

**The University of Texas at El Paso**  
**Department of Computer Science**  
**CS 4381/5381 – Topics in Software Engineering:**  
**Applied Agile Software Development and Data Management**  
**Spring 2023 Syllabus**

**1. General Information**

**Instructor:**

Daniel Mejía

Email: [dmmejia2@utep.edu](mailto:dmmejia2@utep.edu)

Dates: January 17 – May 4, 20223

Office Hours: M 9:30am – 10:30am, W 10:00am-11:00am, R 12:30pm – 2:00pm, or by appointment

Office: CCSB 3.1018

<b>Spring 2023</b>		
Course - CRN	CS 4381 – 27681	CS 5381 – 27682
Day/Time	MW 4:30-5:50pm	
Location	CCSB G.0208	

**Prerequisites:**

CS 3331 with a C or better

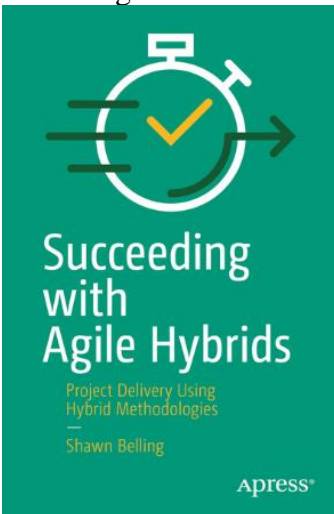
**Important Dates:**

- First Day of Class – January 17, 2023
- Census Day – February 1, 2023
- Spring Break – March 13-17, 2023
- Drop Deadline (Automatic W) – March 30, 2023
- Cesar Chavez (No Classes) – March 31, 2023
- Spring Study Day (No Classes) – April 7, 2023
- Last Day of Classes – May 4, 2023
- Dead Day – May 5, 2023

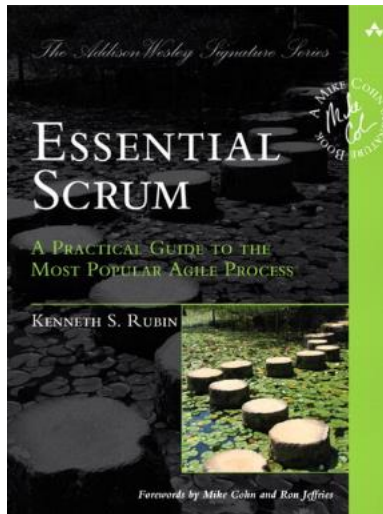
**Textbooks:**

1. *Succeeding with Agile Hybrids: Project Delivery Using Hybrid Methodologies*. Belling, S. Apress, 2020.
2. *Succeeding with Agile: Software Development Using Scrum*. Cohn, M. Addison-Wesley Professional, 2009.
3. *The Art of Agile Development, 2<sup>nd</sup> Edition*. Shore, Warden, Klitgaard, Warden. O’Reilly Media, 2021.
4. *The Professional Scrum Master (PSM I) Guide*. Heath, F. Packt Publishing, 2021.
5. *Essential Scrum: A Practical Guide to the Most Popular Agile Process*. Rubin, K. Addison-Wesley Professional, 2012.

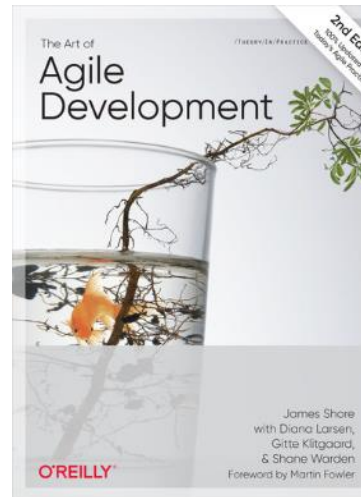
All texts are free through your UTEP account: <https://learning.oreilly.com/>. Additional readings/textbooks will be provided as needed.



<https://learning.oreilly.com/library/view/succeeding-with-agile/9781484264614/>



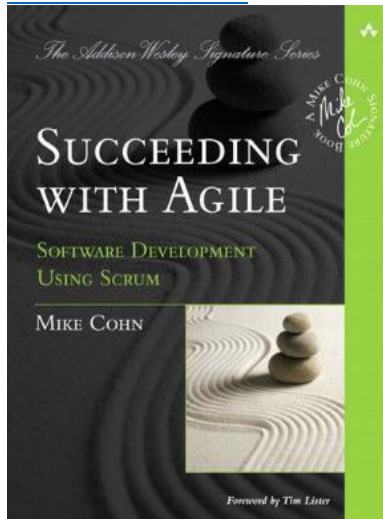
<https://learning.oreilly.com/library/view/essential-scrum-a/9780321700407/>



<https://learning.oreilly.com/library/view/the-art-of/9781492080688/>



<https://learning.oreilly.com/library/view/the-professional-scrum/9781800205567/>



<https://learning.oreilly.com/library/view/succeeding-with-agile/9780321660534/>

## 2. Objectives & Outcomes

### Course Description

CS 4381/5381 – Topics in Software Engineering. Topics related to techniques, methods, approaches, and paradigms in software engineering. Example topics include agile development, aspect-oriented development, formal methods, and model-driven development.

