

## CHE 492-003/498-013/592-005 Computer Methods in ChemE Fall 2017

**1014 SERC, 12-12:50 MWF**

3 credit hours

**Instructor:** Prof. Jason E. Bara    Office: SERC 3072E    Phone: 348-6836    email: [jbara@eng.ua.edu](mailto:jbara@eng.ua.edu)

**Office hours/HW Help: T 2:00-4:00**

**Co-requisites:** CHE 354 or graduate standing

**Course Description:** A survey of Excel, Matlab, data and analytics applied to chemical engineering and everyday topics.

**Course Objectives/Learning Goals:** This course is designed as a senior and graduate-level elective to teach the use of Excel and Matlab along with data gathering, analysis and visualization techniques as a means to solve problems or answer open-ended questions. Developing improved oral and written presentation skills and thinking outside of the engineering “box” are emphasized.

**Textbook:** *MATLAB: A Practical Introduction to Programming and Problem Solving*. Stormy Attaway, 4th ed., ISBN: 978-0-12-804525-1.

**Software:** Matlab student edition with curve fitting toolbox; Microsoft Office

**Homework:** 10 assignments: mixture of textbook and original problems.

**Grading:** Homework: 20%; Projects (3): 20% each; Participation: 20%

**Class Website:** <http://baraclass.eng.ua.edu>

**Grade Ranges:** 97 A+, 93 A, 90 A-, 87 B+, 83 B, 80, B-, 77 C+, 73 C, 70 C-, 67 D+, 63 D, 60 D-

**Difference between 492 & 498/592:** 498/592 students will have 1-2 additional problems on each HW assignment. 492 students will work in teams of 3 for each presentation. 498/592 students will work individually on each project/presentation.



### Tentative Course Schedule

Date	Day	Topic	Item(s) Due
23 August	W	Introduction, Outline & Expectations	
25	F	Better Spreadsheets in Excel	
28	M	<b>NO CLASS</b>	
30	W	<b>NO CLASS</b>	
1 September	F	<b>NO CLASS</b>	
4	M	<b>NO CLASS – Labor Day</b>	
6	W	Better Graphs in Excel	<b>HW #1</b>
8	F	Curve Fitting in Matlab vs. Excel	
11	M	Solver & Goal Seek	<b>CHE Tools Topics</b>
13	W	Vectors, Arrays, Matrices and 3-D Plots	
15	F	Interactive Discussion & Questions	
18	M	Statistics & Probability	<b>HW #2</b>
20	W	Statistics & Probability	
22	F	Interactive Discussion & Questions	
25	M	CHE Excel Tools Presentations / Demos	<b>Book Selections</b>
27	W	CHE Excel Tools Presentations / Demos	

29	F	CHE Excel Tools Presentations / Demos	
<b>2 October</b>	M	Conditional Formatting & Data Validation	<b>HW #3</b>
4	W	Working with Strings/Text	
6	F	Interactive Discussion & Questions	
9	M	Logic & Boolean Operators	<b>HW #4</b>
11	W	Sorting and Finding Data	
13	F	Interactive Discussion & Questions	
16	M	Big Data/Analytics Book Presentations	<b>HW #5</b>
18	W	Big Data/Analytics Book Presentations	
20	F	Big Data/Analytics Book Presentations	
23	M	Designing a Simulation	<b>HW #6</b>
25	W	Running a Simulation	
27	F	<b>NO CLASS – Fall Break</b>	
30	M	<b>NO CLASS – AIChE National Meeting</b>	
1	W	<b>NO CLASS – AIChE National Meeting</b>	
3	F	<b>NO CLASS – AIChE National Meeting</b>	
6	M	Spreadsheets vs. Other Data Structures	<b>Data Project Topics, HW #7</b>
8	W	Techniques for Gathering Data	
10	F	Interactive Discussion & Questions	
13	M	Solving Systems of Linear Equations	<b>HW #8</b>
15	W	Solving Systems of ODEs	
17	F	Interactive Discussion & Questions	
20	M	<b>NO CLASS – Thanksgiving</b>	
22	W	<b>NO CLASS – Thanksgiving</b>	
24	F	<b>NO CLASS – Thanksgiving</b>	
27	M	Statistical Design of Experiments	<b>HW #9</b>
29	W	Statistical Design of Experiments	
<b>1 December</b>	F	Interactive Discussion & Questions	
4	M	492 Group Presentations	<b>HW #10, Post Projects Online</b>
6	W	492 Group Presentations	
8	F	592 Individual Presentations	

