CBE 117L (1 Cr.) – Programming for Chemical and Biological Engineering

Spring Semester 2018
Department of Chemical and Biological Engineering
South Dakota School of Mines and Technology
2018.04.14

COURSE SYLLABUS

Instructor: Travis Walker
Email: travis.walker@sdsmt.edu
Phone: 605.394.2543
Office: CBEC 3310
Office Hours: MWF 1400-1500, TR 1100-1200, and by appointment

Dates: 2018.01.08-05.04
Workshops: R 0800-1050
Classroom: CBEC 212
Optional Workshops: T 0800-1050
Classroom: CBEC 221

Course Description: CBE 117L Programming for Chemical and Biological Engineering
Credits: (0-1) 1
An introduction to chemical engineering through the development of computational and laboratory skills. The extended use of spreadsheets, programming, and computational software packages will be covered. Elementary numerical methods will be utilized in process modeling and laboratory experiments. Students will participate in hands-on programming exercises in a computer laboratory, or in a lab, using a tablet-pc.
Pre or Corequisites: MATH 123
CRN: 10875

Course Website:
`https://webpages.sdsmt.edu/~twalker/secure/teaching/2018/2018_01/cbe117l.html`

Required Textbook:

> J.C. Musto, W.E. Howard, & R.R. Williams. *Engineering Computations: An Introduction Using MATLAB and Excel*. McGraw Hill (2009).

Course Grading:

Laboratory Exercises	30%
Laboratory Quizzes	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.

Grading: 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):

90-100	A
80-90	B
70-80	C
60-70	D
00-60	F

Course 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, while including 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 course website will be used to distribute information, while email to MINES addresses will be used for course communication. I do my best to answer emails as promptly as possible, but I reserve the right to have 24 hours to answer all email inquires. Under certain circumstances this timeline could be longer.

Lectures:

Lectures will be used for the following:

- content instruction and
- workshop introduction.

Attendance in lectures 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.

While the University is a place where the free exchange of ideas and concepts allows for debate and disagreement, all classroom behavior and discourse should reflect the values of respect and civility. Behaviors that are disruptive to the learning environment will not be tolerated. As your instructor, I am dedicated to establishing a learning environment that promotes diversity of race, culture, gender, sexual orientation, and physical disability. Anyone noticing discriminatory behavior, or who feels discriminated against, should bring it to the attention of the instructor or other institutional personnel as appropriate.

Workshops:

During each workshop a problem-based exercise will be completed. You must bring your tablet with the ability to access Microsoft Excel and MATLAB.

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 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. Make-up quizzes will fall under the policies of examinations.

Optional Workshops:

Tuesday optional workshops will be used for the following:

- additional office hours,
- content review,
- NXT and Vernier development, and
- exam feedback and questions.

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

Examinations:

Two examinations will exist in this course: one midterm examination during week 08 and one final examination during finals week. The dates of the examinations are the following:

- Week 08, Thursday, 2018.03.01 from 0900-1050 in CBEC 3304 & 3305
- Finals Week, Thursday, 2018.05.03 from 1300-1450 in CBEC 3304 & 3305

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@sdsmt.edu). You will not have an opportunity to make up the examination without an approved reason.

Important Dates:

Add/Drop 2018.01.17
Midterm 2018.03.01 0900-1050
Withdraw 2018.04.03
Final Exam 2018.05.03 1300-1450

Tentative Course Outline (2018.04.14): This tentative list and schedule is subject to change depending on class needs.

Week	0800-0900	0900-1000	1000-1050
01	Introduction, Syllabus, Survey	Conical Tank	
02	MATLAB	Arithmetic	
03	Groups & NXT Inventory	NXT Tests 01-04 & Examples 01-06	
04	NXT Omits 01-03 & IR Robot		
05	Drugs & Bugs		
06	**Quiz 1**	Debugging & Troubleshooting	NXT Tests 06-07
07	Vector Victory		
08	Review	**Midterm Examination**	
XX	Spring Break		
09	Chill Out, Al!		
10	Roots	Sequential Reactions	
11	**Quiz 2**	Buckingham Π	Falling Sphere
12	Newton's Method	Excel $\leftrightarrow$ MATLAB	Simultaneous Equations
13	NXT Spectrophotometer		NXT Inventory
14	Matrix Operations	Michaelis-Menten & Lineweaver-Burk	
15	Oxygenation		Review
16	**Final Exam 2018.05.03 1300-1450**		

Underlined items indicate lectures that will be delivered.
Bold items indicate timed assessments.

Academic Integrity: Students are expected to abide by the SDSM&T policies of academic integrity (with regard to cheating, plagiarism, etc.), as outlined in the Course Catalog.

ADA Statement: *Students with special needs or requiring special accommodations should contact the instructor, (Travis Walker, at travis.walker@sdsmt.edu or 605.394.2543) and/or the Director of Counseling and Disability Services, Ms. Megan Reder-Schopp, at megan.reder-schopp@sdsmt.edu or 394-6988 at the earliest opportunity.*

Freedom in Learning Statement: *Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the Provost and Vice President for Academic Affairs to initiate a review of the evaluation.*

Additional Support

- The Student Success Center is a hub for learning support, resources, and help in identifying sources of assistance or support on campus. Go to `http://www.sdsmt.edu/Academics/Student-Success-Center/` for more information or stop by the office in the Surbeck Center (across from the Dean of Students office) to visit with Lisa.Carlson@sdsmt.edu or Tyg.Long@sdsmt.edu. The phone number is 605.394.5261.

- Student Resource List:
  `http://www.sdsmt.edu/Campus-Life/Student-Resources/Student-Resources-List/`

- Information about how to use or access ITS resources (e.g., computer, Internet, email):
  `http://www.sdsmt.edu/Campus-Services/ITS/How-Do-I/`

- Title IX of the Educational Amendments Act of 1972 is the federal law prohibiting discrimination based on sex under any education program and/or activity operated by an institution receiving and/or benefiting from federal financial assistance. Behaviors that can be considered "sexual discrimination" include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. You are encouraged to report these behaviors. Reporting: SD Mines can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise – for example, if more than one complainant reports having been assaulted or harassed by the same individual.

  SDSM&T is committed to providing a safe and positive learning experience. To report a violation of sexual misconduct or gender discrimination, please contact the Title IX Coordinator at 605-394-1203. Please note that as your professor, I am required to report any incidences to the Title IX Coordinator. Confidential support for students is available by contacting the Student Counseling Center at 605.394.1924.