Here’s some advice

Advising help for Fall 2025 courses

Menu

Menu of Links

- Are you a newish App State student?
  - Things to consider
- Degreeworks: what gen ed courses do you need to take?
  - General Education Requirements
- Degreeworks: what CS courses do you need to take?
  - CS Requirements
- Degreeworks: what are fall-through courses?
  - Fall through courses
- Degreeworks: how do you view requirements of certificates and minors?
  - Minors and Certifications

Menu

Menu of Links

- Degreeworks: thinking about changing majors?
  - What-if Analysis
- Degreeworks: what grades do I need to get to improve my GPA?
  - GPA Calculator
- Where's the CS 3100 course?
  - You'll take ENG 3695 instead
- Are you thinking about dropping or repeating a course?
  - Drops versus Repeats
- Can I do a study abroad?
  - Study Abroad

Menu

Menu of Links

- Are you looking for an additional credential? You can earn a Data Science certificate with one extra course
  - Academic Option: Data Science Certificate
- Are you an excellent student? Do you want to make yourself even more marketable? Are you interested in an academic career?
  - Academic Option: Accelerated Bachelors to Masters
- Are you looking for an academic challenge in your undergraduate degree?
  - Academic Option: Department Honors Program

Menu

Menu of Links

- Are you interested in a minor? You can earn a Math minor with one extra course and a cybersecurity minor with three extra courses.
  - Academic Options: Minors
- How to I add or change a minor/certificate/major?
  - Adding/changing major/minor/certificate
- Are you interested in an internship? You should be. In addition to money, experience, and a chance at full-time employment, you can earn CS elective credit for an internship.
  - Internships
- How many classes do I need to take in a semester to graduate in four years?
  - How many classes should I take?

Menu

Menu of Links

- When can I register?
  - Registration
- How can I tell if I have the prerequisites for a course?
  - Prerequisites
- When/how do I apply for graduation?
  - Applying for Graduation
- What CS courses will be offered in Fall 2025?
  - Fall 2025 Computer Science courses
- Can I take graduate courses?
  - Fall 2025 Graduate courses

Menu

Menu of Links

- What honors courses will be offered in Fall 2025?
  - Fall 2025 Graduate courses
- What Data Science courses will be offered in Fall 2025?
  - Fall 2025 Data Science courses
- What CS courses will be offered in Summer 2025?
  - Summer 2025 Computer Science courses
- Ready for your PIN?
  - Completion Form

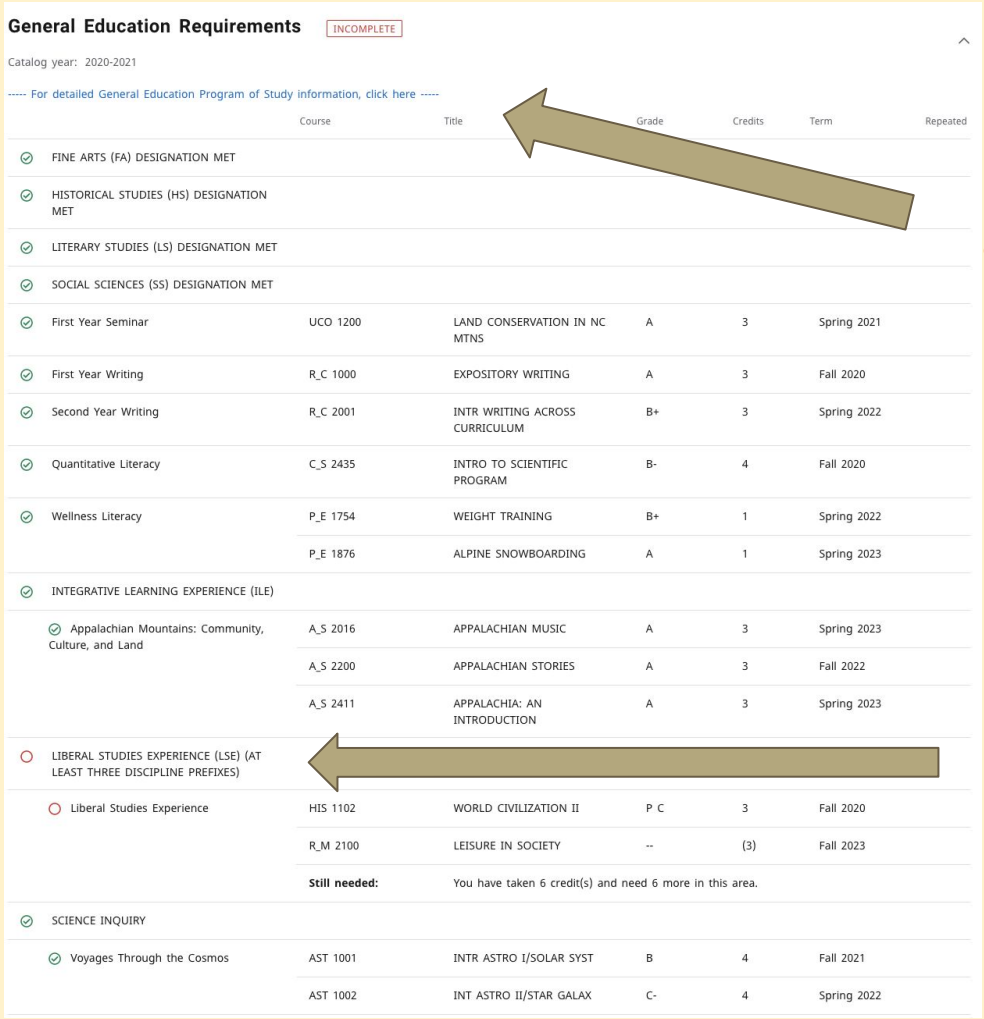
Note the bottom right corner of each slide contains a link that takes you back to this menu.