The course presents a look into Agile Software Development and Data Management systems commonly used in industry. This course builds upon experience with the object-oriented

programming paradigm as well as leverages the use of web-based data integration. Emphasis of this course will be product prototype development using agile software development techniques. Additionally, this course will utilize industry hosted cloud data services (Google Firebase) to maintain information. This course teaches students to approach software development using iterative approaches commonly used in industry.

### **Objectives:**

1. Understand agile software development philosophies, methodologies, reasoning, and use in industry
2. Understand basic full-stack software development
3. Understand user-centric software design and implementation
4. Understand and implement iterative software development and its rationale for use
5. Understand the use of industry cloud-based services for the purpose of software backends
6. Understand and analyze multiple methodologies of software development

### **Learning Outcomes**

Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. Upon successful completion of this course, students will be able to:

1. Describe the history of software design and development
2. Define agile principles based on the agile manifesto
3. Define the full-stack software development paradigm
4. Describe differences in unstructured and structured data with respect to feasibility of scaling projects
5. Describe simple security concepts with respect to software development and data management

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of this course, students will be able to:

1. Utilize industry standards in code version control (e.g., Git/GitHub)
2. Utilize industry programming style standards for improved readability, modularity, refactoring process, and software verification
3. Conduct code reviews to ensure software robustness, readability, error mitigation, and best practices
4. Utilize basic problem-solving techniques to implement, debug, and integrate software engineering solutions
5. Integrate frontend and backend services for the development of a product
6. Analyze the use of agile methodologies in industry
7. Analyze and use teamwork roles in agile software development
8. Utilize front end web design and tools (HTML, JavaScript, CSS, etc.) for product development
9. Utilize “backend-as-a-service” features for maintaining data and hosting products
10. Utilize and evaluate agile project management tools for product development

Level 3 outcomes are those in which the student can apply the material in new situations. This is

the highest level of mastery. Upon successful completion of this course, students will be able to:

1. Analyze and abstract user requirements for agile product design to develop project requirements and user stories
2. Implement agile software development concepts, methodologies, and techniques into product prototypes such as:
  - a. Scrum
  - b. Extreme Programming (XP)
  - c. Kanban
3. Develop product prototypes that maintain high quality design, maintainability, readability, consistent style, and extensibility
4. Utilize unstructured data in product design and implementation of a database to handle common services such as:
  - a. Insert
  - b. Delete
  - c. Query
  - d. Update

**Graduate Students only (CS 5381):**

5. Analyze and compare software design methodologies:
  - a. Waterfall Methodology
  - b. Agile Methodology
6. Synthesize current trends in software development and uses in industry
7. Synthesize research trends in Software Engineering

**3. Policies & Other Information**

**Grading:**

**CS 4381**

Homework (Non-Project)	15%
Quizzes	5%
Exam 1	15%
Project (Written Assignments)	15%
Project (Programming Deliverables)	35%
Final Project Deliverable	10%
Final Team Presentation	5%

**CS 5381**

Homework (Non-Project)	10%
Exam 1	10%
Project (Written Assignments)	15%
Project (Programming Deliverables)	35%
Final Project Deliverable	10%
Final Team Presentation	5%
Individual Project	5%
Research Poster/Presentation & Report	10%

\*Many assignments will be the same for both CS 4381/5381. However, students enrolled in CS 5381 will have their assignments graded at a finer level of granularity. Additionally, students in CS 5381 will have multiple additional assignments.

The nominal percentage-score-to-letter-grade conversion is as follows:

- 90% or higher is an A
- 80-89% is a B
- 70-79% is a C
- 60-69% is a D
- below 60% is an F

Additionally, any one of the following will result on a final grade of F, even if the overall average is greater than 60%.

- Not submitting ALL project assignments by the end of the semester, even if they are too late to receive credit (projects should still be functional and will be tested to ensure functionality).

The instructor reserves the right to adjust these criteria downward (e.g., so that 88% or higher represents an A, based on overall class performance). The criteria will not be adjusted upward, however.

