Computer Science (COMPSCI)

Courses

Expand all course descriptions [+]Collapse all course descriptions [-]

COMPSCI C8 Foundations of Data Science 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024, Fall 2023, Spring 2023, Fall 2022, Spring 2022, Fall 2021, Summer 2021 8 Week Session, Fall 2020

Foundations of data science from three perspectives: inferential thinking, computational thinking, and real-world relevance. Given data arising from some real-world phenomenon, how does one analyze that data so as to understand that phenomenon? The course teaches critical concepts and skills in computer programming and statistical inference, in conjunction with hands-on analysis of real-world datasets, including economic data, document collections, geographical data, and social networks. It delves into social and legal issues surrounding data analysis, including issues of privacy and data ownership.

Foundations of Data Science: Read More [+]

Rules & Requirements

Prerequisites: This course may be taken on its own, but students are encouraged to take it concurrently with a data science connector course (numbered 88 in a range of departments)

Credit Restrictions: Students will receive no credit for DATA C8\COMPSCI C8\INFO C8\STAT C8 after completing COMPSCI 8, or DATA 8. A deficient grade in DATA C8\COMPSCI C8\INFO C8\STAT C8 may be removed by taking COMPSCI 8, COMPSCI 8, or DATA 8.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of laboratory per week

Summer: 8 weeks - 6 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: Computer Science C8/Statistics C8/Information C8

Also listed as: DATA C8/INFO C8/STAT C8

Foundations of Data Science: Read Less [-]

COMPSCI 10 The Beauty and Joy of Computing 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024

An introductory course for students with minimal prior exposure to computer science. Prepares students for future computer science courses and empowers them to utilize programming to solve problems in their field of study. Presents an overview of the history, great principles, and transformative applications of computer science, as well as a comprehensive introduction to programming. Topics include abstraction, recursion, algorithmic complexity, higher-order functions, concurrency, social implications of computing (privacy, education, algorithmic bias), and engaging research areas (data science, AI, HCI). Students will program in Snap! (a friendly graphical language) and Python, and will design and implement two projects of their choice.

The Beauty and Joy of Computing: Read More [+]

Rules & Requirements

Credit Restrictions: Students will receive no credit for 10 after having taken W10, 61A, 61B, or 61C.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture, 1 hour of discussion, and 4 hours of laboratory per week

Summer: 8 weeks - 4 hours of lecture, 2 hours of discussion, and 8 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Garcia, Hug

The Beauty and Joy of Computing: Read Less [-]

COMPSCI W10 The Beauty and Joy of Computing 4 Units

Terms offered: Fall 2012

This course meets the programming prerequisite for 61A. An introduction to the beauty and joy of computing. The history, social implications, great principles, and future of computing. Beautiful applications that have changed the world. How computing empowers discovery and progress in other fields. Relevance of computing to the student and society will be emphasized. Students will learn the joy of programming a computer using a friendly, graphical language, and will complete a substantial team programming project related to their interests.

The Beauty and Joy of Computing: Read More [+]

Rules & Requirements

Credit Restrictions: Students will receive no credit for W10 after taking 10, 61A, 61B or 61C. A deficient grade in 10 may be removed by taking W10.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of web-based lecture and 5 hours of web-based discussion per week

Summer: 8 weeks - 4 hours of web-based lecture and 10 hours of web-based discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Garcia, Hug

The Beauty and Joy of Computing: Read Less [-]

COMPSCI 36 CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions 2 Units

Terms offered: Fall 2019, Fall 2018, Spring 2018

Computer Science 36 is a seminar for CS Scholars who are concurrently taking CS61A: The Structure and Interpretation of Computer Programs. CS Scholars is a cohort-model program to provide support in exploring and potentially declaring a CS major for students with little to no computational background prior to coming to the university. CS 36 provides an introduction to the CS curriculum at UC Berkeley, and the overall CS landscape in both industry and academia—through the lens of accessibility and its relevance to diversity. Additionally, CS36 provides technical instruction to review concepts in CS61A, in order to support CS Scholars' individual learning and success in the CS61A course.

CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Students will know where to find several support services including tutoring, advising, counseling, and career advice.

Students will perform as well as possible in the CS61A prerequisite for the CS major. They will also have customized program plans for completing the major within four years.

Rules & Requirements

Prerequisites: Prerequisite satisfied Concurrently: Participating in the CS Scholars program, and concurrently taking COMPSCI 61A

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of seminar per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Alternative to final exam.

Instructor: Hunn

CS Scholars Seminar: The Educational Climate in CS & CS61A technical discussions: Read Less [-]

COMPSCI 39 Freshman/Sophomore Seminar 1.5 - 2 Units

Terms offered: Fall 2023, Spring 2022, Spring 2019
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. Enrollment limits are set by the faculty, but the suggested limit is 25.
Freshman/Sophomore Seminar: Read More [+]

Rules & Requirements

Prerequisites: Priority given to freshmen and sophomores

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 2-3 hours of seminar per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final Exam To be decided by the instructor when the class is offered.

Freshman/Sophomore Seminar: Read Less [-]

COMPSCI 47A Completion of Work in Computer Science 61A 1 Unit

Terms offered: Fall 2024, Spring 2024, Fall 2023
Implementation of generic operations. Streams and iterators. Implementation techniques for supporting functional, object-oriented, and constraint-based programming in the Scheme programming language. Together with 9D, 47A constitutes an abbreviated, self-paced version of 61A for students who have already taken a course equivalent to 61B.
Completion of Work in Computer Science 61A: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B, COMPSCI 9D, and consent of instructor

Credit Restrictions: Students will receive no credit for 47A after taking 61A.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of self-paced per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Garcia

Completion of Work in Computer Science 61A: Read Less [-]

COMPSCI 47B Completion of Work in Computer Science 61B 1 Unit

Terms offered: Fall 2024, Spring 2024, Fall 2023
Iterators. Hashing, applied to strings and multi-dimensional structures. Heaps. Storage management. Design and implementation of a program containing hundreds of lines of code. Students who have completed a portion of the subject matter of COMPSCI 61B may, with consent of instructor, complete COMPSCI 61B in this self-paced course. Please note that students in the College of Engineering are required to receive additional permission from the College as well as the EECS department for the course to count in place of COMPSCI 61B.
Completion of Work in Computer Science 61B: Read More [+]

Rules & Requirements

Prerequisites: A course in data structures, COMPSCI 9G, and consent of instructor

Credit Restrictions: Students will receive no credit for 47B after taking 61B.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of self-paced per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Garcia

Completion of Work in Computer Science 61B: Read Less [-]

COMPSCI 47C Completion of Work in Computer Science 61C 1 Unit

Terms offered: Fall 2024, Spring 2024, Fall 2023
MIPS instruction set simulation. The assembly and linking process. Caches and virtual memory. Pipelined computer organization. Students with sufficient partial credit in 61C may, with consent of instructor, complete the credit in this self-paced course.
Completion of Work in Computer Science 61C: Read More [+]

Rules & Requirements

Prerequisites: Experience with assembly language including writing an interrupt handler, COMPSCI 9C, and consent of instructor

Credit Restrictions: Students will receive no credit for COMPSCI 47C after completing COMPSCI 61C, or COMPSCI 61CL.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of self-paced per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Garcia

Completion of Work in Computer Science 61C: Read Less [-]

COMPSCI 61A The Structure and Interpretation of Computer Programs 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024
An introduction to programming and computer science focused on abstraction techniques as means to manage program complexity. Techniques include procedural abstraction; control abstraction using recursion, higher-order functions, generators, and streams; data abstraction using interfaces, objects, classes, and generic operators; and language abstraction using interpreters and macros. The course exposes students to programming paradigms, including functional, object-oriented, and declarative approaches. It includes an introduction to asymptotic analysis of algorithms. There are several significant programming projects.
The Structure and Interpretation of Computer Programs: Read More [+]
Rules & Requirements

