

IE13333: Computational Methods Syllabus

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Course Homepage	Blackboard

Course description:

In industry, many engineering problems are commonly associated with computational resources. Optimization problems, transportation problems, scheduling problems, and other complex engineering problems require several computer software to generate a solution that is useful, accurate and trustworthy. A knowledge and expertise of the fundamentals in computational methods is needed not only to develop models and algorithms but also to apply them and adapt them for specific applications.

In this course, the student will develop the programming thinking skills required to develop and apply computer methods and applications to solve complex engineering problems in the industrial manufacturing and systems engineering area.

Course Objective:

To become familiar with the major concepts of programming, such as structured programming, object-oriented programming, functions, classes, hierarchies, variables, structures., etc.

To develop skills for identifying; formulating, solving, and interpreting appropriate programming algorithms

Understand and apply basic programming tools such as, conditional statements, loops, data structures, functions among others

Learn well known algorithms that can be applied in the real-world and to learn to effectively use them in engineering applications

Test Book

Think Python: How to Think Like a Computer Scientist, 2nd edition

Other References

Python Crash Course by Eric Matthes, 2016

Effective Computation in Physics: Field Guide to Research with Python by Anthony Scopatz, Kathryn D. Huff, 2015.

Python programming Fundamentals by Lee

ABET Outcomes

Contribution to Industrial Engineering Program Outcomes:		
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	X
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	X

Summary of Course Structure

Content is provided in 2 modules (weeks). Each module will have instructions to identify discussion board postings and/or individual and group activities (Homework) to be completed on Blackboard's course shell.

#	Module Name
1	Introduction & basic programming tools
2	Functions and classes
3	Libraries and applications

Point Distribution

Criteria	Percentage
Discussions	10%
Exercises	15%
HomeWorks	10%
Exams (3)	45%
Final project	20%

Grading Criteria

The following scale is used for assigning letter grades.

A	[90 % and above]
B	[80 % - 89 %]
C	[70 % - 79%]
D	[60 % - 69 %]
F	[0 % - 59%]

- **There will be no makeup exams administered.** If you have a **university-approved excuse**, your instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.
- No late Homework will be accepted no excuses

Student Precipitation

The course is designed to be an enjoyable learning experience for everyone, with support for every participant. This course will immerse students into a community of practice so that students can develop skills and knowledge that facilitate their professional development.

Students are expected to complete all weekly content and to participate actively and respectfully on discussion boards, chats, and blogs. Furthermore, students should finish quizzes and deliver complete quality assignments and projects on time.

The following policies will be enforced:

1. Students must complete all discussion boards assigned for each week to receive a weekly participation grade.
2. Students who miss two major assignments will be dropped from the course.
3. Students who have little or no activity in the course will be dropped.

Assignments

This course uses several different methods to assess student learning. A description of each method follows:

- **Self-Reflection/Self-Evaluation:** Reflection and self-evaluation develop metacognitive thinking. By engaging in self-review, students can carry their learning into other parts of their lives and take more responsibility for their own learning. Although not all students take self-evaluation seriously, those who do will benefit greatly from it.
- **Homework:** At the end of each week a set of problems related with the topics covered in the module will be assigned
- **Exams:** At the end of each module the student will be tested using an exam

Course Rule policies

- **Remember your place:** A Web-based classroom is still a classroom, and comments that would be inappropriate in a regular classroom are likely to be inappropriate in a Web-based course as well.
- **This is permanent:** Think carefully about the content of your message before contributing it. Once sent to the group, there is no taking it back. Members of the class and the instructor will be reading any postings.
- **Respect your fellow students and instructor.** Respect and courtesy must be provided to classmates and to instructor at all times. Do not use inappropriate language, all capital letters, or language short cuts. No harassment, flaming, or inappropriate postings will be tolerated.
- **Giving feedback professionally:** Write constructive feedback by addressing the idea, not the person. People may have different points, positions and beliefs in the aspects being discussed. The discussion must be limited to the aspects/ideas only. Personal attacks are not tolerated. When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face to face situation.
- **Be forgiving:** If someone states something that you find offensive, mention this directly to the instructor. Remember that the person contributing to the discussion is also new to this form of communication. What you find offensive may quite possibly have been unintended and can best be cleared up by the instructor.
- **Language:** Given the absence of face-to-face clues, written text can easily be misinterpreted. Avoid the use of strong or offensive language and the excessive use of exclamation points. If you feel particularly strongly about a point, it may be best to write it first as a draft and then to review it, before posting it, in order to remove any strong language.
- **Test for clarity:** Messages may often appear perfectly clear to you as you compose them, but turn out to be perfectly obtuse to your reader. One way to test for clarity is to read your message aloud to see if it flows smoothly. If you can read it to another person before posting it, even better.
- **Submit quality work.** Online entries should be written in Standard Writing English with edited spelling, grammar, and punctuation. Although the grammar and spelling of a message typically are not graded, they do reflect on you, and your audience might not be able to decode misspelled words or poorly constructed sentences. It is a good practice to compose and check your comments in a word-processor before posting them.