Menu

Things to consider (advice for new students)

- Have you take CS 1440: Computer Science I?
  - If you have no programming experience, you may want to consider enrolling in section 104 which is specifically for students who haven't programmed before.
  - Email: Courtney Dixon, dixoncs@appstate.edu, for permission to register for that section
- Options for transfer students
  - First semester (if calculus ready): CS 1440: Computer Science 1, CS 1100: Discrete Mathematics, MAT 1110: Calculus I
    - CS 2435: Introduction to Scientific Program - not a CS requirement but is the department's only Python course
  - Second semester: CS 2440: Computer Science II, MAT 1120: Calculus II, CS 3430: Database
    - CS 2450: Intro to Computer Systems - prerequisite is CS 2440 and CS 1100, but transfer students can petition to take it with CS 1440 and CS 1100
    - CS 3435: Data Collection and Visualization - not a CS requirement but can help you earn Data Science Certificate (CS 2435 is the prerequisite)

Menu



General Education Requirements

INCOMPLETE

Catalog year: 2020-2021

----- For detailed General Education Program of Study information, click here -----

	Course	Title	Grade	Credits	Term	Repeated
FINE ARTS (FA) DESIGNATION MET						
HISTORICAL STUDIES (HS) DESIGNATION MET						
LITERARY STUDIES (LS) DESIGNATION MET						
SOCIAL SCIENCES (SS) DESIGNATION MET						
First Year Seminar	UCO 1200	LAND CONSERVATION IN NC MTNS	A	3	Spring 2021	
First Year Writing	R_C 1000	EXPOSITORY WRITING	A	3	Fall 2020	
Second Year Writing	R_C 2001	INTR WRITING ACROSS CURRICULUM	B+	3	Spring 2022	
Quantitative Literacy	C_S 2435	INTRO TO SCIENTIFIC PROGRAM	B-	4	Fall 2020	
Wellness Literacy	P_E 1754	WEIGHT TRAINING	B+	1	Spring 2022	
	P_E 1876	ALPINE SNOWBOARDING	A	1	Spring 2023	
INTEGRATIVE LEARNING EXPERIENCE (ILE)						
Appalachian Mountains: Community, Culture, and Land	A_S 2016	APPALACHIAN MUSIC	A	3	Spring 2023	
	A_S 2200	APPALACHIAN STORIES	A	3	Fall 2022	
	A_S 2411	APPALACHIA: AN INTRODUCTION	A	3	Spring 2023	
LIBERAL STUDIES EXPERIENCE (LSE) (AT LEAST THREE DISCIPLINE PREFIXES)						
Liberal Studies Experience	HIS 1102	WORLD CIVILIZATION II	P C	3	Fall 2020	
	R_M 2100	LEISURE IN SOCIETY	--	(3)	Fall 2023	
	Still needed:	You have taken 6 credit(s) and need 6 more in this area.				
SCIENCE INQUIRY						
Voyages Through the Cosmos	AST 1001	INTR ASTRO I/SOLAR SYST	B	4	Fall 2021	
	AST 1002	INT ASTRO II/STAR GALAX	C-	4	Spring 2022	

Notice the link to get information about the gen ed requirements

Themes are chosen Appalnet. When you choose a science inquiry, make sure it also meets CS requirements

Choose gen courses that meet both the “experience” and a “designation”

Appears wherever you have a requirement left to meet
(A discipline prefix is HIS or CS.)