Prerequisites: MATH 1A (may be taken concurrently) or Math 10A or Math 16A. Programming experience equivalent to that gained from a score of 3 or above on the Advanced Placement Computer Science exam

Credit Restrictions: Students will receive no credit for COMPSCI 61A after completing COMPSCI 47A, COMPSCI 61AS, or COMPSCI W61A. A deficient grade in COMPSCI 61A may be removed by taking COMPSCI 61AS, or COMPSCI W61A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture, 1.5 hours of discussion, and 1.5 hours of laboratory per week

Summer: 8 weeks - 6 hours of lecture, 3 hours of discussion, and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Garcia, Hilfinger

The Structure and Interpretation of Computer Programs: Read Less [-]

COMPSCI 61B Data Structures 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Fundamental dynamic data structures, including linear lists, queues, trees, and other linked structures; arrays strings, and hash tables. Storage management. Elementary principles of software engineering. Abstract data types. Algorithms for sorting and searching. Introduction to the Java programming language.
Data Structures: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61A, COMPSCI 88, or ENGIN 7

Credit Restrictions: Students will receive no credit for COMPSCI 61B after completing COMPSCI 61BL, or COMPSCI 47B. A deficient grade in COMPSCI 61B may be removed by taking COMPSCI 61BL.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture, 1 hour of discussion, and 2 hours of laboratory per week

Summer: 8 weeks - 6 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Hilfinger, Shewchuk

Data Structures: Read Less [-]

COMPSCI 61BL Data Structures and Programming Methodology 4 Units

Terms offered: Summer 2024 8 Week Session, Summer 2023 8 Week Session, Summer 2022 8 Week Session
The same material as in 61B, but in a laboratory-based format.
Data Structures and Programming Methodology: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61A, COMPSCI 88, or ENGIN 7

Credit Restrictions: Students will receive no credit for COMPSCI 61BL after completing COMPSCI 47B, or COMPSCI 61B. A deficient grade in COMPSCI 61BL may be removed by taking COMPSCI 61B.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture and 6 hours of laboratory per week

Summer: 8 weeks - 2 hours of lecture and 12 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Hilfinger

Data Structures and Programming Methodology: Read Less [-]

COMPSCI 61C Great Ideas of Computer Architecture (Machine Structures) 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024
The internal organization and operation of digital computers. Machine architecture, support for high-level languages (logic, arithmetic, instruction sequencing) and operating systems (I/O, interrupts, memory management, process switching). Elements of computer logic design. Tradeoffs involved in fundamental architectural design decisions.
Great Ideas of Computer Architecture (Machine Structures): Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61A, along with either COMPSCI 61B or COMPSCI 61BL, or programming experience equivalent to that gained in COMPSCI 9C, COMPSCI 9F, or COMPSCI 9G

Credit Restrictions: Students will receive no credit for COMPSCI 61C after completing COMPSCI 61CL.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture, 1 hour of discussion, and 2 hours of laboratory per week

Summer: 8 weeks - 6 hours of lecture, 2 hours of discussion, and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Garcia, Katz, Stojanovic

Great Ideas of Computer Architecture (Machine Structures): Read Less [-]

COMPSCI W61A The Structure and Interpretation of Computer Programs (Online) 4 Units

Terms offered: Summer 2019 8 Week Session
An introduction to programming and computer science focused on abstraction techniques as means to manage program complexity. Techniques include procedural abstraction; control abstraction using recursion, higher-order functions, generators, and streams; data abstraction using interfaces, objects, classes, and generic operators; and language abstraction using interpreters and macros. The course exposes students to programming paradigms, including functional, object-oriented, and declarative approaches. It includes an introduction to asymptotic analysis of algorithms. There are several significant programming projects.
The Structure and Interpretation of Computer Programs (Online): Read More [+]

Rules & Requirements

Prerequisites: MATH 1A (may be taken concurrently); programming experience equivalent to that gained from a score of 3 or above on the Advanced Placement Computer Science A exam

Credit Restrictions: Students will receive no credit for Computer Science W61A after completing Computer Science 47A or Computer Science 61A. A deficient grade in Computer Science W61A may be removed by taking Computer Science 61A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of web-based lecture, 1.5 hours of laboratory, and 1.5 hours of web-based discussion per week

Summer: 8 weeks - 6 hours of web-based lecture, 3 hours of laboratory, and 3 hours of web-based discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Denero

The Structure and Interpretation of Computer Programs (Online): Read Less [-]

COMPSCI 70 Discrete Mathematics and Probability Theory 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024
Logic, infinity, and induction; applications include undecidability and stable marriage problem. Modular arithmetic and GCDs; applications include primality testing and cryptography. Polynomials; examples include error correcting codes and interpolation. Probability including sample spaces, independence, random variables, law of large numbers; examples include load balancing, existence arguments, Bayesian inference.
Discrete Mathematics and Probability Theory: Read More [+]
Rules & Requirements

Prerequisites: Sophomore mathematical maturity, and programming experience equivalent to that gained with a score of 3 or above on the Advanced Placement Computer Science A exam

Credit Restrictions: Students will receive no credit for Computer Science 70 after taking Mathematics 55.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Summer: 8 weeks - 6 hours of lecture and 4 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Rao, Vazirani, Wagner, Sahai

Discrete Mathematics and Probability Theory: Read Less [-]

COMPSCI 84 Sophomore Seminar 1 or 2 Units

Terms offered: Fall 2007
Sophomore seminars are small interactive courses offered by faculty members in departments all across the campus. Sophomore seminars offer opportunity for close, regular intellectual contact between faculty members and students in the crucial second year. The topics vary from department to department and semester to semester. Enrollment limited to 15 sophomores.
Sophomore Seminar: Read More [+]
Rules & Requirements

Prerequisites: At discretion of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring:
5 weeks - 3-6 hours of seminar per week
10 weeks - 1.5-3 hours of seminar per week
15 weeks - 1-2 hours of seminar per week

Summer:
6 weeks - 2.5-5 hours of seminar per week
8 weeks - 2-4 hours of seminar per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Sophomore Seminar: Read Less [-]

COMPSCI C88C Computational Structures in Data Science 3 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024, Spring 2023, Fall 2022

Development of Computer Science topics appearing in Foundations of Data Science (C8); expands computational concepts and techniques of abstraction. Understanding the structures that underlie the programs, algorithms, and languages used in data science and elsewhere. Mastery of a particular programming language while studying general techniques for managing program complexity, e.g., functional, object-oriented, and declarative programming. Provides practical experience with composing larger systems through several significant programming projects.

Computational Structures in Data Science: Read More [+]

Objectives & Outcomes

Course Objectives: Develop a foundation of computer science concepts that arise in the context of data analytics, including algorithm, representation, interpretation, abstraction, sequencing, conditional, function, iteration, recursion, types, objects, and testing, and develop proficiency in the application of these concepts in the context of a modern programming language at a scale of whole programs on par with a traditional CS introduction course.

Student Learning Outcomes: Students will be able to demonstrate a working knowledge of these concepts and a proficiency of programming based upon them sufficient to construct substantial stand-alone programs.

Rules & Requirements

Prerequisites: This course is a Data Science connector course and may only be taken concurrently with or after COMPSCI C8/DATA C8/INFO C8/STAT C8. Students may take more than one Data Science connector (88) course if they wish, concurrent with or after having taken the C8 course

Credit Restrictions: Students will receive no credit for DATA C88C after completing COMPSCI 61A.

