

# Syllabus

## Course catalog information

**Semester:** Summer II 2023

**Course name:** PROGRAM ANALYSIS

**Course ID:** C S3537

**Section number:** 101

**Credit hours:** 3

**Modality:** face-to-face

**Meeting days:** MTWH

**Meeting time:** 11:00am - 1:00pm

**Meeting location:** 311 Anne Belk Hall

**Course description:** The focus of the course will be on static program analysis, especially focused on tasks related to program comprehension/understanding. The course will start with an overview of the needed background in programming languages, especially focused on concepts needed to understand language front-ends. After this, the course will include a mixture of paper discussions and short lectures to provide information on topics discussed in the papers. Students will complete a short project, which will either be a replication based on existing work, or a new project in collaboration with the instructor. Projects will most likely be individual or two-person teams, depending on the topics chosen, the number of students, and student interest. Students will be expected to present their work during the course.

**Course prerequisites/co-requisites:** CS 3460

## Instructor information

**Instructor name:** Dr. Mark Hills

**Instructor office:** 312L Anne Belk Hall

**Instructor phone:** 828-262-7159

**Instructor email:** [hillsma@appstate.edu](mailto:hillsma@appstate.edu) (<mailto:hillsma@appstate.edu>)

**Office hours:** Monday: 10:00am - 11:00am Tuesday: 10:00am - 11:00am Wednesday: 1:00pm - 2:00pm Thursday: 1:00pm - 2:00pm

## Course objectives

The focus of the course will be on static program analysis, especially focused on tasks related to program comprehension/understanding. The course will start with an overview of the needed background in programming languages, especially focused on concepts needed to understand language front-ends. After this, the course will include a mixture of paper discussions and short lectures to provide information on topics discussed in the papers. Upon completion of this course each student will be able to:

- Understand the basics of creating a language front-end for parsing source code and generating an abstract syntax tree;
- reading and understanding basic definitions of programming languages for both program execution and analysis;
- compare program analyses across a variety of different dimensions, including soundness and completeness of each analysis;
- work with and extend existing analysis tools and frameworks;
- understand the different analysis formalisms, such as data flow analysis and abstract interpretation;
- discuss the tradeoffs and challenges of using analysis tools for larger software systems.

## Required materials and resources

Any needed material, including material from textbooks, research papers, blogs, and other online resources will be made available directly on AsULearn. There is no required textbook for this course.

## Grades

Students will be evaluated based on paper reflections and discussions, participation in weekly hands-on activities, and a term project.

### Grading Scale

Letter	Percentage Required
A	93
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	65
D	60
F	< 60

This grade is based on the following relative weights of the various activities:

Weighting	
Paper Reflections/Discussions	20%
Hands-On Activities	20%
Term Project	60%

The project itself will be weighted around the following activities/deliverables:

Weighting	
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Project Proposal	10%
Week 1 Update	10%
Week 2 Update	10%
Week 3 Update	10%
Week 4 Update	10%
Mid-Semester In-Class Update	10%
Final Report	20%
Final Presentation	20%

AsULearn rounds your grade and that rounding will be final.

## Assignment details

Paper reflections and hands-on activities will be due throughout the semester. Details about the term project are available on AsULearn.

## General course policies

### Office Hours

I will hold office hours in-person. If I am with another student, please be patient and respectful to the other student by waiting your turn. There may be times throughout the semester when I must cancel or reschedule my office hours due to last minute meetings or appointments. I will make sure to announce these changes. If you cannot attend my scheduled office hours, you may email me for an appointment. You are always welcome to ask questions over email. Please be patient with me because it may take me more than 60 minutes to respond. I may not immediately answer emails sent after 5pm on weekdays or sent at any time on weekends.

### Public Labs

Anne Belk Hall, Rooms 309 and 311, are available to all Computer Science majors outside of scheduled class times and during normal building hours.

### Attendance Policy

It is the policy of Appalachian State University that class attendance is an important part of a student's educational experience. Students are expected to attend every meeting of their classes. However, I do understand that life happens. Attendance will be taken every lecture period by means of each student writing their name on an attendance sheet before leaving class. If you do not write your name on the attendance sheet, then you will be marked absent. It is your responsibility to make sure that you have been counted present for every day of class. You can check this using the Attendance link on the course AsULearn page. If you see a discrepancy, please email me with your name and the date and I will look into it. I will not be recording lecture sessions and materials will not necessarily be posted to the course page. It is up to you to attend lecture and take notes. If you are absent, I suggest asking a friend for their notes or attending my office hours. Attendance is not counted as part of your grade, but you are still expected to attend class, and attendance information will be kept for my records. See the University policies on attendance [here \(https://academicaffairs.appstate.edu/sites/academicaffairs.appstate.edu/files/printable\\_pdf\\_of\\_the\\_attendance\\_policy.pdf\)](https://academicaffairs.appstate.edu/sites/academicaffairs.appstate.edu/files/printable_pdf_of_the_attendance_policy.pdf).

### Attention and Participation

You must be an agent in your learning experience by attending lecture and paying attention. Lecture materials will not necessarily be posted to the course AsULearn page, and we will be doing many different activities (such as labs) in class. You will also need to keep up with the reading and other activities, which are important to learning the material well. Please be sure to attend lecture.