Menu

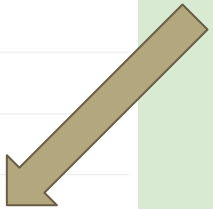
Major in Computer Science

INCOMPLETE

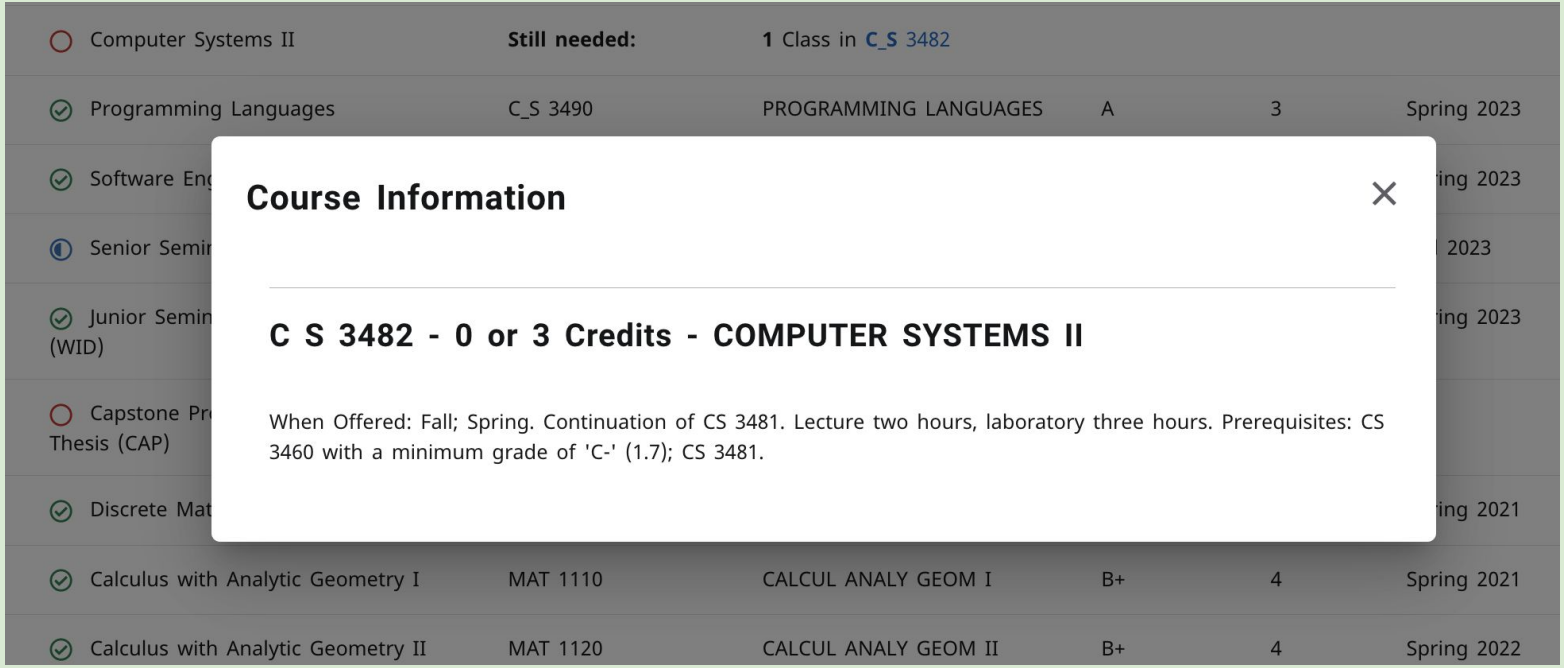
Catalog year: 2020-2021

	Course	Title	Grade	Credits	Term	Repeated
Writing in the Discipline Course (WID)	ENG 3695	TECHNICAL WRITING FOR COMP SCI	A	3	Spring 2023	
Capstone Course (CAP)	**Still needed:**	Capstone Course still needed.				
MAJOR REQUIREMENTS						
Computer Science I	C_S 1440	COMPUTER SCIENCE I	A-	4	Spring 2021	
Computer Science II	C_S 2440	COMPUTER SCIENCE II	A-	4	Fall 2021	
Introduction to Computer Systems	C_S 2450	INTRO TO COMPUTER SYSTEMS	B-	3	Fall 2022	
Introduction to Theoretical Computer Science	C_S 2490	INTRO THEORETICAL CMP SC	B	3	Fall 2022	
Database	C_S 3430	DATABASE	A	3	Fall 2022	
Data Structures	C_S 3460	DATA STRUCTURES	B-	3	Spring 2022	
Computer Systems I	C_S 3481	COMPUTER SYSTEMS I	--	(3)	Fall 2023	

indicates a course
In progress



Menu



If you click on a course that you need to take, you will be shown the course description, including the prerequisites. Note the minimum grade requirements.

Menu

CS Electives

- CS major requires 12 hours of **CS electives**
- 3 hours of those can be from an internship
- Two math courses count for a CS elective (MAT 4310: Numerical Methods; MAT 4990: Numerical Linear Algebra)
- Each semester we offer special topics courses that count as CS electives

○ Computer Science Electives	C_S 4900	INTERNSHIP	S	3	Spring 2024
	Still needed:	**9** Credits in **C_S** 3240 or 3440 or 3463 or 3500 or 3515 or 3530:3549 or 3750 or 3760 or 3770 or 4435 or 4440 or 4450 or 4465 or 4521 or 4550 or 4570 or 4620 or 4680 or 4740 or 4755 or **MAT** 4310 or 4990			

Menu

Elective courses

- CS major also requires **7-9 hours of electives** be completed to get to 120 hours (these can be anything you want)
- Elective courses show up on degree works in the major block

Electives	BIO 1202	BIOLOGY IN SOCIETY II	APCR	3	Fall 2021
	Satisfied by:	BIO20 - BIOLOGY - Advanced Placement Credit			
	BIO 1203	BIOLOGY IN SOCIETY LABORATORY	APCR	2	Fall 2021
	Satisfied by:	BIO20 - BIOLOGY - Advanced Placement Credit			
	MAT 1025	PRECALCULUS	B	4	Fall 2021

Fall through courses

- CS major: 44 hours of gen ed plus 67 to 69 hours for CS (depending upon science sequence) plus 7 to 9 hours of electives equals 120 hours
- Fall through courses are other courses taken by the student that are not needed for the CS major or any declared minors

Fall Through - Courses Not Included

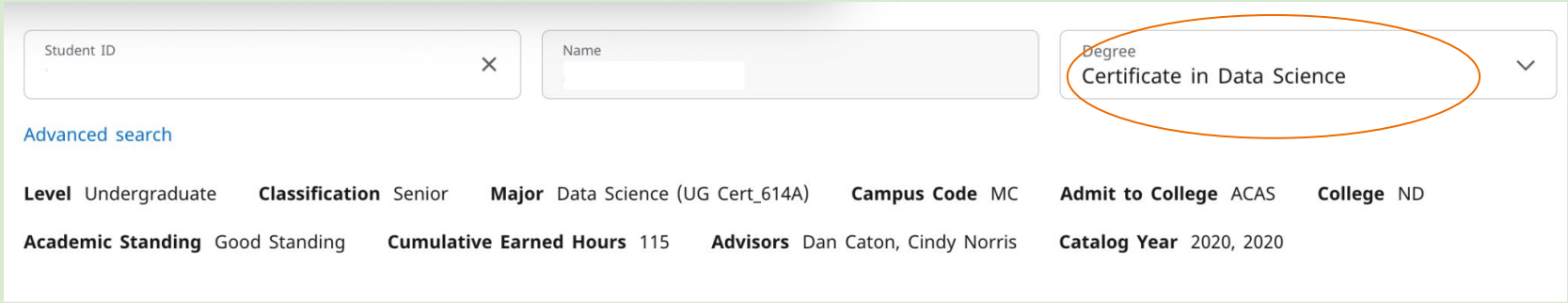
Credits applied: 6 Classes applied: 2

Course	Title	Grade	Credits	Term	Repeated
BIO 1201	BIOLOGY IN SOCIETY I	APCR	3	Fall 2021	
	Satisfied by: BIO20 - BIOLOGY - Advanced Placement Credit				
IDS 3250	INTERNET STUDIES	A	3	Fall 2022	

Menu

Minors and Certificates

- Degreeworks shows any minor requirements in a block below the display of major requirements
  - Computer science doesn't require completion of a minor, but some degrees do
- If you are completing a certificate or another major, you can see those requirements after selecting it in the degree block