Hours & Format

Fall and/or spring: 15 weeks - 2-2 hours of lecture, 2-2 hours of laboratory, and 0-1 hours of supplement per week

Summer: 8 weeks - 4-4 hours of lecture, 4-4 hours of laboratory, and 0-2 hours of supplement per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Ball, Culler

Formerly known as: Computer Science 88

Also listed as: DATA C88C

Computational Structures in Data Science: Read Less [-]

COMPSCI C100 Principles & Techniques of Data Science 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024, Summer 2023 8 Week Session, Fall 2022, Fall 2021, Fall 2020

In this course, students will explore the data science lifecycle, including question formulation, data collection and cleaning, exploratory data analysis and visualization, statistical inference and prediction, and decision-making. This class will focus on quantitative critical thinking and key principles and techniques needed to carry out this cycle. These include languages for transforming, querying and analyzing data; algorithms for machine learning methods including regression, classification and clustering; principles behind creating informative data visualizations; statistical concepts of measurement error and prediction; and techniques for scalable data processing.

Principles & Techniques of Data Science: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI C8 / DATA C8 / INFO C8 / STAT C8 with a C- or better, or Pass; and COMPSCI 61A, COMPSCI/DATA C88C, or ENGIN 7 with a C- or better, or Pass; Corequisite: MATH 54, 56 or EECS 16A (C- or better, or Pass, required if completed prior to Data C100)

Credit Restrictions: Students will receive no credit for DATA C100\STAT C100\COMPSCI C100 after completing DATA 100. A deficient grade in DATA C100\STAT C100\COMPSCI C100 may be removed by taking DATA 100.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture, 1-1 hours of discussion, and 0-1 hours of laboratory per week

Summer: 8 weeks - 6-6 hours of lecture, 2-2 hours of discussion, and 0-2 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Gonzalez, Nourozi, Perez, Yan

Formerly known as: Statistics C100/Computer Science C100

Also listed as: DATA C100/STAT C100

Principles & Techniques of Data Science: Read Less [-]

COMPSCI 152 Computer Architecture and Engineering 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Instruction set architecture, microcoding, pipelining (simple and complex). Memory hierarchies and virtual memory. Processor parallelism: VLIW, vectors, multithreading. Multiprocessors.
Computer Architecture and Engineering: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61C

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Summer: 8 weeks - 6 hours of lecture and 4 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Instructors: Asanovic, Culler, Kubiatowicz, Wawrzynek

Computer Architecture and Engineering: Read Less [-]

COMPSCI 160 User Interface Design and Development 4 Units

Terms offered: Summer 2024 8 Week Session, Spring 2024, Summer 2023 8 Week Session
The design, implementation, and evaluation of user interfaces. User-centered design and task analysis. Conceptual models and interface metaphors. Usability inspection and evaluation methods. Analysis of user study data. Input methods (keyboard, pointing, touch, tangible) and input models. Visual design principles. Interface prototyping and implementation methodologies and tools. Students will develop a user interface for a specific task and target user group in teams.
User Interface Design and Development: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B or COMPSCI 61BL

Credit Restrictions: Students will receive no credit for Computer Science 160 after taking Computer Science 260A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Agrawala, Canny, Hartmann, Paulos

User Interface Design and Development: Read Less [-]

COMPSCI 161 Computer Security 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024
Introduction to computer security. Cryptography, including encryption, authentication, hash functions, cryptographic protocols, and applications. Operating system security, access control. Network security, firewalls, viruses, and worms. Software security, defensive programming, and language-based security. Case studies from real-world systems.
Computer Security: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B, COMPSCI 61C, and COMPSCI 70

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 1-1.5 hours of discussion per week

Summer: 8 weeks - 6-6 hours of lecture and 2-3 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Paxson, Song, Wagner

Computer Security: Read Less [-]

COMPSCI 162 Operating Systems and System Programming 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Basic concepts of operating systems and system programming. Utility programs, subsystems, multiple-program systems. Processes, interprocess communication, and synchronization. Memory allocation, segmentation, paging. Loading and linking, libraries. Resource allocation, scheduling, performance evaluation. File systems, storage devices, I/O systems. Protection, security, and privacy.
Operating Systems and System Programming: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B, COMPSCI 61C, and COMPSCI 70

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Joseph, Kubiatowicz, Stoica

Operating Systems and System Programming: Read Less [-]

COMPSCI 164 Programming Languages and Compilers 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Survey of programming languages. The design of modern programming languages. Principles and techniques of scanning, parsing, semantic analysis, and code generation. Implementation of compilers, interpreters, and assemblers. Overview of run-time organization and error handling.
Programming Languages and Compilers: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B and COMPSCI 61C

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Bodik, Hilfinger, Necula

Programming Languages and Compilers: Read Less [-]

COMPSCI 168 Introduction to the Internet: Architecture and Protocols 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2022
This course is an introduction to the Internet architecture. We will focus on the concepts and fundamental design principles that have contributed to the Internet's scalability and robustness and survey the various protocols and algorithms used within this architecture. Topics include layering, addressing, intradomain routing, interdomain routing, reliable delivery, congestion control, and the core protocols (e.g., TCP, UDP, IP, DNS, and HTTP) and network technologies (e.g., Ethernet, wireless).
Introduction to the Internet: Architecture and Protocols: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B and COMPSCI 162

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Katz, Paxson, Ratnasamy, Shenker, Stoica

Introduction to the Internet: Architecture and Protocols: Read Less [-]

COMPSCI 169A Introduction to Software Engineering 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Fall 2023
Ideas and techniques for designing, developing, and modifying large software systems. Service-oriented architecture, behavior-driven design with user stories, cloud computing, test-driven development, automated testing, cost and quality metrics for maintainability and effort estimation, practical performance and security in software operations, design patterns and refactoring, specification and documentation, agile project team organization and management.
Introduction to Software Engineering: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Students will learn how to approach and add functionality to a legacy code base;
Students will learn how to identify, measure, and resolve maintainability problems in code;
Students will learn how to work with nontechnical customers and convert customer requirements into a software plan that can be effort-estimated, built, and deployed to the public cloud, including the use of behavior-driven design, user stories, and velocity;
Students will learn how to write automated tests and measure test coverage;
Students will learn practical security and performance considerations for SaaS applications.
Students will learn the architecture and machinery of software as a service; the agile/XP methodology for software development and how it compares with other methodologies, including "Plan-and-document" methodologies;
Students will learn the role of software design patterns in refactoring, and how to identify opportunities to use them;

Rules & Requirements

Prerequisites: COMPSCI 61A and COMPSCI 61B; COMPSCI 70 is recommended

Credit Restrictions: Students will receive no credit for COMPSCI 169A after completing COMPSCI 169, or COMPSCI W169A. A deficient grade in COMPSCI 169A may be removed by taking COMPSCI 169, or COMPSCI W169A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Fox, Fox, Ball

Introduction to Software Engineering: Read Less [-]

COMPSCI 169L Software Engineering Team Project 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Open-ended design project enhancing or creating software for real customers in an agile team setting. Teamwork coordination, effective customer meetings, pre- and post-iteration team meetings, running scrums and standups, technical communication. Contributing as a team to an open-source project; tools and workflows associated with open source collaboration, including fork-and-pull, rebase, upstream merge, continuous deployment & integration.
Software Engineering Team Project: Read More [+]

Objectives & Outcomes

Course Objectives: Students will work in a team to develop new software or enhance existing software for a customer with a real business need.

