

# The University of Texas at El Paso

## EE 2372 – Software Design I

Fall 2022

CRN: 11266  
TR: 3:00 pm – 4:20 pm.  
EDUC 112

**Professor:** Patricia A. Mendoza

Office: Engineering Building E312

Office Phone: 915-747-8684\*

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**Office Hours:**

TR from 1:30pm-2:30pm, after class,  
or by appointment

**Textbooks:**

**Programming in C (4th Edition) - Required**

By Stephen Kochan

ISBN: 978-0321776419

Publisher: Pearson Education

**Data Structures and Algorithms in C++ (2nd Edition) \*\* Optional**

By Michael Goodrich, Roberto Tamassia, and David Mount

ISBN: 978-0470383278

Publisher: Wiley

**Optional Reference Texts:**

**The C Programming Language** by Brian Kernighan and Dennis Ritchie

**GNU/Linux Application Programming** by M. Tim Jones (2nd Edition)

**Linux Pocket Guide** by Daniel J. Barret (2nd Edition)

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### **Course Description**

Foundations of data structures and algorithms. These foundations include: space and time complexity analysis, the use of data structures such as linked lists and binary trees, basic sorting and searching algorithms, and foundations of software testing/verification/validation.

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### **Prerequisite**

**CS 1320 with a grade of “C” or better.**

## ***Learning Objectives***

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1. Become a proficient user of the Linux software development environment and GNU software development tool-chain [**CE-SWD-2**]
  - a. Linux software development environment
  - b. GNU software development tools – gcc, gdb, make, gprof, gcov
2. Understand C language programming constructs [**CE-SWD-3**]
  - a. Variables
  - b. Algebraic and logical expressions (including operator set)
  - c. Simple I/O
  - d. Decision statements
  - e. Iterative control statements
3. Understand and follow structured software design strategies [**CE-SWD-3**]
  - a. Programming paradigms: procedural/modular, object-oriented
  - b. Design for reuse using the procedural/modular paradigm
  - c. Utilizing standard libraries, focus on C standard library
4. Understand and utilize fundamental data structures [CE-SWD-5]
  - a. Arrays and structures
  - b. Strings and string processing
  - c. Pointers, linked lists, and binary trees
  - d. Storage allocation: static, stack and heap
5. Software testing, verification, and validation [CE-SWD-8]
  - a. Understand the differences between testing, verification, and validation.
  - b. Demonstrate an understanding of unit testing strategies and tradeoffs.
  - c. Ability to construct test vectors and use tools to automate their construction
6. Understand the foundations of algorithm analysis [CE-CAL-1, CE-CAL-2, CECAL-3]
  - a. History and the role of algorithms
  - b. Algorithms available in the C standard library
  - c. Determine time complexity of algorithms
  - d. Determine space complexity of algorithms
7. Understand and utilize fundamental algorithms [CE-CAL-5]
  - a. Sorting algorithms: bubble sort and insertion sort
  - b. Searching algorithms: linear search, binary search, and hash functions

Note: correlation to ACM curriculum standards in square brackets, knowledge units in bold should be covered in a pre-requisite course as well.

## ***Grading***

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Attendance/Class Participation:	<b>10%</b>
Quizzes/Homework:	<b>15%</b>
Exam 1:	<b>15%</b>
Exam 2:	<b>15%</b>
Exam 3 (during Finals Week):	<b>15%</b>
Projects:	<b>30%</b>

*\* Depending on the semester, this scale table might be modified to be able to grade students accordingly. If some of these points for grading are missed, the total grade might be based on the rest of them.*

## **Grading Scale**

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**A** = 100% - 90%

**B** = 89% - 80%

**C** = 79% - 70%

**D** = 69% - 60%

**F** = 59% or below.

\*\*\*EE 2372 is part of the ECE BS Lower Division classes and requires a “C” grade or better in order to fulfill the B.S. EE degree requirement and successfully complete the course.

## **Homework**

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Students will have some homework assignments during the semester, and these will be based on class lectures and book readings.

Homework will have to be submitted thru Blackboard Shell. Specific instructions and due dates for assignments will be given either during class or through Blackboard announcements.