Menu

Drops versus Repeats

- Withdrawal Credits (formerly, Career Drops)
  - Drop after the early drop-add period during the beginning of the semester before the end of the ninth week of the semester is called a “withdrawal”
  - Students are limited to a total of 16 withdrawal credits during their undergraduate careers at Appalachian State University.
- Repeat
  - A retake of a course causes the first grade in the course to be forgiven
  - Students are allowed four repeats for four *different* courses
  - The second grade replaces the first even if it’s worse!
  - The Registrar automatically does this for a retake
    - You can waive it with a form completed by end of 1st week of retake
    - Why waive? A 1-credit course doesn’t have much GPA “bang”

Menu

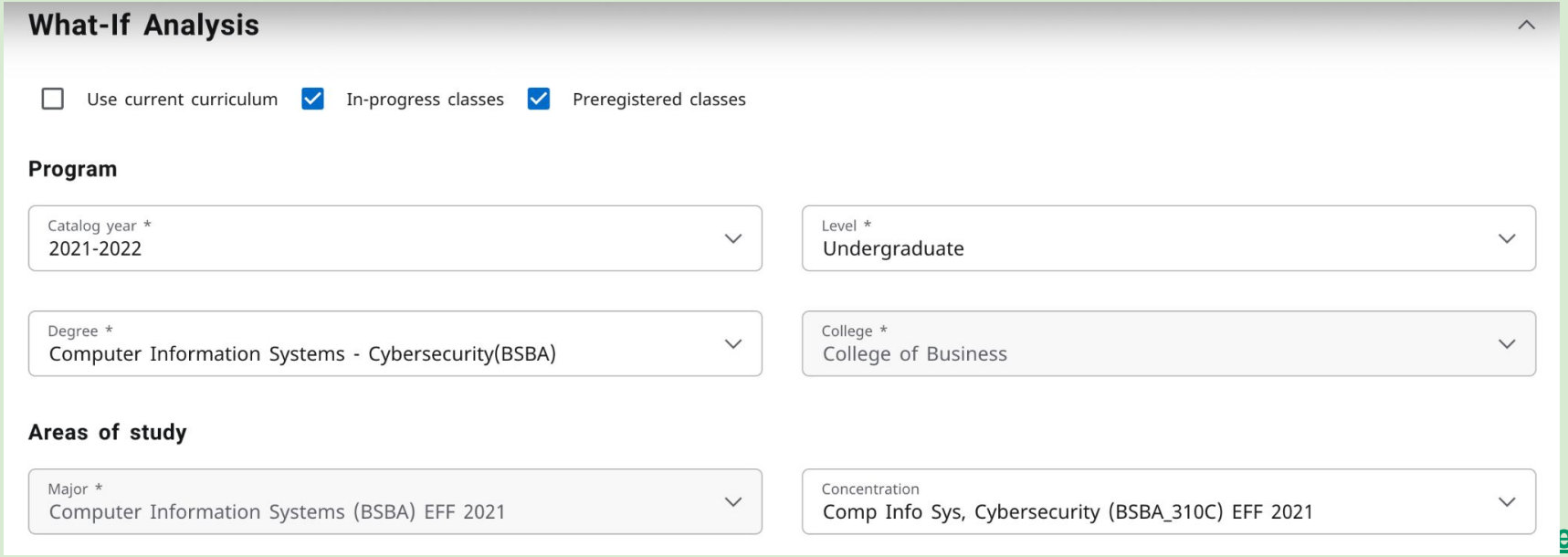
Should a I drop or repeat?

- If you are changing majors
  - Drop the course if you have withdrawal credits available
- If you are out of withdrawal credits
  - You can still drop if there are extenuating, documented circumstances
    - https://registrar.appstate.edu/students/withdrawal-policy/late-or-retroactive-withdrawals
- If you are staying in the major
  - Repeating the course is reasonable
  - The grade you earn in the course the second time will replace your first grade (up to four times for four *different* courses)
    - You don't want to earn a lower grade in the second attempt!

Menu

What-If Analysis

- Degree works what-if analysis allows you to see how close you are to finishing a different major



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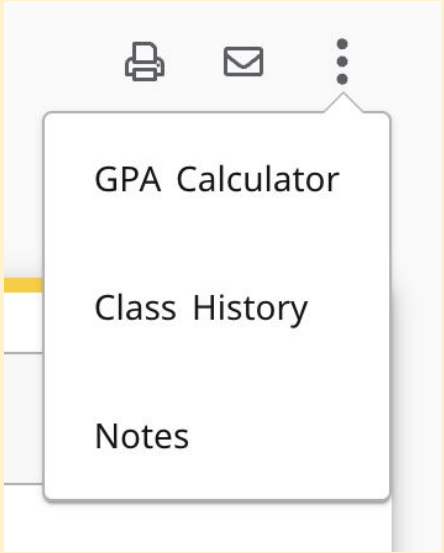
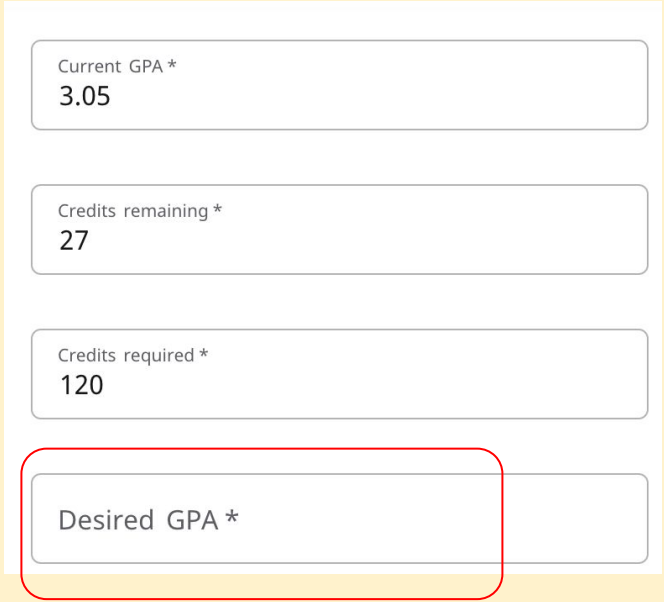
GPA Calculator