Student Learning Outcomes: Students will learn how to conduct effective meetings with nontechnical customers and work with their feedback;
Students will learn how to coordinate teamwork on developing, testing, and deploying features; and in most cases, how to approach a legacy codebase and add features to it.
Students will learn to run a small team including rotation of team roles such as product owner, scrum master, and so on;

Rules & Requirements

Prerequisites: COMPSCI 169A or COMPSCI W169A

Credit Restrictions: Students will receive no credit for COMPSCI 169L after completing COMPSCI 169.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of discussion and 8 hours of fieldwork per week

Summer: 8 weeks - 6 hours of discussion and 16 hours of fieldwork per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Instructors: Fox, Sen

Software Engineering Team Project: Read Less [-]

COMPSCI W169A Software Engineering 3 Units

Terms offered: Summer 2021 8 Week Session, Fall 2020, Summer 2020 8 Week Session
This course presents ideas and techniques for designing, developing, and modifying large software systems using Agile techniques and tools. Topics include: function-oriented and object-oriented modular design techniques, designing for re-use and maintainability including proper use of design patterns, behavior-driven design, test-driven development, user stories for requirements elicitation & documentation, verification and validation, cost and quality metrics and estimation, project team organization and management, analyzing and refactoring legacy code.
Software Engineering: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Students will learn how to apply BDD & TDD to identify the main parts of a legacy code base, measure code quality, and refactor code to improve its quality;
Students will learn how to apply behavior-driven development (BDD) to elicit customer needs and express them as user stories that will drive development;
Students will learn how to apply the key ideas of learning a new framework to construct and deploy simple Rails applications;
Students will learn how to apply the key ideas of learning a new language in order to construct programs in Ruby;
Students will learn how to construct unit- and module-level tests and measure their coverage;
Students will learn how to exercise best practices in planning, effort estimation, and coordination of the efforts of small software teams, using appropriate tools to support those practices;
Students will learn how to identify and repair potential app-level security and performance problems.
Students will learn how to recognize when an appropriate Design Pattern may improve code quality, and refactor code to apply those Design Patterns;
Students will learn how to summarize the key architectural elements of RESTful SaaS applications and microservices;
Students will learn to articulate the primary differences between Agile and Plan-and-Document methodologies;

Rules & Requirements

Prerequisites: COMPSCI 61A and COMPSCI 61B

Credit Restrictions: Students will receive no credit for COMPSCI W169A after completing COMPSCI 169, or COMPSCI 169A. A deficient grade in COMPSCI W169A may be removed by taking COMPSCI 169, or COMPSCI 169A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of web-based lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of web-based lecture and 0 hours of discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Fox, Sen

Software Engineering: Read Less [-]

COMPSCI 170 Efficient Algorithms and Intractable Problems 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Concept and basic techniques in the design and analysis of algorithms; models of computation; lower bounds; algorithms for optimum search trees, balanced trees and UNION-FIND algorithms; numerical and algebraic algorithms; combinatorial algorithms. Turing machines, how to count steps, deterministic and nondeterministic Turing machines, NP-completeness. Unsolvable and intractable problems.
Efficient Algorithms and Intractable Problems: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B and COMPSCI 70

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Demmel, Papadimitriou, Rao, Wagner, Vazirani

Efficient Algorithms and Intractable Problems: Read Less [-]

COMPSCI 171 Cryptography 4 Units

Terms offered: Spring 2024, Spring 2021
Cryptography or cryptology is the science of designing algorithms and protocols for enabling parties to communicate and compute securely in an untrusted environment (e.g. secure communication, digital signature, etc.) Over the last four decades, cryptography has transformed from an ad hoc collection of mysterious tricks into a rigorous science based on firm complexity-theoretic foundations. This modern complexity-theoretic approach to cryptography will be the focus. E.g., in the context of encryption we will begin by giving a precise mathematical definition for what it means to be a secure encryption scheme and then give a construction (realizing this security notion) assuming various computational hardness assumptions (e.g. factoring).
Cryptography: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 70

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Garg

Cryptography: Read Less [-]

COMPSCI 172 Computability and Complexity 4 Units

Terms offered: Fall 2024, Fall 2022, Spring 2022
Finite automata, Turing machines and RAMs. Undecidable, exponential, and polynomial-time problems. Polynomial-time equivalence of all reasonable models of computation. Nondeterministic Turing machines. Theory of NP-completeness: Cook's theorem, NP-completeness of basic problems. Selected topics in language theory, complexity and randomness.
Computability and Complexity: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 170

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Papadimitriou, Seshia, Sinclair, Vazirani

Computability and Complexity: Read Less [-]

COMPSCI 174 Combinatorics and Discrete Probability 4 Units

Terms offered: Spring 2023, Spring 2022, Fall 2019
Permutations, combinations, principle of inclusion and exclusion, generating functions, Ramsey theory. Expectation and variance, Chebychev's inequality, Chernov bounds. Birthday paradox, coupon collector's problem, Markov chains and entropy computations, universal hashing, random number generation, random graphs and probabilistic existence bounds.
Combinatorics and Discrete Probability: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 170

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Bartlett, Papadimitriou, Sinclair, Vazirani

Combinatorics and Discrete Probability: Read Less [-]

COMPSCI 176 Algorithms for Computational Biology 4 Units

Terms offered: Fall 2020, Fall 2018, Fall 2017
Algorithms and probabilistic models that arise in various computational biology applications: suffix trees, suffix arrays, pattern matching, repeat finding, sequence alignment, phylogenetics, genome rearrangements, hidden Markov models, gene finding, motif finding, stochastic context free grammars, RNA secondary structure. There are no biology prerequisites for this course, but a strong quantitative background will be essential.
Algorithms for Computational Biology: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 70 and COMPSCI 170; experience programming in a language such as C, C++, Java, or Python

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Song

Algorithms for Computational Biology: Read Less [-]

COMPSCI C176 Algorithms for Computational Biology 4 Units

Terms offered: Fall 2022
This course will provide familiarity with algorithms and probabilistic models that arise in various computational biology applications, such as suffix trees, suffix arrays, pattern matching, repeat finding, sequence alignment, phylogenetics, hidden Markov models, gene finding, motif finding, linear/logistic regression, random forests, convolutional neural networks, genome-wide association studies, pathogenicity prediction, and sequence-to-epigenome prediction.
Algorithms for Computational Biology: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Understand the basic elements of molecular, cell, and evolutionary biology.
Understand the key probabilistic and machine learning models used in computational biology applications.
Understand various data structures and algorithms that arise in computational biology.

Rules & Requirements

Prerequisites: COMPSCI 70 and COMPSCI 170, MATH 54 or EECS 16A or an equivalent linear algebra course

Credit Restrictions: Students will receive no credit for COMPSCI C176 after completing COMPSCI 176. A deficient grade in COMPSCI C176 may be removed by taking COMPSCI 176.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Song, Yun, Ioannidis

Also listed as: CMPBIO C176

Algorithms for Computational Biology: Read Less [-]

COMPSCI C177 Algorithmic Economics 4 Units

Terms offered: Spring 2024
The class provides an introduction to algorithmic questions in economic design. The class will cover problems of public goods and social choice, as well as allocative questions and private consumption. The focus is on normative questions: From the perspective of social goals, these are efficiency, fairness, and equity. In terms of private goals, the focus is on revenue maximization. The course will cover voting, fair division, pricing and market mechanisms. There is an emphasis on the algorithmic questions that arise naturally in economic design.
Algorithmic Economics: Read More [+]
Rules & Requirements

Prerequisites: Students should be comfortable with formal mathematical proofs, and will be expected to write proofs on their own

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Also listed as: ECON C147

Algorithmic Economics: Read Less [-]

COMPSCI 180 Intro to Computer Vision and Computational Photography 4 Units

Terms offered: Fall 2024, Fall 2023
This advanced undergraduate course introduces students to computing with visual data (images and video). We will cover acquisition, representation, and manipulation of visual information from digital photographs (image processing), image analysis and visual understanding (computer vision), and image synthesis (computational photography). Key algorithms will be presented, ranging from classical to contemporary, with an emphasis on using these techniques to build practical systems. The hands-on emphasis will be reflected in the programming assignments, where students will acquire their own images and develop, largely from scratch, image analysis and synthesis tools for real-world applications.
Intro to Computer Vision and Computational Photography: Read More [+]
Objectives & Outcomes

Course Objectives: Students will learn classic algorithms in image manipulation with Gaussian and Laplacian Pyramids, understand the hierarchy of image transformations including homographies, and how to warp an image with these transformations.
Students will learn how to apply Convolutional Neural Networks for computer vision problems and how they can be used for image manipulation.
Students will learn the fundamentals of 3D vision: stereo, multi-view geometry, camera calibration, structure-from-motion, multi-view stereo, and the plenoptic function.
Students will learn the fundamentals of image processing from the mechanics of a pin-hole camera, representation of images as pixels, physics of light and the process of image formation, to manipulating the visual information using signal processing techniques in the spatial and frequency domains.

