA study lounge

Britany Swann
Email: swannb@oregonstate.edu
Office: Gleeson 206
Office Hours: by appointment

Prerequisites: MTH 112 or MTH 251 or MTH 251H
Dates: 2016.01.04-03.11
Lectures: MW 1700-1750: CRN 35233 (CBEE 102) or CRN 36391 (CBEE 102H)
Classroom: GLFN AUD
Workshops: TR: See section schedule below for your appropriate section information.
Classroom: GRAF 208 & 210

Course Description: (CRN: 35233) CBEE 102. ENGINEERING PROBLEM SOLVING AND COMPUTATIONS (3). Elementary programming and problem-solving concepts implemented using MATLAB software; emphasis on problem analysis and development of algorithms in engineering; application experiences are established through a team-based design competition using the LEGO® NXT microprocessor for data acquisition. Lec/lab. **PREREQS:** MTH 112 or MTH 251 or MTH 251H

Website: `https://oregonstate.instructure.com/`
(Please make sure you have access to the Oregon State University Instructure website, since all course materials and announcements will be available there.)

Section Schedule:

WSN	CRN	Sec	Date	Time	Location	GTA/UTA			
#	#	#				HR1	HR2	HR3	HR4
1	36392	010	TR	0800-0950	Graf 208	AE	AEFI	AFI	AFI
2	35235	011	TR	0800-0950	Graf 210	DH	DGH	DGH	DGH
3	37711	020	TR	1000-1150	Graf 208	ACFI	ACI	ACI	ACI
4	35237	013	TR	1000-1150	Graf 210	BDEG	BDE	BDEG	BDE
5	40125	016	TR	1200-1350	Graf 208	CEF	CEF	CEF	CEF
6	35234	010	TR	1200-1350	Graf 210	DHJ	DHJ	DHJ	DHJ
7	40126	017	TR	1400-1550	Graf 208	CFH	CFH	CFH	CFH
8	35236	012	TR	1400-1550	Graf 210	BJK	BJK	BJK	BJK
9	35238	014	TR	1600-1750	Graf 210	BEK	BEK	BFK	BFK

Instructor: (A) Walker
GTA: (B) Hilliard, (C) Li, (D) Reddick, (E) Swann
UTA: (F) Cashen, (G) Rosene, (H) Landers, (I) Colcer, (J) Dorn, (K) Alanko

Textbook: Musto, Joseph C., William E. Howard, & Richard R. Williams. *Engineering Computations: An Introduction Using MATLAB and Excel*. McGraw Hill. 2009.

Course Grading:

Laboratory Exercises	20%
Laboratory Quizzes	10%
Group Project	20%
Midterm Examination	20%
Final Examination	30%

Grade Policy: Work received up to 24 hours late will receive 50% credit. Work received beyond 24 hours late will receive 0% credit. Group work on homework is permitted, but each student must submit his or her own individual assignment with a list of contributors. If you determine that a regrade is necessary, the entire assignment will be regraded.

Final performance percentage will be assigned a minimum letter grade by the following scale (implying that the percentage requirements for a particular grade may be decreased at the instructor's sole discretion but will not be increased):

94-100	A	74-76	C
90-93	A-	70-73	C-
87-89	B+	67-69	D+
84-86	B	64-66	D
80-83	B-	60-63	D-
77-79	C+	0-60	F

Course Overview & Objectives: By the end of the course, a student will be able to do the following:

- use a programming language (i.e., MATLAB) to perform simple calculations and analyze data;
- use a programming language (i.e., MATLAB) to develop appropriate plots of data from a variety of input data methods. Include relevant components such as text comments, arrows, legends, etc.;
- write programs in MATLAB following good programming practice, using scalar operations, array operations, control structures, integrated math functions, and user-written functions; and
- make meaningful contributions to team efforts to design a software solution to a problem.

Course Structure:

Communication:

The Canvas announcement tab and email to ONID addresses will be used for course communication. I will only use the lecture Canvas (CRN 35233 called "ENGR PROB SOLV & COMPUTATIONS (CBEE_102_X001_W2016"; not individual workshops). All scores will be posted as a PDF on Canvas with the name 2016w_cbee102_grades_master under the module "Start Here". The Canvas grade center will not be used.

Lectures:

Monday lectures will be used for the following:

- Content instruction,
- Thursday workshop overview and Tuesday workshop introduction, and
- One midterm exam

Attendance during the Monday lecture is expected. You are expected to be punctual and to minimize disruptions. Cell-phones need to be off during class. Also, no use of laptops or other electronic devices for activity outside of its use in this class will be tolerated. If you miss a class, you are responsible for obtaining lecture notes from other students.

Recitations:

Wednesday optional recitations will be used for the following:

- Content instruction,
- Tuesday workshop overview and Thursday workshop introduction, and
- Exam feedback and questions.

Attendance during the Wednesday recitation is optional. However, you are expected to be courteous and to minimize disruptions.