### Email and Communications

I assume that students check their ASU email several times daily. If you check a different email address more frequently than your ASU address, then set your AppalNet account so that your email gets forwarded. I will hold you responsible for all information conveyed to you through email

from me. Any updates will be posted to the AsU Learn Announcements forum. When an announcement is posted on AsU Learn, you should also receive an email. Again, I expect you to check your official campus email with some regularity. However, if I inform you in class that an assignment will be posted, I expect you to check for that assignment online even without an email. Assignments will appear on the calendar on the course AsU Learn page as well as being listed in the week it was assigned. I will announce assignments in lecture as well. Please check the Announcements regularly in the event that you are not receiving emails sent from the course AsU Learn page. Please use proper email etiquette when emailing me (or any professor). Use your official AppState email and include your course number or the name of the course (just "Program Analysis" is fine) in the subject line. As I am getting to know everyone in the beginning of the semester, I ask that you are sure to introduce yourself in every email. Please be respectful in your emails. I will not respond to emails that I feel are rude or lack proper etiquette. If you are unsure of how to write an email to a professor please use the template below.

*Hello Professor Hills,*

*My name is {first name last name} and I am in your Program Analysis course. {insert question or comment here}*

*Thank you,*

*{first name last name}*

### **Accommodations for Students with Disabilities (quoted from Vice Provost)**

Appalachian State University is committed to providing an inclusive experience, accessible learning environments and equal opportunity to individuals with disabilities in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Individuals needing reasonable accommodations should contact the Office of Disability Resources (828.262.3056 or [odr.appstate.edu \(https://odr.appstate.edu/\)](https://odr.appstate.edu)).

### **Religious Observance Policy**

Students must be allowed a minimum of two excused absences each academic year for religious observances. Students are responsible for requesting excused absences for religious observances required by the faith of a student. Except in extraordinary circumstances, student requests for excused absences for religious observances must be submitted to instructors in writing no later than three weeks after the first class day of the term. For the purposes of this policy, ASU defines the term religious observance to include religious holidays, holy days, or similar observances associated with a student's faith that require absence from class.

### **Student Engagement**

In its mission statement, Appalachian State University aims at providing undergraduate students a rigorous liberal education that emphasizes transferable skills and preparation for professional careers as well as maintaining a faculty whose members serve as excellent teachers and scholarly mentors for their students. Such rigor means that the foremost activity of Appalachian students is an intense engagement with their courses. In practical terms, students should expect to spend two to three hours of studying for every hour of class time. Hence, a fifteen-hour academic load might reasonably require between 30 and 45 hours per week of out-of-class work.

### **Academic Integrity Code (quoted from Vice Provost)**

#### Introduction

Appalachian State University's Academic Integrity Code is designed to create an atmosphere of trust, respect, fairness, honesty, and responsibility. The Academic Integrity Code outlines "user-friendly" procedures and mechanisms for resolving alleged violations of academic integrity. The Academic Integrity Code is the result of cooperation among Appalachian's faculty, students and administrators, and promotes a campus dialogue about academic integrity. All members of the Appalachian State University community are responsible for promoting an ethical learning environment.

#### The Academic Integrity Code

Students attending Appalachian State University agree to abide by the following Code:

- Students will not lie, cheat, or steal to gain academic advantage.
- Students will oppose every instance of academic dishonesty.

Students shall agree to abide by the Academic Integrity Code when submitting the admission application.

### **Extreme Circumstances**

Extreme circumstances include extended illness documented by a doctor's statement, death of a close relative, or other such problem. It does not include field trips, sporting events, other class work, oversleeping, bad hair days, problems with pets, working overtime, etc.

### **Class Cancellations**

The university will send out an email should classes be cancelled for adverse weather. If I need to cancel class for any reason, I will notify you via email.

**Special Days**

Please reference the registrar's official 2022-2023 academic calendar for special days for the semester. Be aware of Add/Drop days and final exam periods. You can find the academic calendar [here \(https://registrar.appstate.edu/sites/registrar.appstate.edu/files/2022-2023\\_academic\\_calendar.pdf\)](https://registrar.appstate.edu/sites/registrar.appstate.edu/files/2022-2023_academic_calendar.pdf) or a pdf link can be found on the course AsULearn page. You can find the final exam schedule [here \(https://registrar.appstate.edu/sites/default/files/asu\\_fall\\_2022\\_exam\\_schedule\\_final.pdf\)](https://registrar.appstate.edu/sites/default/files/asu_fall_2022_exam_schedule_final.pdf) or a link can also be found on the course AsULearn page.

**Covid**

Appalachian State University has returned to pre-pandemic operations. Please see here for more information: <https://www.appstate.edu/go/coronavirus/> (<https://www.appstate.edu/go/coronavirus/>). Masks are not required in classrooms, but you are welcome to wear a mask at your discretion.

[Syllabi Policy and Statement Information \(https://academicaffairs.appstate.edu/resources-forms/syllabi-policy-and-statement-information\)](https://academicaffairs.appstate.edu/resources-forms/syllabi-policy-and-statement-information)

[Additional Syllabi Policy and Statement Information \(https://academicaffairs.appstate.edu/resources-forms/optional-syllabi-policy-and-statement-information\)](https://academicaffairs.appstate.edu/resources-forms/optional-syllabi-policy-and-statement-information)