Student Learning Outcomes: After this class, students will be comfortable implementing, from scratch, these algorithms in modern programming languages and deep learning libraries.

Rules & Requirements

Prerequisites: COMPSCI 61B, COMPSCI 70, and MATH 53 (or other vector calculus course). MATH 54, MATH 110, or EECS 16A. COMPSCI 182 is strongly recommended

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Efros, Kanazawa

Intro to Computer Vision and Computational Photography: Read Less [-]

COMPSCI 182 Designing, Visualizing and Understanding Deep Neural Networks 4 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Deep Networks have revolutionized computer vision, language technology, robotics and control. They have growing impact in many other areas of science and engineering. They do not however, follow a closed or compact set of theoretical principles. In Yann Lecun's words they require "an interplay between intuitive insights, theoretical modeling, practical implementations, empirical studies, and scientific analyses." This course attempts to cover that ground.
Designing, Visualizing and Understanding Deep Neural Networks: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Students will come to understand visualizing deep networks. Exploring the training and use of deep networks with visualization tools.
Students will learn design principles and best practices: design motifs that work well in particular domains, structure optimization and parameter optimization.
Understanding deep networks. Methods with formal guarantees: generative and adversarial models, tensor factorization.

Rules & Requirements

Prerequisites: MATH 53, MATH 54, and COMPSCI 61B; COMPSCI 70 or STAT 134; COMPSCI 189 is recommended

Credit Restrictions: Students will receive no credit for COMPSCI 182 after completing COMPSCI W182, or COMPSCI L182. A deficient grade in COMPSCI 182 may be removed by taking COMPSCI W182, or COMPSCI L182.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Instructor: Canny

Designing, Visualizing and Understanding Deep Neural Networks: Read Less [-]

COMPSCI 184 Foundations of Computer Graphics 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Techniques of modeling objects for the purpose of computer rendering: boundary representations, constructive solids geometry, hierarchical scene descriptions. Mathematical techniques for curve and surface representation. Basic elements of a computer graphics rendering pipeline; architecture of modern graphics display devices. Geometrical transformations such as rotation, scaling, translation, and their matrix representations. Homogeneous coordinates, projective and perspective transformations. Algorithms for clipping, hidden surface removal, rasterization, and anti-aliasing. Scan-line based and ray-based rendering algorithms. Lighting models for reflection, refraction, transparency.
Foundations of Computer Graphics: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B or COMPSCI 61BL; programming skills in C, C++, or Java; linear algebra and calculus

Credit Restrictions: Students will receive no credit for Comp Sci 184 after taking Comp Sci 284A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: O'Brien, Ng

Foundations of Computer Graphics: Read Less [-]

COMPSCI 185 Deep Reinforcement Learning, Decision Making, and Control 3 Units

Terms offered: Not yet offered

This course will cover the intersection of control, reinforcement learning, and deep learning. This course will provide an advanced treatment of the reinforcement learning formalism, the most critical model-free reinforcement learning algorithms (policy gradients, value function and Q-function learning, and actor-critic), a discussion of model-based reinforcement learning algorithms, an overview of imitation learning, and a range of advanced topics, including exploration, model-based learning with video prediction, transfer learning, multi-task learning, and meta-learning. Homework assignments will cover imitation learning, policy gradients, Q-learning, and model-based reinforcement learning, as well as a final project.

Deep Reinforcement Learning, Decision Making, and Control: Read More [+]

Rules & Requirements

Prerequisites: CS189/289A or equivalent is a prerequisite for the course. This course will assume some familiarity with reinforcement learning, numerical optimization and machine learning, as well as a basic working knowledge of how to train deep neural networks (which is taught in CS182 and briefly covered in CS189)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Instructor: Levine

Deep Reinforcement Learning, Decision Making, and Control: Read Less [-]

COMPSCI 186 Introduction to Database Systems 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023

Access methods and file systems to facilitate data access. Hierarchical, network, relational, and object-oriented data models. Query languages for models. Embedding query languages in programming languages. Database services including protection, integrity control, and alternative views of data. High-level interfaces including application generators, browsers, and report writers. Introduction to transaction processing. Database system implementation to be done as term project.

Introduction to Database Systems: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61C or COMPSCI 47C. COMPSCI 47C may be taken as a co-requisite for transfer students

Credit Restrictions: Students will receive no credit for COMPSCI 186 after completing COMPSCI W186. A deficient grade in COMPSCI 186 may be removed by taking COMPSCI W186.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Cheung, Hellerstein

Introduction to Database Systems: Read Less [-]

COMPSCI W186 Introduction to Database Systems 4 Units

Terms offered: Fall 2021, Spring 2021, Spring 2020
Broad introduction to systems for storing, querying, updating and managing large databases. Computer science skills synthesizing viewpoints from low-level systems architecture to high-level modeling and declarative logic. System internals, including the complex details of query optimization and execution, concurrency control, indexing, and memory management. More abstract issues in query languages and data modeling – students are exposed to formal relational languages, SQL, full-text search, entity-relationship modeling, normalization, and physical database design. Recent technological trends in the field, including “Big Data” programming libraries like MapReduce, and distributed key-value stores with various consistency models.
Introduction to Database Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61B and COMPSCI 61C

Credit Restrictions: Students will receive no credit for COMPSCI W186 after completing COMPSCI 186. A deficient grade in COMPSCI W186 may be removed by taking COMPSCI 186.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of web-based lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of web-based lecture and 2 hours of discussion per week

Online: This is an online course.

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Hellerstein

Introduction to Database Systems: Read Less [-]

COMPSCI 188 Introduction to Artificial Intelligence 4 Units

Terms offered: Fall 2024, Summer 2024 8 Week Session, Spring 2024
Ideas and techniques underlying the design of intelligent computer systems. Topics include search, game playing, knowledge representation, inference, planning, reasoning under uncertainty, machine learning, robotics, perception, and language understanding.
Introduction to Artificial Intelligence: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61A, COMPSCI 61B, and COMPSCI 70

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 1-1.5 hours of discussion per week

Summer: 8 weeks - 6-6 hours of lecture and 2-3 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Abbeel, Klein, Russell

Introduction to Artificial Intelligence: Read Less [-]

COMPSCI 189 Introduction to Machine Learning 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Theoretical foundations, algorithms, methodologies, and applications for machine learning. Topics may include supervised methods for regression and classication (linear models, trees, neural networks, ensemble methods, instance-based methods); generative and discriminative probabilistic models; Bayesian parametric learning; density estimation and clustering; Bayesian networks; time series models; dimensionality reduction; programming projects covering a variety of real-world applications.
Introduction to Machine Learning: Read More [+]
Rules & Requirements

Prerequisites: MATH 53 and MATH 54; and COMPSCI 70 or consent of instructor

Credit Restrictions: Students will receive no credit for Comp Sci 189 after taking Comp Sci 289A.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Summer: 8 weeks - 6 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Abbeel, Bartlett, Darrell, El Ghaoui, Jordan, Klein, Malik, Russell

Introduction to Machine Learning: Read Less [-]

COMPSCI C191 Introduction to Quantum Computing 4 Units

Terms offered: Spring 2024, Fall 2023, Spring 2023
This multidisciplinary course provides an introduction to fundamental conceptual aspects of quantum mechanics from a computational and informational theoretic perspective, as well as physical implementations and technological applications of quantum information science. Basic sections of quantum algorithms, complexity, and cryptography, will be touched upon, as well as pertinent physical realizations from nanoscale science and engineering.
Introduction to Quantum Computing: Read More [+]
Rules & Requirements