Late homework will **NOT** be accepted. In a case of illness or an emergency, is the student’s responsibility to notify the instructor (before class preferably) of the conflicting situation. **Validating proof of the illness or emergency** will be required to accept late homework submissions.

## **Projects**

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Student will have to work on **at least one project** through the semester based on C/C++ programming understanding. This project is individual and students are expected to submit unique and individual work. In programming, there are several ways for accomplishing the same result, and an unrepeated/different/unique work should be submitted. For more information, please review this syllabus’ “Student Conduct” section. There will be **NO** make ups for projects. More information about the projects will be provided later.

## **Quizzes**

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There will be several quizzes throughout the semester to provide feedback about your performance and understanding in class. These quizzes might be counted as in-class activities, and these might not be previously announced. Moreover, there might be situations where Quizzes will have to be completed thru Blackboard Shell. There will be **NO** make ups for quizzes.

iClicker Reef – a cloud-based student response software - might be incorporated to our class. This will help me to understand what you know, give everyone a chance to participate in class, and increase how much you learn when we are in class together. This might count as a short quiz activity or just as participation. More information about iClicker will be provided later.

## **Exams**

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There will be three **onsite exams** during the semester, mostly focusing on lectured material and assignments. A UTEP computer laboratory might be reserved to complete these exams. Remember that our online exams are still individual work, and you should complete these by yourself with no other’s help.

**No** retakes for exams will be allowed. In a case of illness or an emergency that might prevent the student from taking the exam, it is the student’s responsibility to notify the instructor as soon as possible

(before exam time preferably) of the situation. Validating proof of the illness or emergency will be required, and professor will provide a new time and date for this exam.

### ***Final Exam***

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The official final exam period time will be used for our third **online** exam. Completion of this exam is required as part of the class grade. All online exams will require use of “Respondus 4.0” software. More information on how to install this software will be provided later. Make sure to also read the “Test Proctoring Software” section. A library computer laboratory might be reserved to complete exams. Remember that our online final exam is still individual work, and you should complete this by yourself with no other’s help.

There will be **no** make up for this last exam. In a case of illness or an emergency which might prevent the student from taking/completing this exam, it is the student’s responsibility to notify the instructor as soon as possible of the situation. Validating proof of the illness or emergency will be required. Professor might provide an “I” (incomplete) grade for the class until the terms for replacing this grade are discussed and completed by the student.

### ***Class Attendance and Participation***

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This class is an in-person class, where students are encouraged to attend class every Tuesday and Thursday from 3:00 pm to 4:20 pm. Class is intended to be interactive and student participation is extremely important. Consider that by only attending class you will have the opportunity to answer quizzes and have discussions about class materials which might count for participation and/or assignments, plus you will receive a percentage grade just for attending class. Attendance in the course is determined by attending class and by participation in the learning activities of the course. iClicker Reef might be incorporated to class activities.

Class material will be provided for students who for some important reason cannot attend class in person. In-class quizzes and iClicker Reef activities might be provided to students who are not present in class, but these might be graded accordingly or might not count completely for the grade. Revise the “Exams” and “Final Exam” sections for more information.

### ***Class Recordings (ONLY if possible)***

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The use of recordings might enable you to have access to class lectures, group discussions, and more, in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstances. 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 (if possible) 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, 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.

## ***Withdrawal and Dropping the class***

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Not submitting assignments and/or presenting quizzes/tests does not constitute official withdrawal, and the professor might **not** drop you from the class. Make sure to talk to the professor if you stopped attending classes and/or completing assignments/quizzes/tests, and you need to be dropped from the course. If a student stops accessing/reviewing materials and/or completing assignments and/or taking tests, the student will receive a grade based on work completed.

According to UTEP Curriculum and Classroom Policies, “*When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.*” Students may drop the class and receive a WC before **October 28<sup>th</sup>, 2022**. After this date, the professor might still be able to drop the student only in cases of medical or family emergencies, but the student will need to contact the professor to make this request and must provide documentation.

If you feel that you are unable to complete the course successfully, please contact the Registrar’s Office (<https://www.utep.edu/student-affairs/registrar/>) to initiate the drop process or contact them at [records@utep.edu](mailto:records@utep.edu). If you cannot complete this course for whatever reason, please contact me, otherwise, you are at risk of receiving an “F” in the course.