Workshops:

Each student should be enrolled in a workshop section. Two workshop periods exist each week for each section. During each workshop a problem-based exercise will be completed. You must bring a laptop with the ability to access Microsoft Excel and MATLAB. Help with access can be found at the end of this syllabus. Note that the Oregon State University College of Engineering has mandated the possession of a usable laptop:

Web link: `http://engineering.oregonstate.edu/laptop-requirements`.

Students will be graded on this activity during the workshop. To achieve full credit, students must be engaged in course activities for the entire period. Student who successfully complete the task before the end of the period and have had their completion approved by the instructor will be allowed to leave early if they desire. The assignment will be multi-part and increase in complexity. The grade for the workshop exercises will be based on the following:

- the student was in attendance;
- the student was prepared with an Excel and MATLAB enabled laptop;
- the student remained productive the entire workshop period;
- the student understands the concepts of the activity; and
- the student achieved a minimum level of competency on the activity.

I encourage discussion and peer-to-peer consultation and guidance during the workshops. I do not allow cell phone or internet (email, web surfing, etc.) use while in the workshops. If the workshop instructor observes these activities, the grade will be lowered. Also, if file sharing between students within one section, or between students in different sections, is observed or suspected, the instructor will file academic dishonesty claims immediately. If you are over 15 minutes late, the instructor will give you a zero for the workshop exercise.

The lowest two workshop scores will be dropped; therefore, no make-up workshops will exist regardless of the reason – no exceptions. The purpose of this policy is to reduce logistics for emergencies in a large class. I advise students to save these "drop" opportunities for true emergencies.

Twice during the term, students will complete a quiz during the workshop section. Make-up quizzes will fall under the policies of examinations.

Group Project:

A course project will be completed by groups or teams of three (3) students. The project will be used as an overall assessment of the students' understanding of key concepts described throughout the course. The project will consist of a MATLAB based code (60% of the project grade), a project report (30% of the project grade), and some additional Administrative Activities including various checkpoints and evaluations (10% of the project grade). Please refer to the additional Group Project description for details beyond the in-

formation listed below.

- lec01: during the first lecture of the course (2016.01.04), a brief overview of the project will be given during the introduction of the course.
- ws01a: prior to the end of the first workshop section (2016.01.05), you will be required to complete a homework assignment surveying your interests and skills. This survey will help the instructors organize the students into teams.
- ws01b: during the second workshop section (2016.01.07), you will be organized into teams based on the results of the survey.
- lec04: during the fourth lecture of the course (2016.01.25), a theoretical background of the Monte Carlo method and a theoretical background of the diffusion problem will be given.
- ws04: during the fourth week of workshop exercises (ws04b), you will complete a brief experiment with your team to collect brute force data.
- lec05: at 1700 on 2016.02.01, the minutes of your required meeting with acknowledgement of the assigned tasks will be due.
- ws05: during the fifth week of workshop exercises, you will have your first project checkpoint meeting during one of your workshops with your instructor, where you will need to present an outline of your plan for completing the project.
- lec06: at 1700 on 2016.02.08, a penultimate flow chart of your project code will be due.
- ws07: during the seventh week of workshop exercises, you will have your second project checkpoint meeting during one of your workshops with your instructor, where the first draft of your report will be due.
- lec09: at 1700 on 2016.02.29, your team project will be due. Absolutely no late projects will be accepted.
- lec10: by 1700 on 2016.03.07, your team project assessments will be due to Charlotte Williams in the CBEE Main Office (Gleeson 103).

Examinations:

Two examinations will exist in this course: one midterm examination during the Monday lecture period in week 06 and one final examination during finals week. The dates of the examinations are the following:

- Week 06, Monday, 2016.02.08 from 1700-1750 in class
- Finals Week, Monday, 2016.03.14 from 2000-2150

The midterm examination and the final examination will be delivered in two different rooms according to workshop sections (subject to change):

- Odd numbered workshop sections (i.e., Sec 1, 3, 5, 7, & 9) that normally meet in will take exams in GLFN AUD.
- Even numbered workshop sections (i.e., Sec 2, 4, 6, & 8) will take exams in CORD 1109.

Please sit with an open chair between you and another student during the examination (i.e., occupy every other seat). During examinations you may only use your copy of the required textbook. You cannot "share" a textbook during an examination or use copies of pages from the book. Note that you may run out of time if you try to "look up" every question. You may write notes in your textbook about topics that are covered in class but not included in the textbook. Laptops, calculators, or phones are not allowed during exams.

Make-up examinations will only be allowed in the case of documented emergencies or with prior authorization (i.e., prior to the examination time) from the instructor. If you must miss one of the examinations for an emergency situation, please let me know as soon as possible (travis.walker@oregonstate.edu). You will not have an opportunity to make up the examination without an approved reason.