Prerequisites: Linear Algebra (EECS 16A or PHYSICS 89 or MATH 54) AND either discrete mathematics (COMPSCI 70 or MATH 55), or quantum mechanics (PHYSICS 7C or PHYSICS 137A or CHEM 120A)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Also listed as: CHEM C191/PHYSICS C191

Introduction to Quantum Computing: Read Less [-]

COMPSCI 194 Special Topics 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Topics will vary semester to semester. See the Computer Science Division announcements.
Special Topics: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Summer: 8 weeks - 2-8 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Special Topics: Read Less [-]

COMPSCI 195 Social Implications of Computer Technology 1 Unit

Terms offered: Fall 2024, Fall 2023, Spring 2023
Topics include electronic community; the changing nature of work; technological risks; the information economy; intellectual property; privacy; artificial intelligence and the sense of self; pornography and censorship; professional ethics. Students will lead discussions on additional topics.
Social Implications of Computer Technology: Read More [+]
Rules & Requirements

Credit Restrictions: Students will receive no credit for 195 after taking C195/Interdisciplinary Field Study C155 or H195.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Instructor: Harvey

Social Implications of Computer Technology: Read Less [-]

COMPSCI H195 Honors Social Implications of Computer Technology 3 Units

Terms offered: Fall 2024, Fall 2023, Spring 2023
Topics include electronic community; the changing nature of work; technological risks; the information economy; intellectual property; privacy; artificial intelligence and the sense of self; pornography and censorship; professional ethics. Students may lead discussions on additional topics.
Honors Social Implications of Computer Technology: Read More [+]
Rules & Requirements

Credit Restrictions: Student will receive no credit for H195 after taking 195 or C195.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of lecture and 1.5 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Instructor: Harvey

Honors Social Implications of Computer Technology: Read Less [-]

COMPSCI H196A Senior Honors Thesis Research 1 - 4 Units

Terms offered: Fall 2021, Fall 2020, Fall 2016
Thesis work under the supervision of a faculty member. To obtain credit the student must, at the end of two semesters, submit a satisfactory thesis to the Electrical Engineering and Computer Science department archive. A total of four units must be taken. The units many be distributed between one or two semesters in any way. H196A-H196B count as graded technical elective units, but may not be used to satisfy the requirement for 27 upper division technical units in the College of Letters and Science with a major in Computer Science.
Senior Honors Thesis Research: Read More [+]
Rules & Requirements

Prerequisites: Open only to students in the computer science honors program

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Senior Honors Thesis Research: Read Less [-]

COMPSCI H196B Senior Honors Thesis Research 1 - 4 Units

Terms offered: Spring 2023, Spring 2010, Spring 2009
Thesis work under the supervision of a faculty member. To obtain credit the student must, at the end of two semesters, submit a satisfactory thesis to the Electrical Engineering and Computer Science department archive. A total of four units must be taken. The units many be distributed between one or two semesters in any way. H196A-H196B count as graded technical elective units, but may not be used to satisfy the requirement for 27 upper division technical units in the College of Letters and Science with a major in Computer Science.
Senior Honors Thesis Research: Read More [+]
Rules & Requirements

Prerequisites: Open only to students in the computer science honors program

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Senior Honors Thesis Research: Read Less [-]

COMPSCI 197 Field Study 1 - 4 Units

Terms offered: Fall 2024, Fall 2023, Spring 2019
Students take part in organized individual field sponsored programs with off-campus companies or tutoring/mentoring relevant to specific aspects and applications of computer science on or off campus. Note Summer CPT or OPT students: written report required. Course does not count toward major requirements, but will be counted in the cumulative units toward graduation.
Field Study: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor (see department adviser)

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of fieldwork per week

Summer:
6 weeks - 2.5-10 hours of fieldwork per week
8 weeks - 2-7.5 hours of fieldwork per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Field Study: Read Less [-]

COMPSCI 198 Directed Group Studies for Advanced Undergraduates 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Group study of selected topics in Computer Sciences, usually relating to new developments.
Directed Group Studies for Advanced Undergraduates: Read More [+]
Rules & Requirements

Prerequisites: 2.0 GPA or better; 60 units completed

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Directed Group Studies for Advanced Undergraduates: Read Less [-]

COMPSCI 199 Supervised Independent Study 1 - 4 Units

Terms offered: Fall 2021, Spring 2020, Fall 2018
Supervised independent study. Enrollment restrictions apply.
Supervised Independent Study: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor and major adviser

Credit Restrictions: Enrollment is restricted; see the Introduction to Courses and Curricula section of this catalog.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Summer:
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study: Read Less [-]

COMPSCI C200A Principles and Techniques of Data Science 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023, Spring 2023, Spring 2022, Spring 2021, Spring 2020
Explores the data science lifecycle: question formulation, data collection and cleaning, exploratory, analysis, visualization, statistical inference, prediction, and decision-making. Focuses on quantitative critical thinking and key principles and techniques: languages for transforming, querying and analyzing data; algorithms for machine learning methods: regression, classification and clustering; principles of informative visualization; measurement error and prediction; and techniques for scalable data processing. Research term project.
Principles and Techniques of Data Science: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI C8 / INFO C8 / STAT C8 or ENGIN 7; and either COMPSCI 61A or COMPSCI 88. Corequisites: MATH 54 or EECS 16A

Credit Restrictions: Students will receive no credit for DATA C200\COMPSCI C200A\STAT C200C after completing DATA C100.

Hours & Format

Fall and/or spring:
8 weeks - 6-6 hours of lecture, 2-2 hours of discussion, and 0-2 hours of laboratory per week
15 weeks - 3-3 hours of lecture, 1-1 hours of discussion, and 0-1 hours of laboratory per week

Summer: 8 weeks - 6-6 hours of lecture, 2-2 hours of discussion, and 0-2 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Formerly known as: Statistics C200C/Computer Science C200A

Also listed as: DATA C200/STAT C200C

Principles and Techniques of Data Science: Read Less [-]

COMPSCI C249A Introduction to Embedded Systems 4 Units

Terms offered: Fall 2024, Fall 2023, Fall 2022
This course introduces students to the basics of models, analysis tools, and control for embedded systems operating in real time. Students learn how to combine physical processes with computation. Topics include models of computation, control, analysis and verification, interfacing with the physical world, mapping to platforms, and distributed embedded systems. The course has a strong laboratory component, with emphasis on a semester-long sequence of projects.
Introduction to Embedded Systems: Read More [+]
Rules & Requirements

Credit Restrictions: Students will receive no credit for Electrical Engineering/Computer Science C249A after completing Electrical Engineering/Computer Science C149.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Lee, Seshia

Formerly known as: Electrical Engineering C249M/Computer Science C249M

Also listed as: EL ENG C249A

Introduction to Embedded Systems: Read Less [-]

COMPSCI 250 VLSI Systems Design 4 Units

Terms offered: Fall 2020, Spring 2017, Spring 2016
Unified top-down and bottom-up design of integrated circuits and systems concentrating on architectural and topological issues. VLSI architectures, systolic arrays, self-timed systems. Trends in VLSI development. Physical limits. Tradeoffs in custom-design, standard cells, gate arrays. VLSI design tools.
VLSI Systems Design: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 150

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Wawrzynek

VLSI Systems Design: Read Less [-]

COMPSCI 252A Graduate Computer Architecture 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Graduate survey of contemporary computer organizations covering: early systems, CPU design, instruction sets, control, processors, busses, ALU, memory, I/O interfaces, connection networks, virtual memory, pipelined computers, multiprocessors, and case studies. Term paper or project is required.
Graduate Computer Architecture: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61C

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Asanovi#, Kubiatowicz

Formerly known as: Computer Science 252

Graduate Computer Architecture: Read Less [-]

