

Syllabus

CS 450: Structure of Higher Level Languages

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Course description

We will be learning and designing the semantics of functional and object-oriented programming. The course is taught “from the ground up,” so it does not assume a specific background in functional programming. Important topics include mechanisms for parameter passing, scoping, dynamic storage allocation, and the implementation of object-oriented programming. The language of instruction is Racket, a dialect of LISP, which is taught and implemented in the course.

Prerequisites

CS310 (Advanced Data Structures and Algorithms) and CS320 (Applied Discrete Mathematics) or permission from the instructor.

Textbook

Structure and Interpretation of Computer Programs. Harold Abelson and Gerald Jay Sussman with Julie Sussman. MIT Press. 1996. ISBN: 978-0-262-51087-5 A free PDF version is available online.¹

Topics covered

- semantics of programming languages
- functional programming
- object oriented programming

¹<https://github.com/sarabander/sicp-pdf>

- persistent data structures
- assignment-free programming

Course work and grades

Final grade consists of:

- Homework: 95%
- Participation: 5%

Notes:

- Your final grade will be a (possibly weighted) average of 9 homework assignments.
- If P is the final percentage of your homework and participation, then your course grade will be calculated as follows, where decimal points are discarded. For instance, a final grade of 74.99 yields a **C+**, **not** a **B-**.
- **To pass this course, you must pass 7 assignments.** That is, if you obtain < 40 points in 3 assignments or more, your final grade is **F**.
- **No courses required by the CS major, minor, or certificate may be taken pass/fail.**
- **There will be no exams.**

$95 \leq P$	A
$90 \leq P < 95$	A-
$85 \leq P < 90$	B+
$80 \leq P < 85$	B
$75 \leq P < 80$	B-
$70 \leq P < 75$	C+
$60 \leq P < 70$	C
$55 \leq P < 60$	C-
$50 \leq P < 55$	D+
$45 \leq P < 50$	D
$40 \leq P < 45$	D-
$P < 40$	F

Incomplete grade policy

We consider a **portion the required class work** to be *at most* 20% of the total work, as per the incomplete policy.² For instance, assuming this course

²https://www.umb.edu/registrar/academic_policies/incomplete_policy

has 8 homework assignments and all assignments have the same weight, then a portion of the required class work would be at most 1 homework assignment.

Here is an excerpt from the school's incomplete policy:

The grade incomplete (INC) is reported only where a portion of the assigned or required class work, or the final examination, has not been completed because of serious illness, extreme personal circumstances, or scholarly reasons at the request of the instructor. If your record is such that you would fail the course regardless of your missing work, you will fail.

Software requirements

Students are expected to have access to Racket 8.2 (or greater). Homework assignments consist of a Racket script or a paper that will be submitted to Gradescope (unless stated otherwise).

Attendance is required. In case of a student not being able to attend a class, the student should contact the instructor as soon as possible. Students are responsible for knowing everything that is covered during class meetings, including announcements. If you must be absent from a class meeting, make arrangements with another student to find out what you missed.

Homework

- The final grade of each assignment is given by the *instructor*, regardless of what the grading software shows.
- **The instructor/TA can schedule an interview, outside of lecture hours, to test your knowledge of any homework assignment you submit;** points can be deducted as a result of the interview.
- Assignments may be deducted points for code style.
- **Each student can retake up to 3 homework assignments.**
- **Retakes are done during the exam season.**
- You may **not** collaborate with anyone else on any homework. Each homework represents your own, individual work.
- It is *acceptable* to discuss the concept in general terms, but *unacceptable* to discuss specific solutions to any homework assignment.
- Homework assignments will be automatically scanned for plagiarism against the present year and all past years of this course.

Participation

The participation component consists of:

- Attendance.
- Participation in the classroom.
- Participation in the online forum.

Participation does not mean just answering questions correctly. Discussion and questions, either posed online or in class, are encouraged and counted toward participation.

AI tools

AI is prohibited: In this class, all work submitted by students must be generated by the students themselves, whether working individually or in groups. Students should not have another person or entity do the writing of any portion of an assignment; this includes hiring a person or a company to write assignments and using AI tools like ChatGPT. All work submitted must contain citations for any material that has been quoted or referenced. If students are unsure about whether or not a source is appropriate to use in the assignment, they should contact the instructor.