### **Class Assignments:**

Reading, non-programming homework, quizzes, and project assignments will be posted on Blackboard/GitHub Classroom. It is your responsibility to check Blackboard for all assignments. Assignments will specify if they are individual or group. For individual assignments, you may discuss the problem in general terms with other people, your answers and your code should be written and tested by you alone. If you need help consult with the instructor. All assignment submissions must be newly attempted, never used original work.

### **Homework Assignments:**

Reading and non-programming homework assignments are due at 11:59pm (Mountain Time) on the due date specified, unless otherwise indicated; a late penalty will be assessed (-10%) for any assignment submitted up to 24 hours late. Unless for unusual circumstances and at the discretion of the instructor, assignments will not be accepted for credit after 24 hours. Some “project assignments” may be related to the project but will not necessarily be classified as part of the “Project Assignment” grade, this will be specified on the assignment. Assignments will specify requirements to how students should complete and submit.

### **Project Assignments:**

Project assignments are due at 11:59 pm (Mountain Time) through GitHub classroom on the specified due date, unless otherwise specified. Late programming assignments will be accepted up to 24 hours after the due date/time for up to 85% credit (15% late penalty). Accompanying reports must be turned in with the source code, should be typed and submitted as a PDF. Some reports will be issued as a separate assignment. Unless for unusual circumstances and at the discretion of the instructor, project assignments will not be accepted for credit after 24 hours past the due date/time. All project assignments are subject to a demo session. All project assignments must be submitted prior to the end of the semester to receive a passing grade for the course, even

if it is too late to receive credit. You should expect to spend at least 10-15 hours/week outside of class on reading and homework.

### **Exams:**

There will be one (1) exam. The exam will be posted and submitted through Blackboard with the appropriate due date listed. The purpose of the exam is to allow you to demonstrate mastery of course concepts covered thus far during the semester. The exam will take place during the regular lecture session. You will receive an announcement (i.e., in-class, email, Blackboard, etc.) at least one week prior to an exam. If you must miss the exam, please meet with the instructor BEFORE the exam. Unless for extreme circumstances and at the discretion of the instructor, students who miss the exam will not be able to make-up the exam.

Exam may make use of test proctoring software such as, Respondus Lockdown Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first exam. You may be required to provide a photo ID (i.e., Miner Gold card, Driver's License, etc.) to take the exam. You may also be required to have an assigned seat during the exam. Students should avoid leaving the classroom during exams – you may be requested to submit your exam prior to leaving.

### **Final Project Delivery/Presentation:**

In lieu of a Final Exam, students will deliver a final project and formally present it to the class. This presentation may include a prepared presentation (i.e., PowerPoint) and a demo of their product. All students must participate in the final project delivery and presentation to receive credit. CS 4381 students must score 70% or better on the final deliverable and presentation to pass the course. CS 5381 students must score 80% or better on the final deliverable and presentation to pass the course. If you have any scheduling concerns, consult the course instructor in advance for accommodations.

### **Quizzes:**

The purpose of each quiz is to ensure that you are staying current with the class reading and to verify that you have acquired the skills developed in lecture. Quizzes will be paper-based, online quizzes on Blackboard, or other platform(s) as mentioned in the class. There will be **no make-up** for missed quizzes.

### **Attendance:**

Attendance and participation in all lecture sessions are critical factors of your success in this course. Students should be **on time** for all scheduled sessions and **attend the entire session**. The instructor reserves the right to not allow you into class after being late for 5 minutes, you will be able to meet with the instructor to discuss this further after class has concluded. Please inform the instructor if you will be late or absent to class.

### **Class Participation:**

Students should notify the instructor prior to missing a session if possible, and certainly right after if earlier was not possible. The instructor will allow two unexcused absences per semester before having the option to deduct points from the final grade (5 points from overall grade per subsequent unexcused absence). It is the student's responsibility to obtain the content covered during missed class(es). Any assignments due on the date of the absence will be considered late if not turned in as specified by the assignment guidelines unless an exception is granted by the

instructor. Points lost due to an unexcused absence may not be made up. Any points lost due to an excused absence will need to be made up by arrangement with the instructor.

#### **4. CS 5381 – Graduate Students Only**

##### **Research Paper (CS 5381 Only):**

Students will engage in reading and synthesize research related to software development, data management, software and data management integration, and similar fields (students conducting research as part of their degree program may consider incorporating these fields into their research as part of this class (see instructor for topic approval)). Students should prepare to read multiple scholarly articles related to these areas. Students should submit 4-6 scholarly articles they wish to report/present by the end of week 2 of classes by 11:59pm for instructor approval. Students will prepare a written report of the articles that analyzes and synthesizes their contributions by the end of week 9. All submissions will be through Blackboard.

