CS4121 - Programming Languages

Spring 2025

Course Information

Course #, Name	CS4121, Programming Languages
Class Location & Time	Monday, Wednesday & Friday
R01	Fisher 329, 9:00am-10:00am

Instructor Information

R01 Dr. Gorkem Asilioglu, Rekhi 308
Office Hours: MWF 10:30am to 11:30am, additionally by e-mail, and by appointment
galolu@mtu.edu (include CS4121 in subject e-mail)

Course References

Course Web-site Canvas – `http://courses.mtu.edu/`
Canvas will be the main source for all course materials (lecture slides, assignments, etc.). Be sure to check Canvas regularly and enable notifications appropriately to receive announcements and updates in a timely manner.

Course Text The required textbook for this course is:
Programming Language Pragmatics, 4th Edition, by Michael L. Scott (Publisher: Morgan Kaufmann, 2015)

Course Description

A discussion of the concepts underlying programming languages. Topics include programming paradigms; language properties (including syntax, semantics, run-time behavior, and implementation issues); data, procedure, functional, and control abstraction; functional programming; and language security.

Learning Objectives

After completing this course, successful students should be able to:

- specify the syntax of programs with regular expressions, grammars and implement with scanners and parsers
- specify the meaning of programming languages through development of interpreters and compilers
- understand type systems including type checking, type equivalence, and type compatibility
- specify memory layout and implementation of composite types
- understand procedural abstraction, parameter passing, bindings and their implementation
- program in new programming language paradigms such as functional programming
- understand basic concepts in language security, buffer overflow and mitigation schemes

Course Topics

Topic	Book Sections
History of Programming Languages	1.1 - 1.7, Notes
Scanners (review)	2.1.1, 2.2
Parsers	2.1.2, 2.1.3, 2.3, 2.4, Notes
Rudimentary Compilation	Notes, 3.1, 3.2
Control Flow	6.1 - 6.6
Types & Dynamic Memory Management	7.1 - 7.4; 8.1 - 8.6
Subroutine and Control Abstraction	3.3 - 3.5, 3.8.1, 9.1 - 9.3
Data Abstraction	10.1 - 10.7
Functional Languages	3.6, 8.6, 11.1 - 11.3
Logic Programming (if time permits)	12.1 - 12.2
Language Security and C Security and Java Virtual Machine	Notes

Grading Policy

All course scores will be kept in Canvas. Your performance in this class will be evaluated in four areas: Homework assignments, Programming projects, Quizzes, and Exams. Your grade will be calculated as a percentage of points received weighted for each part of the course:

- 40% Programming projects (5)
- 5% Quizzes
- 20% Homework (5 to 6)
- 35% Exams (3 exams)

Your assignments, quizzes, and exams should be graded and returned to you within about 7-10 days. Any questions about a grade received (or request for regrades) should be made in writing (over e-mail) to the instructor or TA within one week of returning the material. No grade changes will be made after that point except in the case of an arithmetic error in summing points or the grade was recorded incorrectly in the grade book.

The final score will determine your letter grade. The following grading scale gives guaranteed scores (the cutoffs for grades may be moved downward, but will not be raised).

Percentage	Letter Grade
> 0.90	A
$[0.85 - 0.90)$	AB
$[0.80 - 0.85)$	B
$[0.75 - 0.80)$	BC
$[0.70 - 0.75)$	C
$[0.65 - 0.70)$	CD
$[0.60 - 0.65)$	D
< 0.60	F

Programming Projects

You will be assigned 5 programming projects throughout the semester. You are expected to complete each project individually.

Late Assignments
Late submissions will not be accepted. Please submit all assignments on time.

Quizzes

There will be a number of online quizzes throughout the semester. In addition, participating in in-class questions will count as a quiz assignment as well.

Homework Assignments

You will be assigned five to six homework assignments throughout the semester.

Exams

The three exams for the class are worth 35% total. The exams will be closed book. Exams will be held in the evening and are announced at least 7 days ahead of the test date. Tentative weeks for the exams are weeks 6 and 12, as well as the finals week for the last exam.

Makeup exams
Makeup exams will not be given without prior arrangements. Excused absences as described in the Student Handbook must be e-mailed to the instructor 3 days prior to the test date. Unplanned events (illness, emergencies) should be brought to the instructor's attention as soon as possible to make alternative arrangements. Unexcused missed exams will result in a zero for that exam.

Collaboration and Cheating

Programming projects:
Programming projects are to be performed individually. You may neither show anyone your project code nor look at the code of anyone else (This policy extends to any external resource, including code found on the web, generative AI tools (ChatGPT, Gemini, Copilot etc.) or individuals who are not enrolled in the course.). However, you may use code found in provided lecture slides, examples shown in class or provided on Canvas. You may also engage in empty hands discussions with anyone. No participant in an empty hands discussion should leave the discussion with written or printed material. If you are unsure whether or not a particular type of collaboration is allowed, you are expected to check with the instructor before engaging in the collaboration.

Quizzes:
Quizzes are expected to be completed independently. Any sharing of either the content of the quizzes, questions of the quizzes, or solutions to problems is cheating.

Homework assignments:
Each homework assignment must be completed individually by each student.

Exams:
You are to complete all exams with no help from other students, and with no textbooks, class notes, cribs, or any electronic equipment (*no cell phones or calculators*), etc. (unless approved in advance by the instructor).

Getting Assistance:
If you have questions on the course, I ask you to consider the following options:

- Email the instructor a clear and detailed question
- Stop by the instructor's or TA's office hours

- Schedule a meeting with the instructor

Academic Misconduct:
Academic misconduct in any form will not be tolerated. Evidence of misconduct will result in zero credit for the assignment, drop in one final course grade, and notification with the Office of Student Affairs. Some cases of misconduct may result in the student failing the course outright.

Class Policy and Communication

Cell phones, Blackberries, iPods, iPads, PDAs, etc. are not to be used in class. Class time is not a time for you to work on other courses assignments, talk with your neighbors, or be disruptful in any manner.

Communication
In addition to class time, students should refer to the course web-site (on Canvas) and class mailing list to receive announcements and information on the class. Make sure you're able to receive announcements on Canvas in your e-mail inbox as soon as they are posted.
Please contact the instructor by e-mail, immediately after class, or during office hours if you have any questions.

University Policy

Assessment Statement
Student work products (exams, essays, projects, etc.) may be used for purposes of university, program, or course assessment. All work used for assessment purposes will not include any individual student identification.

Other Policies
If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see the instructor as soon as possible so that we can make appropriate arrangements.

Michigan Tech has standard policies on academic misconduct and complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. For more information about reasonable accommodation for or equal access to education or services at Michigan Tech, please call the Dean of Students Office, 487-2212 or go to `http://www.mtu.edu/ctl/instructional-resources/syllabus/syllabus_policies.html`

Academic Integrity:
`http://www.mtu.edu/conduct/integrity-center/students/`

Institutional Equity and Inclusion:
`http://www.mtu.edu/equity/`

Disability Services:
`http://www.mtu.edu/deanofstudents/disability/`