

# The University of Texas at El Paso

## Department of Computer Science

### CS 3331 – Advanced Object-Oriented Programming

### Spring 2023 Syllabus

#### 1. General Information

**Instructor:**

Daniel Mejia, Ph.D.

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

Dates: January 17 – May 4, 2023

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

Office: CCSB 3.1018

TR 10:30am		
CRN	21219	
Time	TR 10:30-11:50am	CCSB 1.0202
IA	Diana Valles Martinez	<a href="mailto:dpvallesmar@miners.utep.edu">dpvallesmar@miners.utep.edu</a>
IA	Isabella Gaytan	<a href="mailto:igaytan1@miners.utep.edu">igaytan1@miners.utep.edu</a>
IA	Diana Garcia	<a href="mailto:dagarcia88@miners.utep.edu">dagarcia88@miners.utep.edu</a>

**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

**Prerequisites:**

CS 2302 with a C or better

**Textbook (Required):**

1. *Object-Oriented Analysis, Design and Implementation: An Integrated Approach*. Brahma Dathan, Sarnath Ramnath. Springer, Universities Press, 2015.

Free e-book available through the publisher. Access through UTEP Library (<https://www.utep.edu/library/>) Copy/Paste title into “MinerQuest Search” -> Click “To access this resource” -> Directed to Publisher Site -> Download Book

**Recommended Books (Not required):**

1. *Head First Design Patterns*. 2<sup>nd</sup> Edition Eric Freeman and Elizabeth Freeman. O'Reilly 2020.
2. *Head First Object-Oriented Analysis and Design*. Brett D. McLaughlin, Gary Pollice, and Dave West. O'Reilly 2006.
3. Martina Seidl, et al., *UML@Classroom: An Introduction to Object-Oriented Modeling*, Springer, 2015 ([e-book] through UTEP library)
4. Cay S. Horstmann, *Core Java Volume I - Fundamentals*, 11<sup>th</sup> edition, Prentice Hall, 2018 ([e-book] through UTEP library)

## 2. Objectives & Outcomes

### Course Description

CS 3331 – Advanced Object-Oriented Programming. An in-depth exposure to the object-oriented programming paradigm, which builds upon programming experience gained in lower-level computer science classes. Emphasis on programming in an object-oriented language with which students are already familiar, and on requirements, testing, code reading, and comprehension.

The class presents a look into the growing capabilities of object-oriented programming as a way to model the real world. Additionally, this course will provide the fundamental knowledge to software modeling through the use of best practices. This course teaches students to approach program development using a systematic approach that is used in industry.

### 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:

- a. Explain the differences between an object-oriented approach and a procedural approach
- b. Describe the difference between waterfall and agile software development

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:

- a. Formulate use-case diagrams and scenarios to support understanding of user requirements
- b. Use object-oriented design notations, including UML class diagrams and state machine diagrams (optionally sequence diagrams) to model problem solutions
- c. Use basic object-oriented design patterns to structure solutions to software design problem
- d. Translate design features, such as classes and relationships, to implementations
- e. Use frameworks and library classes and methods, such as collections, GUI, multithreading, and networking, in problem solutions

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:

- a. Design and implement software employing the principles of modularity, encapsulation, information hiding, abstraction, and polymorphism
- b. Design, implement, and use classes and objects by following coding conventions, guidelines, styles, and standards

- c. Design and implement exception handling (including user defined exceptions) and high order functions
- d. Evaluate existing classes and software for the purposes of extension through inheritance
- e. Create API documents for classes, fields, and methods
- f. Design and implement test suites for automated unit testing
- g. Refactor existing source code to improve its design or efficiency

### 3. Policies & Other Information

#### Grading:

- Attendance – 3%
- Homework/In-Class Assignments – 10%
- Quizzes – 5%
- Exam 1 – 12%
- Exam 2 – 12%
- Final Exam – 14%
- Programming Assignments (PA) – 36%
  - PA0 – 1%
  - PA1 – 4%
  - PA2 – 7%
  - PA3 – 6%
  - PA4 – 7%
  - PA5 – 6%
  - PA6 – 5%
- Programming Final Deliverable/Presentation – 8%

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%.

- Earning an average of less than 60% on the programming lab assignments
- Earning a grade of less than 60% on the final exam
- Earning an average of less than 60% on Exam 1 & Exam 2
- Not submitting ALL lab projects by the end of the semester, even if they are too late to receive credit (lab 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 programming lab assignments will be posted on Blackboard. It is your responsibility to check Blackboard for all assignments. All work must be done individually. While 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 the TA, IA, or the instructor. All assignment submissions must be newly attempted, never before used original work.

### **Homework Assignments:**

Reading and non-programming homework assignments are due at 11:59pm on the due date specified, unless otherwise indicated; after this a late penalty will be assessed (-10%). Many assignments will be required to be done on paper or through the use of an electronic tablet (white background). All reading and non-programming homework assignments must be handwritten in either pencil, black/blue pen (including electronic tablet), otherwise it will not be graded and will receive a grade of zero. Some homework assignments will permit the use of an online drawing tool. The assignment must be clearly legible for credit. Students should submit a scanned PDF document (or PDF document created by tablet), using a Scanning App on a Smart Phone; if this is not possible, please contact the the instructor for alternative arrangements.