COMPSCI 260A User Interface Design and Development 4 Units

Terms offered: Spring 2024, Spring 2023, Fall 2020
The design, implementation, and evaluation of user interfaces. User-centered design and task analysis. Conceptual models and interface metaphors. Usability inspection and evaluation methods. Analysis of user study data. Input methods (keyboard, pointing, touch, tangible) and input models. Visual design principles. Interface prototyping and implementation methodologies and tools. Students will develop a user interface for a specific task and target user group in teams.
User Interface Design and Development: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61B, COMPSCI 61BL, or consent of instructor

Credit Restrictions: Students will receive no credit for Computer Science 260A after taking Computer Science 160.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Agrawala, Canny, Hartmann

User Interface Design and Development: Read Less [-]

COMPSCI 260B Human-Computer Interaction Research 3 Units

Terms offered: Fall 2024, Fall 2017
This course is a broad introduction to conducting research in Human-Computer Interaction. Students will become familiar with seminal and recent literature; learn to review and critique research papers; re-implement and evaluate important existing systems; and gain experience in conducting research. Topics include input devices, computer-supported cooperative work, crowdsourcing, design tools, evaluation methods, search and mobile interfaces, usable security, help and tutorial systems.
Human-Computer Interaction Research: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 160 recommended, or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Hartmann

Human-Computer Interaction Research: Read Less [-]

COMPSCI 261 Security in Computer Systems 3 Units

Terms offered: Fall 2023, Spring 2021, Fall 2018
Graduate survey of modern topics in computer security, including protection, access control, distributed access security, firewalls, secure coding practices, safe languages, mobile code, and case studies from real-world systems. May also cover cryptographic protocols, privacy and anonymity, and/or other topics as time permits.
Security in Computer Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 162

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: D. Song, Wagner

Security in Computer Systems: Read Less [-]

COMPSCI 261N Internet and Network Security 4 Units

Terms offered: Spring 2020, Fall 2016, Spring 2015
Develops a thorough grounding in Internet and network security suitable for those interested in conducting research in the area or those more broadly interested in security or networking. Potential topics include denial-of-service; capabilities; network intrusion detection/prevention; worms; forensics; scanning; traffic analysis; legal issues; web attacks; anonymity; wireless and networked devices; honeypots; botnets; scams; underground economy; attacker infrastructure; research pitfalls.
Internet and Network Security: Read More [+]
Rules & Requirements

Prerequisites: EL ENG 122 or equivalent; and COMPSCI 161 or familiarity with basic security concepts

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Paxson

Internet and Network Security: Read Less [-]

COMPSCI 262A Advanced Topics in Computer Systems 4 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021
Graduate survey of systems for managing computation and information, covering a breadth of topics: early systems; volatile memory management, including virtual memory and buffer management; persistent memory systems, including both file systems and transactional storage managers; storage metadata, physical vs. logical naming, schemas, process scheduling, threading and concurrency control; system support for networking, including remote procedure calls, transactional RPC, TCP, and active messages; security infrastructure; extensible systems and APIs; performance analysis and engineering of large software systems. Homework assignments, exam, and term paper or project required.
Advanced Topics in Computer Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 162 and entrance exam

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Brewer, Hellerstein

Formerly known as: 262

Advanced Topics in Computer Systems: Read Less [-]

COMPSCI 262B Advanced Topics in Computer Systems 3 Units

Terms offered: Spring 2020, Spring 2009, Fall 2008
Continued graduate survey of large-scale systems for managing information and computation. Topics include basic performance measurement; extensibility, with attention to protection, security, and management of abstract data types; index structures, including support for concurrency and recovery; parallelism, including parallel architectures, query processing and scheduling; distributed data management, including distributed and mobile file systems and databases; distributed caching; large-scale data analysis and search. Homework assignments, exam, and term paper or project required.
Advanced Topics in Computer Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 262A

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Brewer, Culler, Hellerstein, Joseph

Advanced Topics in Computer Systems: Read Less [-]

COMPSCI 263 Design of Programming Languages 3 Units

Terms offered: Fall 2021, Fall 2019, Spring 2019
Selected topics from: analysis, comparison, and design of programming languages, formal description of syntax and semantics, advanced programming techniques, structured programming, debugging, verification of programs and compilers, and proofs of correctness.
Design of Programming Languages: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 164

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Necula

Design of Programming Languages: Read Less [-]

COMPSCI 264 Implementation of Programming Languages 4 Units

Terms offered: Fall 2023, Fall 2021, Spring 2011
Compiler construction. Lexical analysis, syntax analysis. Semantic analysis code generation and optimization. Storage management. Run-time organization.
Implementation of Programming Languages: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 164; COMPSCI 263 recommended

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture, 1 hour of discussion, and 6 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Bodik

Implementation of Programming Languages: Read Less [-]

COMPSCI 265 Compiler Optimization and Code Generation 3 Units

Terms offered: Fall 2024, Fall 2009, Spring 2003
Table-driven and retargetable code generators. Register management. Flow analysis and global optimization methods. Code optimization for advanced languages and architectures. Local code improvement. Optimization by program transformation. Selected additional topics. A term paper or project is required.
Compiler Optimization and Code Generation: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 164

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Sen

Compiler Optimization and Code Generation: Read Less [-]

COMPSCI C267 Applications of Parallel Computers 3 - 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022, Spring 2021
Models for parallel programming. Overview of parallelism in scientific applications and study of parallel algorithms for linear algebra, particles, meshes, sorting, FFT, graphs, machine learning, etc. Survey of parallel machines and machine structures. Programming shared- and distributed-memory parallel computers, GPUs, and cloud platforms. Parallel programming languages, compilers, libraries and toolboxes. Data partitioning techniques. Techniques for synchronization and load balancing. Detailed study and algorithm/program development of medium sized applications.
Applications of Parallel Computers: Read More [+]

Rules & Requirements

Prerequisites: No formal pre-requisites. Prior programming experience with a low-level language such as C, C++, or Fortran is recommended but not required. CS C267 is intended to be useful for students from many departments and with different backgrounds, although we will assume reasonable programming skills in a conventional (non-parallel) language, as well as enough mathematical skills to understand the problems and algorithmic solutions presented

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3-3 hours of lecture and 1-1 hours of laboratory per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Demmel, Yelick

Also listed as: ENGIN C233

Applications of Parallel Computers: Read Less [-]

COMPSCI W267 Applications of Parallel Computers 3 Units

Terms offered: Prior to 2007
Parallel programming, from laptops to supercomputers to the cloud. Goals include writing programs that run fast while minimizing programming effort. Parallel architectures and programming languages and models, including shared memory (eg OpenMP on your multicore laptop), distributed memory (MPI and UPC on a supercomputer), GPUs (CUDA and OpenCL), and cloud (MapReduce, Hadoop and Spark). Parallel algorithms and software tools for common computations (eg dense and sparse linear algebra, graphs, structured grids). Tools for load balancing, performance analysis, debugging. How high level applications are built (eg climate modeling). On-line lectures and office hours.
Applications of Parallel Computers: Read More [+]
Objectives & Outcomes

Student Learning Outcomes: An understanding of computer architectures at a high level, in order to understand what can and cannot be done in parallel, and the relative costs of operations like arithmetic, moving data, etc.
To master parallel programming languages and models for different computer architectures
To recognize programming "patterns" to use the best available algorithms and software to implement them.
To understand sources of parallelism and locality in simulation in designing fast algorithms

Rules & Requirements

Prerequisites: Computer Science W266 or the consent of the instructor

Credit Restrictions: Students will receive no credit for Computer Science W267 after completing Computer Science C267.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of web-based lecture per week

Online: This is an online course.