- Can be used to calculate the average grade you need to earn in order to reach a target GPA





Menu

Study Abroad

- Yes, Computer Science students can do a semester abroad
- The Office of International Programs will help you figure out how to have an enriching experience abroad while also meeting degree requirements

https://international.appstate.edu/education-abroad/starting-process

Menu

Academic Option: Accelerated Bachelors to Masters

- If you have a GPA of 3.2 or above (or you're going to do the work to get it there), think about entering the Accelerated Bachelors to Masters Program
- During your senior year, you can take grad courses that count toward both your undergraduate degree and a future graduate degree
  - Up to 12 hours can double count

Students who graduate with an MS typically have better job opportunities than those with only a BS

For more information contact CS graduate program director:
Dr. Mitch Parry, parryrm@appstate.edu

Menu

Academic Option: Data Science Certificate

- Data scientists extract meaningful insights from data using
  - statistics
  - algorithms
  - programming skills
- Data scientists use data to answer questions like:
  - Will this person renew their subscription?
  - What kind of car is this person likely to buy?
  - Is this a picture of a cat or a dog?

Menu

Data Science Certificate Requirements

- Although the certificate is open to all majors, it is easier for CS majors to earn because of the significant overlap in requirements
- Requirements:
  - **CS 2435:** Introduction to Scientific Programming (Programming in Python)
    - CS 2440: Computer Science II can be a substitute
  - **Math 2240**: Linear Algebra
    - Required for CS major
  - **Stat 3850**: Statistics
    - Required for CS major
  - **CS 3435**: Data Acquisition and Visualization
    - *The one "extra" course, but it also contributes to the 120 hours needed to graduate*
  - **One of these courses:**
    - **CS 4755:** Applied Machine Learning
    - **CS 3750:** Applied Neural Networks
    - **CS 4440:** Artificial Intelligence
      - Each of these also counts as a CS elective (12 hours of CS electives required for CS major)

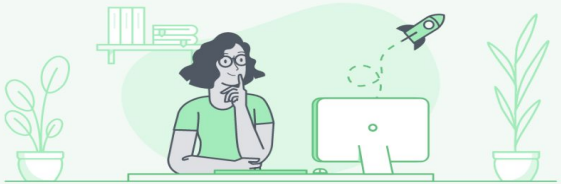
Menu

Why Data Science Certificate?

50 Best Jobs in America for 2022

Best Places to Work | Top CEOs | **Best Jobs** | Best Cities for Jobs | Highest Paying Jobs | Share

2022 | United States



Discover Glassdoor's Best Jobs in 2022

Using Glassdoor's unique data on jobs, salaries, and companies, we compiled a list of the 50 Best Jobs in America to help people find jobs they'll love. Each job stands out for its earning potential (median salary), job satisfaction, and job openings. Are you considering a new position? Check out this comprehensive list to see what jobs made the list this year, and view open jobs at companies across the country.

	Job Title	Median Base Salary	Job Satisfaction	Job Openings	
#1	Enterprise Architect	$144,997	4.1/5	14,021	View Jobs
#2	Full Stack Engineer	$101,794	4.3/5	11,252	View Jobs
#3	Data Scientist	$120,000	4.1/5	10,071	View Jobs

Menu

Academic Option: Department Honors Program

- To graduate with Honors in Computer Science, a student must:
  - Earn a minimum of 9 hours of honors credit:
    - 6 hours of honors courses in Computer Science
    - 3 hours of honors thesis/project (instead of Capstone)
  - Possess a minimum GPA of 3.45 in the Computer Science major upon graduation
- Graduate courses count as Honors courses
  - Take Graduate courses to graduate with honors and simultaneously work toward earning the Master's degree

Menu

Why Honors?

- Richer, more in-depth educational experience
- Interested in becoming a faculty member in higher education?
  - PhD required by most institutions
  - PhD generally requires writing a thesis
  - Honors provides the opportunity to write a thesis
- Interested in becoming a Researcher in academia or industry
  - Honors provides the opportunity to perform research under the guidance of a faculty member

For more information contact CS department honors program director:
Dr. Mark Hills, hillsma@appstate.edu

Menu

Academic Options: Minors

Math minor

- MAT 1120: Calculus II plus 9 more hours
  - MAT 2240: Linear Algebra
  - MAT 4310: Numerical Methods (counts as CS elective)
  - MAT 2310: Computation Mathematics (prerequisite to MAT 4310)

You can get the Math minor with one extra course: MAT 2310

Cybersecurity minor

- 15 hours of coursework (five courses)
- https://cis.appstate.edu/cybersecurity/cybersecurity-minor
- Two CS courses count toward that minor:
  - CS 3760: System Administration and Security
  - CS 4450: Data Communications and Networking

These courses aren't offered every semester so don't delay taking them if you have a chance

Menu

Minors

- CS is a good combination with many fields
  - CS + Biology = computational biology/bioinformatics
  - CS + Chemistry = computational chemistry
  - CS + Psychology = user experience design
  - CS can also be a good blend with fields in the arts and humanities
    - Interested in History?
      - A degree in CS can help you better collect and organize historical data
- Don’t be afraid to combine your CS degree with another passion

Menu

Adding/changing major/minor/certificate

- https://cas.appstate.edu/advising/student-forms has a link to a form that will allow you to
  - change your major to another major in the College of Arts and Sciences
  - add a minor or certificate
  - drop your major, minor, or certificate
  - change your catalog year (In fall 2025, the science required for gen ed will also meet the science requirement for CS. You may want to change your catalog year if you haven't finished your science requirements.)
- If you want to add a major in another college, you need to see advising in that college
  - For example, if you want to change your major to cyber security or computer information systems see: https://businessadvising.appstate.edu/

