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

Spring Semester 2020
Department of Chemical and Biological Engineering
South Dakota School of Mines & Technology
2021.01.12

COURSE SYLLABUS

Instructor: Travis Walker
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Graduate Teaching Assistant: Christopher Beal
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Location: TBA

Dates: 2021.01.11-05.07
Workshops: R 0800-1050
Classroom: CBEC 3304 & CBEC 3305

Course Description: CBE 117L Programming for Chemical and Biological Engineering
Credits: (0-1) 1
The class will meet face to face with the entire class expected to be present at all class meetings. Class time will not be recorded. Instructor office hours will be held via Zoom. Assignments will be submitted digitally via D2L on the due date or submitted on paper in class. A final project will be required in place of a final exam.

Catalog Description: 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: 17964 & 17965

Course Website:
In this course we will use D2L so that we can respond quickly to changing public health conditions. You can access D2L from the central D2L login page. You can also go to the "Current Students" section on the SD Mines homepage and click on the D2L icon. Use your campus Single Sign On email and password to access the website. If you have problems, call the helpdesk at 605-394-1234 or email helpdesk@sdsmt.edu.

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%
Biweekly Projects	30%
Group Project	40%

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.

We encourage discussion and peer-to-peer consultation and guidance during the workshops. We do not allow cell phone or internet (email, web surfing, etc.) use while in the workshops. If the workshop instructors observe these activities, the grade will be lowered. Also, if file sharing between students is observed or suspected, the instructors will file academic dishonesty claims immediately. If you are over 15 minutes late, the instructors 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. We advise students to save these "drop" opportunities for true emergencies.

Projects:

Two (2) types of projects will be completed throughout the term – biweekly and overall. As a part of these projects, students will self-assemble into groups of one, two, or three (1, 2, 3) students, which will remain for the entirety of the term.

Biweekly. Five (5) biweekly projects will be completed. The projects will be used as an assessment of the students' understanding of key concepts that are described during the course. The deliverables will consist of a short memorandum. Further information will be distributed in a separate documents entitled Biweekly Project Description.

Overall. A course project will be completed. The project will be used as an overall assessment of the students' understanding of key concepts described throughout the course. The deliverable will consist of a written report. Further information will be distributed in a separate document entitled Overall Project Description.

Important Dates:

Add/Drop	2021.01.20
Withdraw	2021.04.06
Project Deadline	2021.05.07 1700 MDT

Tentative Course Outline (2021.01.12): 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*	Biweekly Project I		
03	MATLAB	Arithmetic	
04*	Biweekly Project II		
05	Drugs & Bugs		
06*	Debugging & Troubleshooting	Biweekly Project III	
07	Vector Victory		
08*	Biweekly Project IV		
XX	Spring Break		
09	Chill Out, Al!		
10*	Biweekly Project V		
11	Roots	Sequential Reactions	
12	Buckingham Π	Falling Sphere	
13	Newton's Method	Excel $\leftrightarrow$ MATLAB	Simultaneous Equations
14	Matrix Operations	Michaelis-Menten & Lineweaver-Burk	
15	Oxygenation		
16*	**Final Project Deadline**		

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: *SD Mines strives to ensure that physical resources, as well as information and communication technologies, are reasonably accessible to users in order to provide equal access to all. If you encounter any accessibility issues, you are encouraged to immediately contact the instructor of the course and the Title IX and Disability Coordinator, Ms. Amanda Lopez at disabilityservices@sdsmt.edu or 605.394.2533. Students with special needs or requiring special accommodations should also contact the instructor and the Title IX and Disability Coordinator. More information can be found at* `https://www.sdsmt.edu/Campus-Life/Student-Support/Disability-Services/`

Freedom in Learning Statement: Freedom in learning. *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 to visit with Lisa Carlson (Lisa.Carlson@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.
  SD Mines 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.

COVID-19 and Other Personal Extenuating Circumstances

- If you experience any symptoms associated with COVID-19, you should complete the COVID-19 Case Notification Form and not attend face-to-face class(es). Once the form has been reviewed by the Dean or Students or designee, instruction will be provided on notifying your faculty as soon as possible. (See `https://www.sdsmt.edu/Rockers-Return/COVID-19-FAQ/#If` for more detail.)

- If you are ill or injured and are not able to engage in course work (non-COVID related), you should contact the Dean of Students Office at deanofstudents@sdsmt.edu. The Dean of Students will contact your instructor(s) or provide information on notifying your faculty as soon as possible. Documentation of absence may be requested.

- Any make-up of course requirements that are missed shall be agreed between you and your instructor(s). Instructor(s) will respond with the aim of being flexible while retaining the integrity of your academic experience. Failure to communicate quickly and follow-up may result in your inability to complete the semester. Contact the Dean of Students office at deanofstudents@sdsmt.edu if you have additional questions or concerns regarding processes that are related to missing classes due to personal extenuating circumstances.