Important Dates:

Midterm 2016.02.08 1700-1750
Project Deadline 2016.02.29 1700
Final Exam 2016.03.14 2000-2150

Tentative Course Outline (2016.01.31):

Week	Monday	Tuesday/Wednesday	Thursday/Friday
1	Introduction, Syllabus	Survey, MATLAB	MATLAB, LEGO NXT
2	Methodology	MATLAB	LEGO NXT
3	No Lecture, MLKJ Day	MATLAB	LEGO NXT
4	Monte Carlo & Diffusion	MATLAB, Quiz	Experiment, LEGO NXT
5	Trouble Shooting & Debugging	MATLAB	LEGO NXT
6	Midterm Exam	MATLAB	LEGO NXT
7	Graphing & Root Finding	MATLAB	LEGO NXT
8	Matrix Mathematics	MATLAB, Quiz	LEGO NXT
9	Project Due, Solution	MATLAB	LEGO NXT
10	Student Driven Review	MATLAB	LEGO NXT
11	Final Exam	–	–

OSU STATEMENTS:

From the Office of the Dean of Students (1995.12.13): Behaviors which are disruptive to the learning environment will not be tolerated, and will be referred to the Office of the Dean of Students for disciplinary action. Behaviors which create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.

Web link: `http://oregonstate.edu/admin/stucon/index.htm`

Statement Regarding Students with Disabilities Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Web link: `http://ds.oregonstate.edu/prospective/`

Student Conduct Code Choosing to join the Oregon State University community obligates each member to a code of responsible behavior which is outlined in the Student Conduct Code. The assumption upon which this Code is based is that all persons must treat one another with dignity and respect in order for scholarship to thrive.

For a copy of the Student Conduct Code, see `http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/student_conduct_code_1.pdf`.

Academic Honesty Any instances of dishonesty in academic work will be treated according to OSU Academic Regulations. The Statement of Expectations for Student Conduct is given in the OUS OAR #576-015-0020, accessible at the following link:

Web link: `http://oregonstate.edu/studentconduct/home/`.

The policy is summarized below:

> Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another. It includes
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> (i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.
> (ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
> (iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).
> (iv) TAMPERING - altering or interfering with evaluation instruments or documents.
> (v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

ACCESSING COE PROGRAMS AND DOCUMENTS 2015.09.08:

1. **Verify that you have a valid OSU ONID and ENGR computing account.** More information on getting access to and using ENGR computing resources is available here:
   `http://engineering.oregonstate.edu/computing/gettingstarted/224`
   To create an ENGR computing account (if you have not done so already),
   (a) go to `http://engineering.oregonstate.edu/teach`
   (b) select "Create a new account" at the bottom of the screen.
   (c) follow the prompts to create your ENGR account.
   It is strongly suggested that you immediately log in and verify that you can access the Web, printers, etc. from your ENGR account.
   If you are working from off-campus, you will need to access COE systems through the secure Virtual Private Network (VPN).
   For more information and to download software to set up the VPN, please visit `http://oregonstate.edu/helpdocs/network/vpn-campus-access`
2. **You must have a laptop computer with access to wireless networks that is capable of running Microsoft Excel and MATLAB.** Access to a laptop computer is a requirement for students in the OSU College of Engineering (c.f., `http://engineering.oregonstate.edu/laptop-requirements`).
   For general information about OSU COE computing resources, visit `http://engineering.oregonstate.edu/computing/personal`.
   If you need help with your ENGR account, setting up your laptop, installing software, or access to the ENGR wireless network, please contact the COE Wireless Helpdesk or email support@engr.oregonstate.edu. The Helpdesk is located in Dearborn 120A and is open from 9AM - 11PM, 7 days a week. `http://engineering.oregonstate.edu/computing/personal/155`
3. **MATLAB is made available for free by OSU.** Obtain installation access using the following URL.
   `http://engineering.oregonstate.edu/computing/mathworks/`
4. **Microsoft Office is made available for free by OSU.** Obtain installation access using the following URL.
   `http://oregonstate.edu/office365`
5. **Accessing MATLAB and MS Office through Citrix/XenApp Web (no need to purchase Microsoft Office)**
   Both MATLAB and Microsoft Office (including Excel) can be accessed remotely, at no cost, from COE servers using the Citrix or XenApp Web mechanisms.
   Citrix and XenApp allow you to run a wide variety of software applications on your PC or Mac system, as well as some iOS, Android and Chrome-based devices. A convenient Web-based interface makes access to the applications simple and can be accessed at `https://apps.engr.oregonstate.edu`.
   You will need to install the Citrix Receiver software to use applications on the Citrix servers. Follow the directions at the site below to get started with Citrix: `http://engineering.oregonstate.edu/computing/citrix/`

If you need help with any of these steps, please contact the OSU College of Engineering Helpdesk: `http://engineering.oregonstate.edu/computing/policies/155` or `https://secure.engr.oregonstate.edu/forms/contact.php?to=support`