##### **Research Poster/Presentation (CS 5381 Only):**

Students will engage in presenting research related to software development, data management, software and data management integration, and similar fields (students conducting research as part of their degree program may consider incorporating these fields into their research as part of this class (see instructor for topic approval)).

Students will develop a research poster based on the research paper requirement. Students will submit drafts of the research poster at the end of week 10 and week 11. Students will present their research poster to peers and faculty during week 13 of the course. Note: There is a printer's deadline and costs of printing will be the responsibility of the student. Students have a print account associated with their Miners account; posters may be printed through Technology Support in the UTEP library.

##### **Individual Project (CS 5381 Only):**

In addition to the standard team project, students will engage in an individual project of their choice (i.e., Students will create a product prototype). Students should pick a project that may be beneficial to their current or future research interests. Students will use the same services/tools as in the team project. Students must submit their project idea for instructor approval by the end of week 2 of classes by 11:59pm. Students will retain their projects on GitHub classroom. Students will produce this prototype on their own and will be required to demo with the course instructor during week 4, week 8, week 11, and week 14 of the course. Students will prepare a demo video where they record the use of their prototype and narrate the usage of it; final submission will be due during week 15. The expectation is a functional, high-quality project that could potentially be extended and refined.

##### **Additional Assignments (CS 5381 Only):**

Students will have additional assignments. Assignments will be announced in class and/or posted on Blackboard with specific instructions, deadlines, and expectations.

## 5. General Information, Standards of Conduct and Academic Dishonesty

### **Technology:**

Course content is delivered via the Internet through the Blackboard learning management system (LMS), supplemented by Microsoft Teams, GitHub Classroom, and Jira. Ensure your UTEP MINERS account is working and that you have access to the Internet. You may use any of the primary Web browsers—Edge, Google Chrome, Firefox, Safari, etc. (Firefox/Chrome is recommended for most activities). When having technical difficulties, try switching to another browser.

The use of laptops, cell phones, or tablets will be necessary for this course (homework). It may be necessary to have a cell phone with a PDF Scanning App (Adobe Scanner, Notes (iPhone), CamScanner, etc.) to scan homework assignments. You may use a tablet (iPad, Surface Pro, etc.) to handwrite certain homework assignments and submit as PDF documents.

You will need to have access to a computer/laptop, printer, scanner, a webcam, and a microphone. Additionally, you may be required to submit video recordings during the semester – this can be done using a phone camera, webcam, and/or video camera. You will be using the following programming/scripting/markup languages, including but not limited to: JavaScript, HTML, CSS, and Python.

You will be required to use an IDE. It is highly recommended that you use VS Code in this course. Additionally, you will need to have a Google account (e.g., Gmail) and a GitHub account linked with your UTEP MINERS account. Check that your computer hardware and software are up-to-date and able to access all parts of the course. If you encounter technical difficulties of any kind, contact the [Help Desk](#).

You are not authorized to use any online services that is not licensed by UTEP (except for GitHub, Jira, and Google Firebase Services), including, but not limited to Discord, Twitch, WhatsApp, or GroupMe. You should not use these services for communication, collaboration, or the like in any way with respect to this course. You are only permitted to use Microsoft Teams, Microsoft Office (Licensed through your Miners account), GitHub Classroom, Jira, Google Firebase Services, Blackboard and any other relevant software product as approved by the instructor.

Students are allowed to use tablets (i.e., iPad or similar) during class for the purpose of note taking. Students are expected to bring their laptops each class period to use if requested by the instructor. Students are not permitted from using social media, messaging apps, web browsers not related to the content being covered, etc. during class (unless requested by the instructor); students will be asked to leave the course session if they are using such services.

### **Incomplete Policy:**

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to the instructor immediately if you believe an incomplete is warranted. If granted, a contract of work to be completed with deadlines will be established.



**Drop Policy:**

You will not be dropped by the instructor in this course. However, if you feel that you are unable to complete the course successfully, please let the instructor know and then contact the Registrar's Office to initiate the drop process. If you do not, you are at risk of receiving an "F" for the course.

**Accommodations Policy:**

UTEP is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS); please contact the office at (915) 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu). Students are required to discuss their accommodations with the instructor for a proper plan to be made.

**COVID-19/Illness Precautions:**

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let the instructor know as soon as possible, so that appropriate accommodations can be made. If you have tested positive for COVID-19, you are encouraged to report your results to [covidaction@utep.edu](mailto:covidaction@utep.edu), so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area. For more information about the current rates, testing, and vaccinations, please visit [epstrong.org](http://epstrong.org).

