



CSCI 330: PROGRAMMING LANGUAGES

DEPARTMENT OF COMPUTER SCIENCE
MILLERSVILLE UNIVERSITY OF PENNSYLVANIA
SPRING 2021

INSTRUCTOR

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Assistant Professor
Roddy 133

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OFFICE HOURS

-T-R- 03:00PM - 04:00PM
--W-- 08:00AM - 11:00AM
Zoom: 972-1028-2828

SECTION 50

-T-R- 01:10PM - 03:00PM
Zoom: 912-8242-6560

ZOOM INFORMATION

Office Hours Password
my last name, all lowercase

All Lecture Passwords
programming languages

PREREQUISITES

C- or better in CSCI 362
OR
Enrolled in CSCI 362

COURSE DESCRIPTION

Introduction to the fundamental principles of programming language design, semantics, and implementation. Structure and vocabulary of modern programming languages. Programming language topics include formal semantics of programming, name binding, scope, data types, type systems, control flow, object orientation, scripting languages, functional languages, polymorphism, and concurrency. Labs and assignments will include experience in writing programs in a nonprocedural programming paradigm.

COURSE OUTCOMES

1. Apply syntax-related concepts such as context-free grammars and parse trees.
2. Apply semantics-related concepts such as denotational mapping functions and weakest preconditions.
3. Understand and differentiate between various models for data control, scope, lifetime, and type checking of variables.
4. Analyze and apply various parameter passing techniques.
5. Explain and compare various models of run-time storage management.
6. Compare non-procedural programming paradigms to the procedural programming paradigm.
7. Design and implement programs in a non-procedural programming paradigm.
8. Distinguish between compile-time vs. run-time activities
9. Write a technical paper on a Programming Languages topic.
10. Give an oral presentation on a Programming Languages topic.

GRADING

20% Exam 1	28% Assignments & Project	20% Final Exam
20% Exam 2	12% Paper & Presentation	2% BONUS

GRADING SCALE

< 60	< 63	< 67	< 70	< 73	< 77	< 80	< 83	< 87	< 90	< 93	< MAX
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

NOTES

- A minimum exam average of **70%** is required to pass the class with at least a **70%**
- **All** assignments must be attempted in order to pass the class
- Lack of virtual participation/attendance will result in a grade penalty
- **BONUS** is at the discretion of the professor

COURSE COMPONENTS

Due to the unique situation introduced this term because of the COVID-19 pandemic, I will combine various methods of instruction. We will meet **synchronously** during our scheduled class time. There will be some days where out-of-classroom work will be to watch/view lecture videos while other out-of-classroom work will be traditional laboratory assignments or homework assignments.

VIDEO RECORDINGS

The bulk of the material for the course will be presented through video lectures, however, there will likely be some video recordings as well. These video recordings will vary in length – ranging between 5 minutes and 30 minutes. I will do my best to have them only cover a single topic. Video Recordings may be assigned prior to a synchronous lecture period. You will be expected to have watched all assigned videos *prior* to the start of the next class. They will be accessible through [D2L](#).

READINGS

There is no textbook for the course. I am developing open-source materials that can be used for free by anyone. These readings will be informal, down-to-earth, and hopefully presented in an easy-to-understand manner. Since I am creating these resources throughout duration of this course, there is a chance there will be some errors. If you find any, please let me know! The readings are designed to accompany the video recordings (or vice versa) pending your learning style.

SYNCHRONOUS MEETINGS / LECTURES

We would normally be in a physical classroom during our scheduled times listed on the schedule. Instead, I will offer synchronous Zoom meetings. Most of these meetings will be lecture centric. But we will often split into breakout rooms to solve various problems. Active engagement during these synchronous meetings is expected and mandatory.

STUDENT OUTCOME EVALUATION METRICS

HOMEWORK

Low-stakes weekly or bi-weekly problem sets which are graded on a faithful attempt of completion. These will be representative of exam questions.

LABS AND PROJECT

Labs are medium-stakes weekly or bi-weekly individual assignments which are graded via Autolab (mostly) as well as professor feedback. These will increase in difficulty during the semester. The project offers a staged construction of a solution to a reasonably complex problem. Topics learned throughout the semester will be completed as a small group. Evaluation of the project will be manually graded.

PAPER

Medium-stakes paper on programming languages (features, design, etc) split up into four components: proposal, sources, final paper, and presentation. **You must give an oral presentation to pass the class. You must submit a paper to pass the class.**

EXAMS

Large-stakes written evaluations designed to take about two hours. Exams are not cumulative in terms of topics; however, certain topics have implicit “prerequisites” where prior material covered in the class will be expected to be retained.