- **Follow the parameters / Stick to the point:** Follow the posting requirements and parameters set up by your professor. Contributions to a discussion should have a clear subject header, and you need to stick to the subject. Don't waste others' time by going off on irrelevant tangents.
- **Read first, Write later:** Don't add your comments to a discussion before reading the comments of other students unless the assignment specifically asks you to. Ignoring your fellow students is rude. Avoid repetition of what someone else has already said. Add something new to the discussion. Comments related to the content of previous messages should be posted under them to keep related topics organized, and you should specify the person and the particular point you are following up on.
- **Quality posts get credit:** There is no credit for yes/no answers. Posts should justify positions and provide specific examples. Students must demonstrate that they have read the assignment and their classmates' comments carefully and thoughtfully.
- **Meet the deadline:** Be sure to post in a timely fashion to receive credit for attendance and for the discussion.

Academic Dishonesty

Academic dishonesty is prohibited and is considered a violation of the *UTEP Handbook of Operating Procedures*. It includes, but is not limited to, cheating, plagiarism, collusion, and fabrication.

1. Cheating can involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports.
2. Plagiarism occurs when someone intentionally or knowingly represents another person's words or ideas as his or her own.
3. Collusion involves unauthorized collaboration with another person or group to commit any academically dishonest act.
4. Fabrication occurs when false information is included on a works-cited page.

Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Violations will be taken seriously and will be referred to the Office of Student Conduct and Conflict Resolution for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions. You can find more information in the *UTEP Handbook of Operating Procedures*, under the heading "" and in the Regents' Rules and Regulations.

UTEP Handbook of Operating Procedures @ <http://admin.utep.edu/Default.aspx?alias=admin.utep.edu/hoop>
 UTEP Office of Student Life @ <http://sa.utep.edu/studentlife/#student-conduct>

Software requirements

You will need the following software on your computers to efficiently work in this course. In some cases, your computer may already have some of these programs installed.

1. Adobe Acrobat Reader. You can get the program by going to <http://www.adobe.com/>
2. Adobe Flash Player. You can get the player by going to <http://www.adobe.com/> and then clicking on 'Get Adobe Flash Player?'. Follow instructions to install the player.
3. Microsoft Office. I recommend buying this if you do not have any word processing software or presentation software.
4. Email tool with file attachment capability. Please use your UTEP email account.

Equipment Requirements

You *need a personal computer* with administrative privileges so that you may take the exams at the end of the modules. In addition, you need to install **Respondus Lockdown Browser**. You will also install other software applications that requires administration privileges. Not being able to use a work computer to take the quizzes or to install software applications is not an excuse to not submit work.

Students with disabilities:

Students with disabilities or who suspect they have a disability may wish to self-identify for purposes of modifications. You can do so by providing documentation to the Office of Disabled Student Services located in the UTEP Union. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or director of the Disabled Student Services. For general information about the American with Disabilities Act (ADA), please call 747-5184.

Glossary

Cyber-Harassment, or the use of a computer to cause a person harm such as anxiety, distress or psychological harm, including abusive, threatening or hateful emails and messages and the posting of derogatory information online.

Cyberbullying, or intimidating messages sent directly to the victim via email or other Internet communication mediums, and/or the use of technological means to interfere with a victim's use of the Internet such as hacking or denial of services attacks. This can also include spreading rumors about the victim in internet forums or discussion boards; subscribing the victim to unwanted online services or sending messages to others in the victim's name.

Cyberstalking, or threatening behavior or unwanted advances directed at another using the Internet and other forms of online and computer communications. With personal information becoming readily available to an increasing number of people through the Internet and other advanced technology, state legislators are addressing the problem of stalkers who harass and threaten their victims over the World Wide Web.

Flaming, or hostile and insulting interaction between internet users. It is frequently the result of the discussion of heated real-world issues such as politics, religion, and philosophy, or of issues that polarize subpopulations, but can also be provoked by seemingly trivial differences. **Deliberate flaming**, as opposed to flaming as a result of emotional discussions, is carried out by individuals who are specifically motivated to incite flaming. Usually, are subtler than their counterparts, or trolls, who also post inflammatory messages in an online community. Their primary intent is to provoke readers into an emotional response and disrupt normal, on-topic, discussion.

Plagiarism, or the presentation of another person's work as your own, whether you mean to or not (i.e. copying parts of or whole papers off the Internet).

Collusion, or lending work to another person to submit as his or her own.

Fabrication, or deliberately creating false information on a works cited page.