Menu

Internships

- Internships provide real-life experiences at partner colleges or industries
  - Often an internship will lead to a job offer upon completion of a degree
- Spring 2023 graduates
  - 66% of graduates sought an internship
  - 62% of those seeking an internship were able to obtain one
- CS 4900 Internship course is an approved Computer Science elective!
  - 18 interns in CS 4900 last summer, 10 last academic year
- Lots of variety
  - Big company, small company
  - On-site experience, remote experience
  - Local company, regional company, “West Coast” company (San Francisco, Seattle)

All of you should be looking for an internship at some point in your academic career. Typical time to look is in the fall/spring of your junior year (internship in summer after junior year)

Menu

How to find an internship

- https://cs.appstate.edu/internships/
  - Sign up to get emails about flyers
  - Look at recent internship organizations
- Club meetings
- Handshake: https://careers.appstate.edu/handshake
- App State Career Center job and internship fairs
- Linked In
- Indeed
- Don’t miss local opportunities; websites for churches, non-profits, etc.

Menu

Scholarships

- There are several scholarship programs:
  - Department scholarship page: compsci.appstate.edu/scholarships
    - ECRS - funded by the local ECRS company
    - S-STEM - funded by the National Science Foundation (NSF)
      - https://cs.appstate.edu/sstem/
  - App State scholarships portal: asap.appstate.edu
    - Portal allows you to apply for multiple scholarships with one application
    - Open to applications in early December

Pay attention to emails from Dr. Fenwick about scholarships!
As the saying goes, we don't want to leave money on the table.

Menu

How many classes should I take?

- You will need a minimum of 120 hours to graduate with a Computer Science degree
  - 15 hours a semester for eight semester
- Financial aid requires you are full-time to receive full aid
  - 12 hours in a fall/summer semester is considered full-time
  - 6-7 hours in a summer session is considered full-time
- What if you want to take more than 15 hours?
  - 18 hours in fall/spring (7 hours in a summer session) are allowed
  - Beyond that, special permission is required from the Dean's office

Menu

Registration

- Register via: appalnet.appstate.edu
- You'll need your six-digit Alternate PIN to register
  - Obtain from your advisor or via group advising session
- The early registration period is **April 1 - April 14**. Registration will open for you based upon your number of earned hours
  - More hours = earlier time
- To see when you can register:
  - appalnet.appstate.edu
  - Self-service
  - Student
  - Registration
  - View your Registration Time

Menu

Prerequisites

- If the course is a clickable link in degree works, then clicking on it will show the prerequisites, for example:

- Some prerequisites can be viewed here: https://compsci.appstate.edu/academics/undergraduate-program/prerequisites
- Also prerequisites can be seen in the current bulletin: https://bulletin.appstate.edu/index.php?catoid=34
    - Note the current bulletin prerequisites apply, regardless of your catalog year

Menu

Applying for graduation

- Graduation is not the same as commencement
  - You don't need to participate in commencement to graduate
  - You do need to apply for graduation in order to graduate
  - You do need to be enrolled in at least one class in the semester you graduate
- You should apply for graduation the semester *before* the semester in which you plan to graduate
- Apply to graduate via appalnet. Detailed instructions can be found here: https://registrar.appstate.edu/graduation/graduation-application-instructions

Menu

Fall 2025 Computer Science courses

- Every required course is offered every fall and spring semester
- Elective courses loosely follow the schedule indicated in the bulletin
- To see what is actually offered, you need to check the registrar's site:
  - https://bannerxe.appstate.edu/StudentRegistrationSsb/ssb/classSearch/classSearch
- The next set of slides describes each of the CS elective courses offered in the Fall 2025 semester
  - Some elective courses also count for the CS 4755: Applied Machine Learning requirement for the Data Science certificate.

Menu

CS 2531: Computational Reasoning

From the most elementary hardware to the most sophisticated software, all of computer science is based in discrete mathematics. This course covers a range of topics in discrete mathematics that are particularly important in computer science, emphasizing relationships between certain mathematical structures on the one hand, and their applications in computer science on the other. But since it treats mathematical knowledge as primary rather than as something to be picked up ``on the fly", this course provides an opportunity to focus on building a solid mathematical foundation for computer science. This is important --- after all, no computer scientist has ever said that they wished they had less mathematical background or understood mathematics less well! Specific topics to be covered include propositional logic, predicate logic, proof techniques, basic set theory, functions, relations, counting principles, inductively defined sets, inductive proof, and recursive definitions.
Prerequisite: permission of instructor; email johannp@appstate.edu

Professor: Patricia Johann

Menu

CS 3341: Incident Response with Threat Intelligence

The course addresses the emerging cyber threat landscapes and trends of future cyberattacks. In order to provide security of digital assets and infrastructures, it is important to understand how cyber attacks can happen and investigate them thoroughly. With the increase in cyber threats, Incident Response has been a common practice among organizations and/or security teams to secure their perimeters and become more resilient and proactive during a cyberattack. The course will highlight the basic concepts of Incident Response (IR), profiling threat actors based on their footprints, introducing Cyber Kill ChainTM to better understand attack TTPs (technique, tactics, procedures), familiarize students with current practices of threat intelligence, threat hunting, and SOAR (Security Orchestration, Automation, and Response) capabilities for enhancing digital assets' and infrastructures' security. Students will also learn to use analytics and detection engineering tools and techniques in Cyber Threat Incident Response. Lastly, there will be a brief introduction of cyber deception strategies to detect advanced persistent threats (APTs) and deceive them. There will be hands-on lab exercises for students to get experiential learning experience from this course. **Prerequisite**: CS 2440 or equivalent with a minimum grade of "C" (2.0).

