**University of Michigan-Dearborn Syllabus**

**CIS 200, Computer Science II, Winter 2021, 4 Credits**

Prof. Jie Shen

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BlueJeans Online Office Hours: 1:00pm-3:00pm Monday and Wednesday; or by appointment.

https://bluejeans.com/737190965

Course Meeting Times and Format(s): 11:00am-12:15 pm M & W Location: BlueJeans Online

https://bluejeans.com/557498491

Lab Meeting Times & Format(s): 4:00pm – 5:45pm Monday Location: BlueJeans Online

https://bluejeans.com/985518044

**Course Description:**

This course continues the development of the principles of structured design originated in CIS 150. You will be introduced to the principles of data abstraction and object-oriented programming in C++. Major data structures including stacks, queues, and linked-lists will be studied and typical programming applications such as recursion, sorting, searching and elementary file processing will be also covered. The principles of UML modeling are also introduced.

**Program Goals:**

1. An ability to apply knowledge of computing and mathematics appropriate to the discipline;
2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
3. An ability to function effectively on teams to accomplish a common goal.

**Course Objectives:**

Outcomes of instruction

 The student will be able to analyze simple algorithms to determine their efficiency

 The student will be able to create simple test cases and test plans for unit and integration testing of medium-sized programs

 The student will be able to create stub procedures and drivers as needed, to perform top-down or bottom-up integration testing of programs

 The student will be able to describe the tradeoff considerations for data design implementations

 The student will be able to design software to that it is easily modifiable

 The student will be able to implement algorithms using linked lists, stacks, and queues

 The student will be able to incorporate various sorting algorithms into program design

 The student will be able to make use of an existing class library and create a program, using object-oriented analysis and object-oriented design techniques

 The student will be able to use object-oriented design to create libraries of related classes that can be used to solve real-world problems

 The student will be able to utilize data abstraction. data hiding, functions, inheritance, and pointers in C++

 The student will be able to work with the Unix file system and with Unix shell commands

 The student will be able to write a medium-sized program as part of a team

Student outcomes addressed in the course

 Outcome b – An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution *(Not assessed here)*

 Outcome c – An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs *(Assessed here)*

 Outcome d – An ability to function effectively on teams to accomplish a common goal *(Not assessed here)*

 Outcome j – An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices *(Not assessed here)*

 Outcome k – An ability to apply design and development principles in the construction of software systems of varying complexity

 Outcome l – An ability to program

**Required Materials and/or Technology:**

Texts: (1) Data Abstraction & Problem Solving with C++, by F.M. Carrano and T.M. Henry. 7th Edition, Pearson (required).

(2) A Practical Guide to the Unix System, by Mark G. Sobel, 3rd Edition, 1995 (recommended) or

A Practical Guide to Linux Commands, Editors, and Shell Programming by Mark Sobell and

Matthew Hellke, 4th Edition, 2017 (recommended).

(3) C++ How to program, by H.M. Deitel and P.J. Deitel, Prentice Hall, 9th edition, 2013 (recommended).

**Assignment and Grading Distribution:**

Your scores on the programming assignments and exams will determine your grade in this course. There will be two exams, 4 sizable programming projects, and 11 lab assignments. The programming projects will account for 20% of your grade, the labs 20% of your grade, and the exams the remaining 60%. Late work will be penalized at a rate 3%/per actual day, as will evidence of cheating in any form.