## ***Make-up Work***

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Make-up work will be given only in the case of a documented emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

## ***Technology Requirements***

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This course content will be complemented by Blackboard Learning Management System (LMS). Ensure your UTEP e-mail account is working and that you have access to the Web. Mozilla Firefox and Google Chrome are the most supported browsers for Blackboard. Other browsers may cause complications with the LMS. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop, a webcam and a microphone for completing online work and tests. Make sure to have access to any campus computer lab and/or check that your computer hardware and software are up-to-date and able to access all parts of the course.

Technology Support offers a cost-free equipment checkout program for enrolled students. You can check out a Laptop, a Wi-Fi hotspot, webcam even for a semester. For more information please go to [https://www.utep.edu/technologysupport/TSCenter/TSC\\_EQ\\_LaptopsTablets.html](https://www.utep.edu/technologysupport/TSCenter/TSC_EQ_LaptopsTablets.html).

You might also need access to UTEP VPN (Virtual Private Network) to remotely connect to the campus network and access on-campus resources. For more information about VPN services go to [https://www.utep.edu/technologysupport/ServiceCatalog/NET\\_VPNGlobalProtect.html](https://www.utep.edu/technologysupport/ServiceCatalog/NET_VPNGlobalProtect.html).

If you encounter technical difficulties beyond your scope of troubleshooting, please contact the Help Desk at [helpdesk@utep.edu](mailto:helpdesk@utep.edu) or at 915-747-HELP (4357) as they are trained specifically in assisting with technological needs of students.

### ***Test Proctoring Software***

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Course assessments (exams) will make use of Respondus Lock Down 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 test.

Please review the following guidelines:

- The assessments will only be available at the times identified on the course calendar and/or the date/times provided by your professor.
- A reliable Internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- You will have only one attempt to take the test, but if the window closes, you will be able to come back and continue your test where you left. However, the time limit to complete test will not be paused and once this is elapsed, answers will be saved and no changes can be made. In case of any difficulty, it is your responsibility to notify your professor immediately. Check the make-up section for more information.
- Respondus Lockdown Browser requires that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your student ID prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- Notes and/or textbook materials might be permitted during the test. However, Respondus Monitor still requires you to take a video of your surrounding area (desk, chair, walls, etc.).
- You should not have conversations with other people and/or leave and return to the area during the test.

Exams are individual work, and these should be completed by yourself with no other's help. For more information, please review the "Student Conduct" section of this syllabus.

### ***UTEP E-mail Account and Blackboard***

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Student will need to have his/her UTEP email account and Blackboard account ready at the beginning of the semester. Online assignments/quizzes/tests will be provided thru Blackboard Shell and email, and it is the student's responsibility to have these accounts ready. **NO emails from personal email accounts will be accepted.** All emails for this class will require **"EE 2372 Fall 2022"** on the *subject field*.

### ***Students with disabilities, accommodations or support services***

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**Center for Accommodations and Support Services (CASS) Policy:** If you have or believe you have a disability that may impact your ability to succeed in a class, whether it be online or face-to-face, you may wish to contact the Center for Accommodations and Support Services (CASS) to show documentation of a disability or to register for services. Students who have been designated as disabled must reactivate their standing with the CASS yearly. If you feel that you may have a disability requiring accommodations and/or modifications, contact **CASS** at [cass@utep.edu](mailto:cass@utep.edu), or call at 747-5148, or go to CASS AIM portal to request accommodations online: <https://www.utep.edu/student-affairs/cass/>.

### ***COVID-19 Precautions***

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Please stay home if you (1) have been diagnosed with COVID-19, or (2) are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. 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, and might be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit [epstrong.org](http://epstrong.org).

### ***Student Conduct***

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As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of the Dean of Students. The Dean will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' homepage <https://www.utep.edu/student-affairs/osccr/> for more information.

### ***Statement for (N)etiquette***

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When communicating electronically, many of the feelings or impressions that are transmitted via body language in face-to-face communications are lost. Consequently, interpreting emotions and innuendos is much more difficult. Only what is written, or drawn, carries the message. Often, excitement can be misinterpreted as anger or insult. It is important that we all keep this in mind as we communicate. Words in print may seem harmless, but they could emotionally injure us when working at a distance. Hence, it is vitally important that we are conscious of how we communicate while working at a distance.