## Class Policies:

- The instructor will make every effort to follow the guidelines of this syllabus as listed; however, the instructor reserves the right to amend this document as the need arises. In such instances, the instructor will notify students in class and/or via email and/or Twitter and will endeavor to provide reasonable time for students to adjust to any changes.
- All homework assignments are due at the start of class on their respective due dates.
- Students are highly encouraged learn from each other by collaborating within groups on homework assignments, though each student must submit his/her own **original** work. This means no copy and paste of text, computer code, graphs, etc. between group members.
- On every HW, each student must submit one original question to be considered for use on the next HW. The question must be of sufficient rigor such that seniors and graduate students in chemical engineering would find it challenging. Ideally, the question will require the use of Excel, Matlab and/or other software. The question can be math/science/engineering oriented, but does not have to be as interesting questions relating to economics, sports, entertainment, etc. will be considered. The instructor will select several of these for use on subsequent HW(s) and/or during Friday discussions.
- Answers to HW questions from the textbook (primarily as Matlab input/output) are to be submitted through the course Blackboard Learn portal. Answers to other questions are to be submitted as paper assignments.
- **An exceedingly high standard of professional quality is expected on homework assignments.** Problem solutions are to be submitted as typed Word documents with Excel/Matlab graphs that summarize the problem, the approach taken, equations used and solution. Relevant code and data should be included as an appendix. Hand calculations should never be included.
- **DO NOT INCLUDE TABLES OF RAW DATA IN YOUR PAPER HW SOLUTIONS...** this is guaranteed to result in points deducted even if everything else is otherwise perfect.
- **STAPLE ALL OF YOUR WORK!** Folded or paper-clipped homework will also result in points deducted. Acquire a stapler and at least 10 staples if you don't already have these items.
- Should the instructor choose to offer any extra credit opportunities, this will be available to the entire class, although they may be only available as a one day in-class assignment.
- Regular attendance is expected and highly encouraged! Everyone is **required** to attend all presentations. Unexcused absences on presentation days will automatically result in points deducted from the participation component of the course.

## APPENDICES

### A. CODE OF ACADEMIC CONDUCT STATEMENT

All students in attendance at The University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. At the beginning of each semester and on examinations and projects, the professor, department, or division may require that each student sign the following Academic Honor Pledge: "I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedure resulting from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University."

See the [Code of Student Conduct](#) for more information.

### B. GRADE REQUIREMENT STATEMENT

Students must earn a "C-" or better in all required and elective courses in the major. A "C-" or better is required in all external courses required by the major whether they serve as a prerequisite to a major course or are simply required by the major.

### C. DISABILITY ACCOMMODATION STATEMENT

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary.

If you have a disability, but have not contacted the Office of Disability Services, please call (205) 348-4285 (Voice) or (205) 348-3081 (TTY) or visit 1000 Houser Hall to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 1000 Houser Hall, before receiving academic adjustments.

### D. SEVERE WEATHER PROTOCOL

The guiding principle at The University of Alabama is to promote the personal safety of our students, faculty and staff during severe weather events. It is impossible to develop policies which anticipate every weather-related emergency. These guidelines are intended to provide additional assistance for responding to severe weather on campus. UA is a residential campus with many students living on or near campus. In general classes will remain in session until the National Weather Service issues safety warnings for the city of Tuscaloosa. Clearly, some students and faculty commute from adjacent counties. These counties may experience weather related problems not encountered in Tuscaloosa. Individuals should follow the advice of the National Weather Service for that area taking the necessary precautions to ensure personal safety. Whenever the National Weather Service and the Emergency Management Agency issue a warning, people in the path of the storm (tornado or severe thunderstorm) should take immediate life saving actions.

When West Alabama is under a severe weather advisory, conditions can change rapidly. It is imperative to get to where you can receive information from the [National Weather Service](#) and to follow the instructions provided. Personal safety should dictate the actions that faculty, staff and students take.

**The Office of University Relations will disseminate the latest information regarding conditions on campus in the following ways:**

- Weather advisory posted on the UA homepage

- Weather advisory sent out through UA Alerts to faculty, staff and students
- Weather advisory broadcast over WVUA at 90.7 FM
- Weather advisory broadcast over Alabama Public Radio (WUAL) at 91.5 FM
- Weather advisory broadcast over WVUA-TV/WUOA-TV, and on the website <http://wvuatv.com/content/weather>. WVUA-TV Home Team Weather provides a free service you can subscribe to which allows you to receive weather warnings for Tuscaloosa via e-mail or cell phone.

Check <http://wvuatv.com/content/free-email-weather-alerts> for more details and to sign up for weather alerts. In the case of a tornado warning (tornado has been sighted or detected by radar; sirens activated), all university activities are automatically suspended, including all classes and laboratories. If you are in a building, please move immediately to the lowest level and toward the center of the building away from windows (interior classrooms, offices, or corridors) and remain there until the tornado warning has expired. Classes in session when the tornado warning is issued can resume immediately after the warning has expired at the discretion of the instructor. Classes that have not yet begun will resume 30 minutes after the tornado warning has expired provided at least half of the class period remains.

#### **E. UAct: Ethical Community Statement**

The University of Alabama is committed to an ethical, inclusive community defined by respect and civility. The UAct website (<http://www.ua.edu/uact>) provides a list of reporting channels that can be used to report incidences of illegal discrimination, harassment, sexual assault, sexual violence, retaliation, threat assessment or fraud.