**Grading Scale:**

94%- 100% A 90%- 93% A-87%- 89% B+

84%- 86% B

80%- 83% B-77%-79% C+

74%-76% C

70%-73% C-

67%-69% D+

64%-66% D

60%-63% D

**Tentative Course Outline:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week | Date | Topic | Project | Book |
| 1 | Jan 13 | Introduction to Unix, Beginning Unix  no Lab |  | Sobel’s book |
| 2 | Jan 18  Jan 20 | Unix File System, Major Commands of Unix  C++ Overview  Lab#1 SSH & Unix exercise |  | Chapter 1 |
| 3 | Jan 25  Jan 27 | No class (Martin Luther King Day)  Software Design Process  Verification of Software Correctness  Lab#2 Two-dimensional array | 1 – Class & Data Abstraction |  |
| 4 | Feb 1  Feb 3 | Unified Modeling Language  Object-Oriented Design  Abstraction Data Type (ADT)  Lab#3 UML |  |  |
| 5 | Feb 8  Feb 10 | Structure & Class  inheritance  Lab#4 Classes |  | Chapter 3 |
| 6 | Feb 15  Feb 17 | ADTs List  ADTs Stack & ADTs Queue,  Lab#5 Inheritance | 2 – Inheritance | Chapter 4 |
| 7 | Feb 22  Feb 24 | Review of Midterm  Midterm  No lab |  |  |
| 8 | Mar 1  Mar 3 | Software Modifiability, CRC cards  Recursion,  Lab#6 Software Modifiability and  CRC cards |  | Chapter 2 |
| 9 | Mar 8  Mar 10 | Template  Pointer  Lab#7 recursion | 3 – Recursion & Template | Chapter 3 |
| 10 | Mar 15  Mar 17 | Pointer (continued)  Array  Lab#8 template |  | Chapter 8 |
| 11 | Mar 22  Mar 24 | Implementation of linked list  Implementation of stack  Lab#9 pointer |  | Chapter 7 |
| 12 | Mar 29  Mar 31 | Implementation of queue  Stack & Queue by Linked List  Lab#10 list | 4 – Stack and Queue | Chapter 13 |
| 13 | Apr 5  Apr 7 | Lists by Linked List  Lab#11 Sorting algorithms |  | Chapter 8 |
| 14 | Apr 12  Apr 14 | Sorting Algorithms , Tree  Overview of Final Exam  Lab# 12 File Steam |  | Chapter 11 |
|  | Apr 19  Apr xx (TBD)  (11:00am-2:30pm) | Office Hours  Final Exam |  |  |

**University Attendance Policy:**

A student is expected to attend every class and laboratory for which he or she has registered. Each instructor may make known to the student his or her policy with respect to absences in the course. It is the student’s responsibility to be aware of this policy. The instructor makes the final decision to excuse or not to excuse an absence. An instructor is entitled to give a failing grade (E) for excessive absences or an Unofficial Drop (UE) for a student who stops attending class at some point during the semester.

**Academic Integrity Policy:**

The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the University’s standards of academic conduct as set forth by the Code of Academic Conduct (http://umdearborn.edu/697817/), as well as policies established by each college. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offenses and violations can result in penalties up to and including expulsion from the University.

**Disability Statement:**

The University will make reasonable accommodations for persons with documented disabilities. Students need to register with Disability Resource Services (DRS) every semester they are enrolled. DRS is located in Counseling & Support Services, 2157 UC (http://www.umd.umich.edu/cs\_disability/). To be assured of having services when they are needed, students should register no later than the end of the add/drop deadline of each term. If you have a disability that necessitates an accommodation or adjustment to the academic requirements stated in this syllabus, you must register with DRS as described above and notify your professor.

**Safety:**

All students are encouraged to program 911 and UM-Dearborn’s University Police phone number (313) 593-5333 into personal cell phones. In case of emergency, first dial 911 and then if the situation allows call University Police.

The Emergency Alert Notification (EAN) system is the official process for notifying the campus community for emergency events. All students are strongly encouraged to register in the campus EAN, for communications during an emergency. The following link includes information on registering as well as safety and emergency procedures information: https://umdearborn.edu/emergencyalert.

If you hear a fire alarm, class will be immediately suspended, and you must evacuate the building by using the nearest exit. Please proceed outdoors to the assembly area and away from the building. Do not use elevators. It is highly recommended that you do not head to your vehicle or leave campus since it is necessary to account for all persons and to ensure that first responders can access the campus.

If the class is notified of a shelter-in-place requirement for a tornado warning or severe weather warning, your instructor will suspend class and shelter the class in the lowest level of this building away from windows and doors.

If notified of an active threat (shooter) you will Run (get out), Hide (find a safe place to stay) or Fight (with anything available). Your response will be dictated by the specific circumstances of the encounter.

**Harassment, Sexual Violence, Bias, and Discrimination:**

The University of Michigan- Dearborn recognizes that students have a right to study in a safe atmosphere free of sexual violence, harassment, bias and discrimination. Should you wish to report an incident of sexual assault, harassment, bias and discrimination, visit <https://umdearborn.edu/faculty-staff/human-resources/campus-wide-incident-report>.