In general, if you are ill, please stay home.

**Copyright Statement for Course Materials:**

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. It is not permitted to share, reproduce, or alter any assignment for any purpose. Students are not permitted from sharing code, uploading assignments online in any form, or viewing/receiving/modifying code written from anyone else. Assignments are part of an academic course at The University of Texas at El Paso and a grade will be assigned for the work produced individually by the student.

**Class Recordings:**

Course lectures may be recorded by the instructor/department. Students are not permitted to record the course (i.e., video, audio, etc.) without expressed permission from the instructor.

The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. **You may not share recordings outside of this course.** Doing so may result in disciplinary action.

### **Support Services:**

#### Technology Resources

- Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

#### Academic Resources

- UTEP Library: Access a wide range of resources including online full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- Math Tutoring Center (MaRCS): Ask a tutor for help and explore other available math resources.
- History Tutoring Center (HTC): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- RefWorks: A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

#### Individual Resources

- Military Student Success Center: Assists personnel in any branch of service to reach their educational goals.
- Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships.
- Counseling and Psychological Services: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

### **Standards of Conduct:**

You are expected to conduct yourself in a professional and courteous manner, as prescribed by the UTEP Standards of Conduct.

**Etiquette:**

Respect and courtesy must be always provided to classmates and to the instructor/TA/IA. Absolutely no harassment or any inappropriate behavior will be tolerated. This course is a space for learning and should be treated as such. When reacting to someone else's message, address the ideas, not the person. Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space. If students wish to do so, they have the ethical obligation to first request the permission of the writer(s). Disciplinary action will be taken against any inappropriate behavior in this course.

A fundamental principle for any educational institution, academic integrity is highly valued and seriously regarded at The University of Texas at El Paso. More specifically, students are expected to maintain absolute integrity and a high standard of individual honor in scholastic work undertaken at the University. At a minimum, you should complete any assignments, exams, and other scholastic endeavors with the utmost honesty, which requires you to:

- Acknowledge the contributions of other sources to your scholastic efforts.
- Complete your assignments independently unless expressly authorized to seek or obtain assistance in preparing them.
- Follow instructions for assignments and exams, and observe the standards of your academic discipline; and
- Avoid engaging in any form of academic dishonesty on behalf of yourself or another student.

Graded work, e.g., homework and tests, is to be completed independently and should be unmistakably your own work (or, in the case of group work, your team's work), although you may discuss your project with other students in a general way. You may not represent as your own work material that is transcribed or copied from another person, book, or any other source, e.g., a web page.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable to another person. The below information is not necessarily an exhaustive list of cheating, plagiarism, nor collusion.

- **Cheating**
  - Copying from the test paper of another student
  - Communicating with another student during a test
  - Giving or seeking aid from another student during a test
  - Possession and/or use of unauthorized materials during tests without authorization (i.e., Crib notes, class notes, books, etc.)
  - Substituting for another person to take a test
  - Falsifying research data, reports, academic work offered for credit
- **Plagiarism**
  - Using someone's work in your assignments without the proper citations
  - Submitting the same paper or assignment from a different course, without direct permission of instructors

- **Collusion**
  - Unauthorized collaboration with another person in preparing academic assignments

### **Collaboration:**

The following are **not allowed**:

- Posting any assignment (or any of its parts) online in any form
- Sharing assignments outside of the course (i.e., to other students)
- Copy/pasting any code from anywhere other than from Instructor/TA/IA
  - This includes copy/pasting code snippets (or entire assignments) from online resources such as, but not limited to:
    - stackoverflow.com
    - Chegg
    - Course Hero
- Sharing your code with other students (unless otherwise specified).
- Reading code from other students (unless otherwise specified).
- Look at another student's code
- Debug another student's code

The following are **allowed**:

- Communicating with the instructor/TA/IA regarding homework, assignments, and labs
- Searching for basic syntax online
- Copy/pasting examples from any reference material (slides, practice problems, etc.) distributed by your instructor/TA/IA
- Use any small code snippets that instructor/TA/IA share with students.
- Using simple predefined libraries (ask the instructor/TA if you are not sure if it is allowed)

When in doubt, *ask*. It is better to ask if something is permitted, rather than doing something that is not permitted and causing issues later.

### **Plagiarism Detection:**

All coursework and assignments are subject to be submitted to cheating and plagiarism detection software including, but not limited to SafeAssign and MOSS.

A full description of the University Standards of Conduct and Academic Dishonesty can be found in the [Handbook of Operating Procedures](#). Professors are required to -- and will -- report academic dishonesty and any other violation of the Standards of Conduct to the Dean of Students and OSCCR.