Academic Integrity and Student Code of Conduct

Education at UMass Boston is sustained by academic integrity. Academic integrity requires that all members of the campus community are honest, trustworthy, responsible, respectful, and fair in academic work at the university. As part of being educated here, students learn, exercise, increase, and uphold academic integrity. Academic integrity is essential within all classrooms, in the many spaces where academic work is carried out by all members of the UMass Boston community, and in our local and global communities where the value of this education fulfills its role as a public good. Students are expected to adhere to the Student Code of Conduct, including policies about academic integrity, delineated in the University of Massachusetts Boston Graduate Studies Bulletin, Undergraduate Catalog, and relevant program student handbook(s), linked at https://www.umb.edu/academics/academic_integrity.

Accommodations

UMass Boston is committed to creating learning environments that are inclusive and accessible. If you have a personal circumstance that will impact your learning and performance in this class, please let me know as soon as possible, so we can discuss the best ways to meet your needs and the requirements of

the course. If you have a documented disability, or would like guidance about navigating support services, contact the Ross Center for Disability Services by email (ross.center@umb.edu), phone (617-287-7430), or in person (Campus Center, UL Room 211). To receive accommodations, students must be registered with the Ross Center and must request accommodations each semester that they are in attendance at UMass Boston. For more information visit: <https://www.rosscenter.umb.edu>. Please note that the Ross Center will provide a letter for your instructor with information about your accommodations only and not about your specific disability.

Student Support

Writing Center. The University of Massachusetts Boston Writing Center provides free writing support to undergraduate and graduate students. The Writing Center believes that every writer benefits from supportive and generous interaction with a knowledgeable peer, both online and in-person, on their writing. As such, it works one-on-one with writers on all writing projects — whether personal, academic, or professional — at any stage. During individual writing sessions, trained undergraduate and graduate student consultants collaborate with writers on their goals and take into account academic and social contexts. The Writing Center also provides a variety of programming, including workshops and writing groups. To learn more about the Writing Center and its services or schedule an appointment visit: <https://www.umb.edu/writingcenter>

Subject Tutoring. Subject tutoring is available through the Office of Academic Support Programs (287-6550 or <https://www.academicsupport.umb.edu>).

Health, Wellbeing, and Success

We are still coming through the COVID-19 pandemic. Due to the emerging COVID-19 variants, all members of the UMass Boston community — students, faculty, and staff — as well as contractors and visitors are encouraged to wear face coverings in public indoor spaces on the UMass Boston campus. To safeguard your own health and safety as well as that of all students, staff, and faculty, you are reminded that vaccinations are required for all faculty, staff, and students, with limited exceptions (see https://www.umb.edu/healthservices/corona_virus_information/coronavirus_vaccination_requirements). If you have symptoms of COVID-19, you should not come to campus. Flexibility and support will be provided for students in such situations and are addressed in this syllabus. UMass Boston is a vibrant, multi-cultural, and inclusive institution committed to ensuring that all members of our diverse campus community are able to thrive and succeed. The university provides a wide variety of resources to support students' overall success. As we continue to deal with the evolving

impacts of the COVID-19 pandemic, these resources are more important than ever.

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- Are you in emotional distress? Call 617.287.5690 to speak with a licensed clinician 24/7 who can offer support, crisis recommendations, and assistance with finding resources.
- Have a campus question or issue? Use Here4U in the UMass Boston app or via <https://www.umb.edu/here4U>
- Want advice in navigating a university or life situation? Contact the Dean of Students Office at <https://www.umb.edu/deanofstudents>
- Want to connect with housing and food insecurity support, student life groups and events, or recreation activities? Visit <https://www.umb.edu/campus-life/>
- Want to access resources specifically for immigrant-origin, DACA, TPS, and undocumented students? Visit <https://www.umb.edu/campus-life/diversity-inclusion/multicultural-affairs/immigrant-student-programs/>
- Looking for additional identity-based community support? Find more resources at <https://www.umb.edu/all-of-us/inclusive-identity/>
- Want to make the most of your academic experience? Visit https://www.umb.edu/academics/vpass/academic_support
- Unable to attend class on a specific date or participate in an exam or class requirement due to a religious observance? Fill out the excused absence form (requires 2-weeks' notice) to request religious accommodation at <https://www.umb.edu/campus-life/current-students/policies/right-to-excused-absence-because-religious-belief/>