I will leverage Examity for proctoring the exams. While taking any online examination the following will be expected of you:

- You must be using a computer running Microsoft Windows or Apple macOS
- You must have your webcam turned on and be visible
- You must have your microphone turned on
- You must not be hardware muted or have your microphone turned down
- You must not access any webpage on your computer other than D2L
- You must not reference any notes or course material, be they digital or physical
- You must not communicate, coordinate, or collaborate with anyone
- You must not access any other software on your computer besides a web browser.

EXPECTATIONS

A course syllabus serves as a contract between you and me.

MY EXPECTATIONS OF YOU

- Arrive prepared and on time for class
- Engage in active discussion during lecture
- Ask questions. Do not hesitate to clarify a concept
- Do your best work and be confident in your abilities
- Check email frequently for announcements and additional information
- Treat everyone with respect
- Adhere to Millersville University’s Student Code of Conduct
- Adhere to Millersville University’s Academic Honesty Guidelines

Attendance of our synchronous lecture periods is **mandatory**. I encourage everyone to make an active attempt toward participating. Please refrain from using your computer for any other reason than learning during our class period. I will ask you to leave my class if I observe misuse of technology. *Unexcused absences from synchronous lecture periods can result in a 1% grade reduction per occurrence.*

YOUR EXPECTATIONS OF ME

- All graded assignments will have a turnaround time of one calendar week.
- You will have one calendar week to contest any published grades in the gradebook.
- Any email or digital communication will be responded to within 24 *weekday* hours.
- **Five grace days** will be provided on all laboratory assignments. Only three may be used on a single assignment. A grade of zero is earned for any assignment that exceeds your allotment.
- **No grace days** will be provided for exam, homework, paper, or project submissions.
- I will be respectful, approachable, and receptive to feedback.

COURSE RESOURCES

ZOOM

<https://millersville.zoom.us>

We will use Zoom for all of our synchronous meetings throughout the semester. Zoom information can be found on the first page of the syllabus. You will want to download the Zoom client rather than just use the website. You will want to “Log in with SSO” and enter [millersville](#) as the organization when logging into Zoom for the first time. The Information Technology Wiki is a great resource to learn more about how to use Zoom. <https://wiki.millersville.edu/display/instructdocs/Zoom>

EMAIL

william.killian@millersville.edu

For any private communication you wish to have with me, you are always welcome to contact me via email. This can be a question, comment, or concern – or for any other reason.

WEBSITE

cs.millersville.edu/~wkillian

My CS webpage has resources and material for the class posted on it (including this very syllabus). Handouts, material, videos, and other resources will be accessible through my webpage.

BRIGHTSPACE D2L

<https://millersville.desire2learn.com>

D2L is the University’s official LMS (Learning Management System). It will be used for announcements, the gradebook, discussions, and assignment submissions.

AUTOLAB

<https://autolab.millersville.edu>

Autolab is our website for autograded laboratory submissions. If you have never used Autolab before, please let me know so I can go over the basics.

LINUX LAB

<https://www.millersville.edu/computerscience/mucs-secure-connections.php>

Setting up a development environment for OCaml can be a pain, especially since there is no guarantee on what software you will be running on your own personal computer. To this end, the Linux Lab is configured with all of the software you need to complete all programming-related assignments. I also highly encourage the use of Microsoft’s [Visual Studio Code](#) application to remotely connect to the Linux Lab. This will allow you to work “remotely”. There will be a getting started video published to configure your computer (along with Visual Studio Code) posted under our course resources.

RESOURCE UNAVAILABILITY

If for any reason any of the above resources are not functioning as they should, please let me know immediately. I can help troubleshoot Zoom. I manage the Autolab deployment for the department and may be able to resolve issues related to the Linux Lab or my website.

UNIVERSITY POLICIES

STUDENT CODE OF CONDUCT

The Office of Student Conduct and Community Standards exists to educate students about the expectations of the Millersville University community and to assist students in their development. Millersville University wants to ensure that all of our students have an exceptional, productive and challenging educational experience in a civil and safe environment. Millersville University strives to balancing individual and community rights, while promoting a safe, student centered, and inclusive community. <https://www.millersville.edu/studentconduct/files/studentcodeofconduct.pdf>

ACADEMIC DISHONESTY POLICY

- *Things you may do:*
 - Discuss approaches to solving a problem, as long as the discussion remains *above the level of detail* expected for the course.
 - Seek aid in resolving compiler messages.
 - Email me or visit me during office hours.
 - Go to tutoring to ask about theoretical concepts
- *Things you may not do:*
 - Copy a code fragment verbatim
 - Copy a code fragment and rename variables
 - Visit any website with purchasable solutions
 - Post to or visit websites with resources to problems
 - Obtain any solution on open/closed source repositories
 - Obtain a solution from someone who has previously taken the class
 - Coordinating, collaborating, or communicating during any online evaluation

Copying or observable collaborating on individual assignments is not permitted and may result in failure of the course and expulsion from the University. *Writing code is no different than writing a paper — if it was not your original idea, then you should not submit it as your own work.* This applies to all evaluated assessments. <https://www.millersville.edu/honesty-policy>