### **Programming Assignments:**

Programming 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 lab reports must be turned in with the source code, should be typed and submitted as a PDF. Unless for unusual circumstances and at the discretion of the instructor, programming assignments will not be accepted for credit after 24 hours past the due date/time. All programming assignments are subject to a demo session with the TA, IA, or instructor. All programming 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 two (2) exams and one (1) final exam. Exams will be posted and submitted through Blackboard with appropriate due dates listed. The purpose of the exams is to allow you to demonstrate mastery of course concepts. Make-up exams will be given only in extremely unusual circumstances, and at the discretion of the instructor.

The purpose of the midterm exams is to allow you to demonstrate mastery of course concepts covered thus far during the semester. Mid-term exams 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. Make-up exams will be given only in extremely unusual circumstances. If you must miss an exam, please meet with the instructor, BEFORE the exam. Unless for extreme circumstances and at the discretion of the instructor, students who miss an exam will not be able to make-up the exam.

The final exam will be comprehensive. You must score 65% or better on the final exam to pass this course. You must take the final exam during the time shown in the schedule for the lecture section that you normally attend. If you have a scheduling conflict (e.g., if you are taking a final

at EPCC) or if you are scheduled for three final exams in one day, see your instructor in advance for accommodations.

Exams 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, Drivers License, etc.) to your 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.

### **Quizzes:**

The purpose of each quiz is to ensure that you are staying current with the class content weekly reading and to verify that you have acquired the skills developed in class. Quizzes will usually be paper-based, or 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**. Attendance will be taken within the first 5 minutes of class – students who arrive after this time will be counted absent. Attendance will be taken at every session and will count towards your grade. Attendance may be taken through iClicker, Blackboard, sign-in sheets, rollcall, visual attendance by instructional team, or other means. It is required that you attend each session. Failure to attend the class will result in poor performance in the course. Please come prepared for all sessions. Please inform the TA/IA and instructor if you will be late or absent to class.

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). Participation points also include completing post-lecture and post-labs online quizzes (when applicable) that are administered as surveys to monitor students' overall progress and potential struggles. 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.

### **Technology:**

Course content is delivered via the Internet through the Blackboard learning management system (LMS), supplemented by Microsoft Teams and GitHub Classroom. 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. When having technical difficulties, try switching to another browser.

The use of laptops, cell phones, or tablets of any kind, 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 need to download or update the following software: Microsoft Office, Adobe, Flash player, Windows Media Player, QuickTime, and Java.

You will be required to use VS Code (IDE) in this course. Additionally, you will be required to have a GitHub account; this account should be linked to your 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 for individual usage only), 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, and Blackboard.

Students are permitted to use iPad/Tablets to handwrite notes. Students are not permitted to use their iPad/Tablet to browse the internet or use any other applications that are not related to the course. Students who use unauthorized applications during class time will be no longer be permitted to use the iPad/Tablet for note taking. Students should take notes by hand and not by typing. Students should avoid the use of laptops or cell phones during class unless indicated by the instructor.

### **Incomplete Policy:**

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

### **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 me 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.

## 4. Tentative Schedule

Please note that this schedule is subject to change at any time without advance notice. You should not assume that the exams scheduled below are finalized.

<b>Week</b>	<b>Topic</b>
<b>1</b>	Introduction
<b>1</b>	GitHub
<b>1</b>	Abstraction of Class Design
<b>2</b>	Classes, Objects, Operations (Methods), Attributes
<b>2</b>	Class Design (Modularity, encapsulation-information hiding, abstraction, polymorphism)
<b>2</b>	Code Reviews
<b>2</b>	JavaDoc (API Documentation)
<b>2</b>	Introduction to UML
<b>3</b>	UML Class Diagrams
<b>3</b>	Abstract Classes
<b>3</b>	Inheritance
<b>3</b>	Polymorphism
<b>3</b>	Code for aggregation, composition, association, inheritance relationships
<b>4</b>	Review UML Class Diagram/Practice
<b>4</b>	OO Paradigm vs Procedural
<b>4</b>	Design Pattern Intro/Design Pattern (Factory Design Pattern)
<b>5</b>	UML Use Case Diagrams & Scenarios
<b>5</b>	Testing/Test Suites/Unit Testing
<b>6</b>	Design Pattern (Template Design Pattern)

6	Interfaces
6	Refactoring
7	EXAM 1
8	State Machines
8	SOLID
9	Design Patterns (MVC)
9	Exceptions
10	GUI Intro
10	Concurrent Programming
11	Socket Programming
12	Collections/Generics
12	Packages
13	EXAM 2
14	Final Presentation
15	Final Presentation
15	Final Presentation
16	Final Exam

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

### 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.