Professor: Nazia Sharmin

Menu

CS 3440: Client-Side Web Programming

When Offered: Fall. This course studies client-side graphical user interface programming using current internet technologies including browser scripting languages, GUI presentation, asynchronous server communication, event handling, and XML processing. A major individual project is required. Prerequisite: CS 2440 with a minimum grade of "C" (2.0).

Professor: Joel Swanson

Menu

CS 3532: Competitive Programming

Competitive programming is all about solving mathematical and computational problems. In this course, we look at various problem solving paradigms to tackle a wide variety of fun and interesting problems. The skills developed in this course reinforce skills such as problem solving, rapid prototyping, and programming proficiency. We meet for three hours, one hour for a lecture on a topic related to competitive programming, then one hour to work on a handful of problems alone or in small groups, and then an hour to go over solutions to proposed problems. This covers topics such as advanced data structures, graph algorithms, string matching, and programming paradigms such as complete search, divide and conquer, and dynamic programming. **Prerequisite:** CS 3460: Data Structures with C- or higher.

Professor: Chad Waters

Menu

CS 3542: Introduction to Parallel Programming

Single CPU performance is no longer improving at the same rate as it was years ago. One reason for this is the continued gap between memory and CPU performance. The performance of a single-threaded application is limited by how fast the memory can supply the CPU with instructions and data. Another limitation is the increased power consumption caused by the increase in the CPU clock rate. For these reasons, developers are seeking to rewrite their applications to employ multiple processing units. This class provides an introduction to significant parallel program paradigms, including C++ multithreading, OpenMP, CUDA, and MPI. **Prerequisite:** CS 3481: Computer Systems I.

Professor: Cindy Norris

Menu

CS 4755: Applied Machine Learning

When Offered: Fall. Machine Learning is the process of teaching a computer what to do by providing a model for learning and many examples but without explicit instructions. This course introduces algorithms and processes for machine learning, including topics such as feature selection, parameter tuning, model selection, and performance estimation, as well as algorithms for classification, regression, and clustering. **Prerequisites**: CS 3460 with a minimum grade of "C-" (1.7) or CS 3435; MAT 2240.

Professor: Yeganeh Madadi

Menu

Spring 2025 Graduate Courses

- Senior (90 hours) with a minimum 3.0 GPA can take grad courses
- Graduate courses **count as CS electives** for the undergraduate CS degree
- Graduate courses count as honors credits:
  - Academic Options: Department Honors Program
- If you are in the Accelerated Master's Program then graduate course count toward both the undergraduate degree and the graduate degree:
  - Academic Options: Accelerated Bachelors to Masters
- To register for a graduate course, you need to complete the Request for Special Permission Form:
  - https://graduate.appstate.edu/forms

Menu

CS 5110: Design and Analysis of Algorithms

Algorithmic paradigms, worst-case and average-case analysis, recurrence relations, lower bounds, classes of P and NP, and NP-complete problems. Applications including sorting, searching, dynamic structures, set algorithms, graph algorithms, randomized algorithms, and pattern matching. Prerequisite: CS 3460.

Professor: Mohammad Javidian

Menu

CS 5245: Data Programming

This course brings together students from different disciplines who are working (or want to work) in data science. For students without programming experience, a significant part of the course will be devoted to learning computer programming in a high-level programming language such as Python or Matlab. Students who already know how to program will also gain experience using machine learning and visualization packages for those languages. Other topics will be covered based on student interest such as web scraping, web APIs, recommendation engines, image processing, natural language processing, and graphical user interfaces. Novice programmers will be paired with experienced programmers to complete a class project.

Professor: Mitch Parry

Menu

CS 5483: Computer Architecture

An in-depth study of current concepts in computer architecture, including such topics as concurrent execution, parallel architectures, RISC architectures, pipelined and array processors, data-flow machines, and special purpose processors. **Prerequisite**: CS 3482.

Professor: Abdelbaset Hamza

Menu

CS 5666: Software Engineering

Methodical development of large software systems. Topics include: models, project life cycle, requirements and specification, structure charts and design criteria, incremental implementation, software metrics. Use of module and source code management, symbolic debugging, and project planning software. Students will participate in the realization of both group and individual software systems. **Prerequisite**: CS 3481.

Professor: Jay Fenwick

Menu

CS 5750: Topics in Theoretical Computer Science - Programming Language Theory

This course will focus on advanced topics in programming language theory, with particular focus on type theory. The course will cover syntax and semantics of various languages based on the lambda calculus, and include rigorous mathematical proofs of their most important metatheoretic properties. Theoretical pen-and-paper homeworks will be combined with an implementation component. This will include parsers and interpreters for the various languages covered in the lectures. Prerequisite: CS 3460 (Data Structures) or by permission of graduate program director.

Professor: Andrew Polonsky

Menu

Fall 2025 Data Science courses

- Data Science courses can help you earn the Data Science certificate
  - Academic Option: Data Science certificate
- In addition to other courses required by the CS major, you will need to take:
  - **CS 3435: Data Collection and Visualization**
    - **This course does not count as a CS elective**
  - **One of these courses:**
    - **CS 4755: Applied Machine Learning**
    - **CS 3750 Applied Neural Networks**
    - **CS 4440 Artificial Intelligence**
      - Each of these courses count as a CS elective as well as meeting a Data Science certificate requirement

Menu

CS 2435: Introduction to Scientific Programming

When Offered: Fall; Spring. GEN ED: Quantitative Literacy This course provides an introduction to problem solving and computer programming using tools such as MATLAB or Python. The course material is motivated by interdisciplinary applications focusing on computational approaches to solving problems using data. Fundamental topics in computer programming will be covered in the course. Lecture three hours, laboratory two hours. Corequisite: MAT 1020 or MAT 1025 or equivalent with a minimum grade of "C-" (1.7) or MAT 1110, or satisfactory Calculus Readiness Test score.