TITLE IX

Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University's commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report to the University's Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. **Faculty members are obligated to report to the person designated in the University Protection of Minors policy sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred.**

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: <https://www.millersville.edu/titleix>

COURSE SCHEDULE BY WEEK

NOTE: Subject to Change

- Week 01, 01/18 - 01/22: Introduction, Language Design & Evolution, History, [HW 1](#)
- Week 02, 01/25 - 01/29: History, Classes of Languages, *OCaml Intro*, [LAB 1](#)
- Week 03, 02/01 - 02/05: Compiled vs. Interpreted, *OCaml Tail Recursion*, [LAB 2](#), [PAPER TOPIC DUE](#)
- Week 04, 02/08 - 02/12: Describing Syntax, Describing Semantics, [HW 2](#)
- Week 05, 02/15 - 02/19: Axiomatic Semantics, Exam Review, [EXAM 1](#)
- Week 06, 02/22 - 02/26: Exam Debrief, *OCaml Tuples & HOFs*, Basic Types, [LAB 3](#), [PAPER SOURCES DUE](#)
- Week 07, 03/01 - 03/05: Complex Types, Variables and Bindings, *OCaml Variant Types*, [HW 3](#)
- Week 08, 03/08 - 03/12: Bindings and Scope, *OCaml Recursive Types*, Expressions, [LAB 4](#), [PAPER DRAFT DUE](#)
- Week 09, 03/15 - 03/19: Expressions, Statements, Subprograms, [HW 4](#)
- Week 10, 03/22 - 03/26: Subprograms, Exam Review, [EXAM 2](#)
- Week 11, 03/29 - 04/02: Exam Debrief, *OCaml Folding*, [SPRING RECESS](#), [LAB 5](#), [PAPER DUE](#)
- Week 12, 04/05 - 04/09: [PAPER PRESENTATIONS](#)
- Week 13, 04/12 - 04/16: Subprograms, [HW 5](#), [PROJECT LEXER DUE](#)
- Week 14, 04/19 - 04/23: Subprograms, Paradigms, [HW 6](#), [PROJECT PARSER DUE](#)
- Week 15, 04/26 - 04/30: Event-Driven and Exceptional Programming, Exam Review, [PROJECT EVALUATOR DUE](#)
- Week 16, 05/03 - 05/07: [FINAL EXAM](#), [PROJECT FINAL SUBMISSION](#)

NOTES

Section 50 Final Exam: Tuesday May 4th from 12:30PM – 2:30PM

COUNSELING RESOURCES

Students sometimes face mental health or drug/alcohol challenges in their academic careers that interfere with their academic performance and goals. Millersville University is a caring community and resources are available to assist students who are dealing with problems. The Counseling Center (717) 871-7821 is an important resource for both mental health and substance abuse issues. Additional resources include: Health Services (717) 871-5250 , Center for Health Education & Promotion (717) 871-4141 , Campus Ministries, and Learning Services (717) 871-5554 .

MY TEACHING PHILOSOPHY

First and foremost, as an educator, my primary role is to support students' well-being. This includes but is not limited to: physical, mental, and emotional health. I am here to help develop students into outstanding individuals. From the academic side, I will teach key concepts related to the computer science curriculum. From the advisement side, I will support students to achieve personal success.

TEACHING METHODS

I will challenge students to do the absolute best work they are able to do, even if they may not have the confidence in their own abilities. I am a proponent of providing captivating lectures through consistent interaction with students and building up lectures as miniature case studies. This methodology molds well to the computer science curriculum since problem solving is a core component of the foundations of computer science.

PRACTICAL SKILLS

In addition to the required course materials covered, I will also cover other practical industry skills. Knowing the theory of computer science is important, but knowing how to leverage that knowledge in industry, academia, or a business setting is also just as crucial. Through the incorporation of real-life application to my lectures, it is my goal that students feel more empowered and ready for any post-graduate position they may pursue.

SELF DETERMINISM

I believe that everyone is capable of achieving greatness. Some concepts will be harder to grasp than others, but I will do my best to engage your mind. I also believe in self mastery. Self mastery does not mean that you will be an expert at everything you do. Instead, self mastery focuses on understanding yourself, specifically your thought process, learning process, and how you react to external events. You should know your strengths and your weaknesses — embrace your strengths and improve upon your weaknesses. Everyone learns in different ways. Even if you may not enjoy the material covered in my lectures, I will do my best to help expand and explore your self-awareness.

WORK-LIFE BALANCE

I know the majority of students are commuting and work part time jobs. When I was a student (here, at Millersville), I also fit into this category. I understand that you wear many hats in your day-to-day life, but I also expect that you will be able to establish a good school-work-life balance. This can be a bit tricky in the beginnings of your college career, but I believe in you! If you want any examples of what to do (and not to do) I can speak from my own experiences.