For example, avoid the use of caps in your electronic messages, as wording in caps comes across as shouting. The standard practice ("Netiquette") for participation in networked discussion requires that all participation be focused on the topic at hand, not become personalized, and be substantive in nature. (Translation: you may certainly disagree with others, but you must do so respectfully; you may express strong beliefs or emotions, but you may not get so carried away that you lose all perspective on the course itself.)

Please observe the following:

- You are required to check the Blackboard course shell daily for messages, updates, and assignments.
- Respect and courtesy must be provided to fellow classmates and the instructor at all times, in all contexts. No harassment or inappropriate posting will be tolerated.
- Be professional and careful in what you say about others.

- When reacting to someone else’s messages, address and focus on the ideas, not the person who posted them.
- Be careful when using sarcasm and humor. Without face-to-face communication, your joke may be viewed as criticism.

### ***Course Outline***

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Week 1:	Introduction
Weeks 1-2:	GNU/Linux software development environment
Week 2:	C language programming constructs: variables, algebraic expressions, simple I/O
Week 3-4:	C language programming constructs: decision statements and iterative control statements
Weeks 4-5:	Pointers and fundamental data structures: arrays and structures; basic data structures: linked list and binary trees
Week 5:	Fundamental data structures: strings and string processing
Week 5:	<b>Exam I – Online</b>
Week 6:	C standard library: Console and File I/O
Weeks 7-8:	Debugging basics
Week 9:	Software testing/verification/validation
Week 10:	Fundamental algorithms: sorting and searching
Weeks 10-11:	Time and space complexity analysis of algorithms
Week 11:	<b>Exam II - Online</b>
Weeks 12-13:	Recursion; Dynamic memory allocation
Weeks 14-15:	Multithreaded programming
Finals Week:	<b>Exam III – Thursday, Dec 8<sup>th</sup>, 4:00pm – 6:45pm – On Site – EDUC 112</b>

### ***Syllabus Change Policy***

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Except for changes that substantially affect the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.



## ***Important Fall 2021 Dates***

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- **Aug 15<sup>th</sup>** – Financial Aid Disbursed
- **Aug 22<sup>nd</sup>** – Fall classes begin
- **Aug 22<sup>nd</sup>-26<sup>th</sup>** – Late Registration (Fees are incurred)
- **Aug 31<sup>st</sup>- Sept 1<sup>st</sup>** – Work @ UTEP Job Fair – 9:00 am – 1:00 pm
- **Sept 5<sup>th</sup>** – Labor Day Holiday – University Closed
- **Sept 7<sup>th</sup>** – Fall Census Day
  - Note: This is the last day to register for classes. If payment is not received by this day, students will be dropped.
- **Sept 12<sup>th</sup>-16<sup>th</sup>** – Career Week, 30-mins workshops - 12:30pm – 1:00pm
- **Sept 22<sup>nd</sup>-23<sup>rd</sup>** – Fall Career Expo
- **October** – Advising Season Starts, for Spring 2022
- **Oct 4<sup>rd</sup>** – Graduate and Professional Schools Fair, 10:00am – 2:00pm
- **Oct 28<sup>th</sup>** – Fall Drop/Withdrawal Deadline
- **Nov 24<sup>th</sup>-25<sup>th</sup>** – Thanksgiving Holiday – University Closed
- **Dec 1<sup>st</sup>** – Fall – Last day of classes
- **Dec 2<sup>nd</sup>** – Dead day
- **Dec 5<sup>th</sup> – 9<sup>th</sup>** - Fall Final Exams
- **Dec 9<sup>th</sup>** – Exam III – Thursday, Dec 8th, 4:00pm – 6:45pm – On Site – EDUC 112
- **Dec 10<sup>th</sup> – 11<sup>th</sup>** - Fall Commencement
- **Dec 14<sup>th</sup>** – Grades are Due
- **Dec 15<sup>th</sup>** – Grades are posted to students’ records. Students are notified of grades and academic standing