Professors: Michelle Melton, Courtney Dixon, Yeganeh Madadi

This course counts for the Data Science certificate but CS students can substitute CS 2440 for this requirement. CS 2440 is required for the CS major. This course is not required for the CS major.

Menu

CS 3435: Data Collection and Visualization

This class provides students an opportunity to develop skills to access and organize data, scrape data from websites, determine and improve data quality, and produce interactive graphical representations to help discover patterns and answer questions. A class project will provide students the opportunity to apply their learning to a disciplinary problem.
Prerequisites: CS 2440 or CS 2435.

Professor: Mitch Parry

This course counts for the Data Science certificate but does not count as a CS elective.

Menu

CS 4755: Applied Machine Learning

When Offered: Fall. Machine Learning is the process of teaching a computer what to do by providing a model for learning and many examples but without explicit instructions. This course introduces algorithms and processes for machine learning, including topics such as feature selection, parameter tuning, model selection, and performance estimation, as well as algorithms for classification, regression, and clustering.
Prerequisites: CS 3460 with a minimum grade of "C-" (1.7) or CS 3435; MAT 2240.

Professor: Yeganeh Madadi

This course counts for the Data Science certificate and **also counts** as a CS elective.

Menu

Summer 2025 Computer Science courses

- Registration for summer 2025 courses is in the spring
- Summer courses can span
  - Summer session 1 (five weeks of May - June)
  - Summer session 2 (five weeks of July - August)
  - Both sessions (ten week courses spanning both sessions)

Menu

Session 1: CS 1100: Discrete Mathematics

A study of discrete mathematics as it applies to computer science. Concepts covered include number systems, sets, logic, Boolean algebra, digital circuits, combinatorics, relations, functions, vectors, matrices, graphs, and induction proofs. **Prerequisite:** MAT 1025 or equivalent with a grade of "C-" (1.7) or higher or satisfactory. Calculus Readiness Test score.

Professor: Danielle Lapensee-Rankine

Note: This course will be offered **synchronous online**

Menu

Session 1: CS 2490: Introduction to Theoretical Computer Science

This course provides a rigorous but intuitive introduction to computer theory. Topics covered include formal languages, regular expressions, finite automata, grammars, pushdown automata, and Turing machines.
Prerequisites: CS 1100 and CS 2440 with a minimum grade of "C" (2.0) in each.

Professor: Val Lapensee-Rankine

Menu

Session 1: CS 3534: Introduction to Robotics

Description to come.

Professor: Yeganeh Madadi

Note: This course will count as a CS elective

Menu

Session 1: CS 3543: Theory of Computation

This course describes models of computation, polynomial time, undecidability and intractability, time and space complexity, through a rigorous treatment of Turing machines. Prerequisite: CS 2490.

Professor: Pierre Cagne

Note: This course will count as a CS elective.

Note: This course will be offered **synchronous online**

Menu

Ten Weeks: CS 1440: Computer Science I

A first programming course using an object-oriented language. Emphasis is placed on problem-solving and appropriate programming standards. Topics include: classes, objects, data types, expressions, conditional statements, loops, strings, arrays, collections, debugging, inheritance, and polymorphism. Lecture three hours, laboratory two hours. Students with doubts about their mathematics and computing background should consider taking CS 1425 first. Prerequisite: MAT 1025 or equivalent with a minimum grade of "C-" (1.7) or higher or satisfactory Calculus Readiness Test score.

Professor: Abdelbaset Hamza

Note: This course will be offered **synchronous online**

Menu

Ten Weeks: CS 2440: Computer Science II

This course follows CS 1440 - Computer Science I (4). The course introduces students to advanced programming concepts through the development of small to medium sized projects using software component libraries. Topics emphasize conceptual understanding and applications and include inheritance, polymorphism, recursion, interfaces, collections, stream I/O, exceptions, graphical interfaces, and threads. Lecture three hours, laboratory two hours. **Prerequisite:** CS 1440 or CS 2435 with a minimum grade of "C" (2.0). **Corequisite**: CS 1100.

Professor: Courtney Dixon

Note: This course will be offered **synchronous online**

Menu

Ten Weeks: CS 2450: Introduction to Computer Systems

This course includes data representation, digital logic, digital circuits, instruction set architecture, and assembly language programming.
Prerequisites: CS 1100 and CS 2440 with a minimum grade of "C" (2.0) in each.

Professor: Joel Swanson

Note: This course will be offered **synchronous online**

Menu

Session 2: CS 3430: Database

This course covers the design, organization, representation, and manipulation of databases. Topics include the relational model, data definition, data manipulation, queries (SQL), communication and representation (XML), design concepts, security, and integrity. Prerequisite: CS 2440 with a grade of "C" (2.0) or higher.

Professor: Tingaho Feng

Menu

Session 2: CS 3460: Data Structures

Data Structures is the study of organizing data in memory in order to access them efficiently. In this class, we study data structures for storing sets and sequences in the form of arrays, linked lists, stacks, queues, priority queues, hash tables, and binary search trees. We also learn the art of abstraction by treating these data structures as black boxes to solve more complex algorithms. Data structures are vital in almost every field of computer science, and we cover applications in text compression, security, parsing, and more. We learn to model certain problems as a graph, and study graph algorithms for traversing and computing shortest paths.
Prerequisite: CS 2490 with a minimum grade of “C” (2.0).

Professor: Mohammad Ali Javidian

Menu

Session 2: CS 3667: Software Engineering

This course covers the design and implementation of software systems. Topics include requirements analysis, object design, system design, frameworks and patterns, and implementation and testing issues. **Prerequisite**: CS 2440 with a grade of "C" (2.0) or higher.

Professor: Nazia Sharmin

Note: This course will be offered **synchronous online**

Menu

Session 2: CS 3537: Program Analysis

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.
Prerequisite: CS 3460 with a minimum grade of "C"

Professor: Mark Hills

Note: This course will count as a CS elective

Menu

Completion Form

To finish, fill out this advising completion form.

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