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Demmel, Yelick

Applications of Parallel Computers: Read Less [-]

COMPSCI 268 Computer Networks 3 Units

Terms offered: Spring 2023, Spring 2021, Spring 2019
Distributed systems, their notivations, applications, and organization. The network component. Network architectures. Local and long-haul networks, technologies, and topologies. Data link, network, and transport protocols. Point-to-point and broadcast networks. Routing and congestion control. Higher-level protocols. Naming. Internetworking. Examples and case studies.
Computer Networks: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 162

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Joseph, Katz, Stoica

Formerly known as: 292V

Computer Networks: Read Less [-]

COMPSCI 270 Combinatorial Algorithms and Data Structures 3 Units

Terms offered: Fall 2024, Spring 2023, Spring 2021
Design and analysis of efficient algorithms for combinatorial problems. Network flow theory, matching theory, matroid theory; augmenting-path algorithms; branch-and-bound algorithms; data structure techniques for efficient implementation of combinatorial algorithms; analysis of data structures; applications of data structure techniques to sorting, searching, and geometric problems.
Combinatorial Algorithms and Data Structures: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 170

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Papadimitriou, Rao, Sinclair, Vazirani

Combinatorial Algorithms and Data Structures: Read Less [-]

COMPSCI 271 Randomness and Computation 3 Units

Terms offered: Fall 2024, Fall 2022, Spring 2020
Computational applications of randomness and computational theories of randomness. Approximate counting and uniform generation of combinatorial objects, rapid convergence of random walks on expander graphs, explicit construction of expander graphs, randomized reductions, Kolmogorov complexity, pseudo-random number generation, semi-random sources.
Randomness and Computation: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 170 and at least one course from the following: COMPSCI 270 - COMPSCI 279

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Sinclair

Randomness and Computation: Read Less [-]

COMPSCI 272 Foundations of Decisions, Learning, and Games 4 Units

Terms offered: Not yet offered
This course introduces students to the mathematical foundation of learning in the presence of strategic and societal agency. This is a theory-oriented course that will draw from the statistical and computational foundations of machine learning, computer science, and economics. As a research-oriented course, a range of advanced topics will be explored to paint a comprehensive
picture of classical and modern approaches to learning for the purpose of decision making.These topics include foundations of learning, foundations of algorithmic game theory, cooperative and non-cooperative games, equilibria and dynamics, learning in games, information asymmetries, mechanism design, and learning with incentives.
Foundations of Decisions, Learning, and Games: Read More [+]
Rules & Requirements

Prerequisites: Graduate-level mathematical maturity, including proof-based graduate-level courses in at least two, but recommended three, of the following categories: Statistics and Probability, e.g., STAT205A, STAT210B Economics, e.g., ECON207A Algorithms, e.g., CS270 Optimization, e.g., EE 227B Control theory, e.g., EE 221A

Credit Restrictions: Students will receive no credit for COMPSCI 272 after completing COMPSCI 272. A deficient grade in COMPSCI 272 may be removed by taking COMPSCI 272.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Jordan, Haghtalab

Foundations of Decisions, Learning, and Games: Read Less [-]

COMPSCI 276 Cryptography 3 Units

Terms offered: Fall 2024, Fall 2020, Fall 2018
Graduate survey of modern topics on theory, foundations, and applications of modern cryptography. One-way functions; pseudorandomness; encryption; authentication; public-key cryptosystems; notions of security. May also cover zero-knowledge proofs, multi-party cryptographic protocols, practical applications, and/or other topics, as time permits.
Cryptography: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 170

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Trevisan, Wagner

Cryptography: Read Less [-]

COMPSCI 278 Machine-Based Complexity Theory 3 Units

Terms offered: Spring 2024, Spring 2021, Fall 2016
Properties of abstract complexity measures; Determinism vs. nondeterminism; time vs. space; complexity hierarchies; aspects of the P-NP question; relative power of various abstract machines.
Machine-Based Complexity Theory: Read More [+]

Rules & Requirements

Prerequisites: 170

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Trevisan

Machine-Based Complexity Theory: Read Less [-]

COMPSCI 280A Intro to Computer Vision and Computational Photography 4 Units

Terms offered: Fall 2024, Fall 2023
This course introduces students to computing with visual data (images and video). We will cover acquisition, representation, and manipulation of visual information from digital photographs (image processing), image analysis and visual understanding (computer vision), and image synthesis (computational photography). Key algorithms will be presented, ranging from classical to contemporary, with an emphasis on using these techniques to build practical systems. The hands-on emphasis will be reflected in the programming assignments, where students will acquire their own images and develop, largely from scratch, image analysis and synthesis tools for real-world applications.
Intro to Computer Vision and Computational Photography: Read More [+]

Objectives & Outcomes

Course Objectives: Students will learn classic algorithms in image manipulation with Gaussian and Laplacian Pyramids, understand the hierarchy of image transformations including homographies, and how to warp an image with these transformations., Students will learn how to apply Convolutional Neural Networks for
computer vision problems and how they can be used for image manipulation.
Students will learn the fundamentals of 3D vision:
stereo, multi-view geometry, camera calibration, structure-frommotion, multi-view stereo, and the plenoptic function
mechanics of a pin-hole camera, representation of images as pixels, physics of light and the process of image formation, to manipulating the visual information using signal processing techniques in the spatial and frequency domains.

Student Learning Outcomes: After this class, students will be comfortable implementing, from scratch, these algorithms in modern programming languages and deep learning libraries.

Rules & Requirements

Prerequisites: COMPSCI 61B and MATH 53. MATH 54, MATH 56, MATH 110, or EECS 16A. COMPSCI 182 or COMPSCI 189

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Efros, Kanazawa

Intro to Computer Vision and Computational Photography: Read Less [-]

COMPSCI C280 Computer Vision 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Paradigms for computational vision. Relation to human visual perception. Mathematical techniques for representing and reasoning, with curves, surfaces and volumes. Illumination and reflectance models. Color perception. Image segmentation and aggregation. Methods for bottom-up three dimensional shape recovery: Line drawing analysis, stereo, shading, motion, texture. Use of object models for prediction and recognition.
Computer Vision: Read More [+]
Rules & Requirements

Prerequisites: MATH 1A; MATH 1B; MATH 53; and MATH 54 (Knowledge of linear algebra and calculus)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Malik

Also listed as: VIS SCI C280

Computer Vision: Read Less [-]

COMPSCI C281A Statistical Learning Theory 3 Units

Terms offered: Fall 2023, Fall 2021, Fall 2020
Classification regression, clustering, dimensionality, reduction, and density estimation. Mixture models, hierarchical models, factorial models, hidden Markov, and state space models, Markov properties, and recursive algorithms for general probabilistic inference nonparametric methods including decision trees, kernal methods, neural networks, and wavelets. Ensemble methods.
Statistical Learning Theory: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Bartlett, Jordan, Wainwright

Also listed as: STAT C241A

Statistical Learning Theory: Read Less [-]

COMPSCI C281B Advanced Topics in Learning and Decision Making 3 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Recent topics include: Graphical models and approximate inference algorithms. Markov chain Monte Carlo, mean field and probability propagation methods. Model selection and stochastic realization. Bayesian information theoretic and structural risk minimization approaches. Markov decision processes and partially observable Markov decision processes. Reinforcement learning.
Advanced Topics in Learning and Decision Making: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Bartlett, Jordan, Wainwright

Also listed as: STAT C241B

Advanced Topics in Learning and Decision Making: Read Less [-]

COMPSCI 282A Designing, Visualizing and Understanding Deep Neural Networks 4 Units

Terms offered: Fall 2023, Spring 2023, Fall 2022
Deep Networks have revolutionized computer vision, language technology, robotics and control. They have growing impact in many other areas of science and engineering. They do not however, follow a closed or compact set of theoretical principles. In Yann Lecun's words they require "an interplay between intuitive insights, theoretical modeling, practical implementations, empirical studies, and scientific analyses." This course attempts to cover that ground.
Designing, Visualizing and Understanding Deep Neural Networks: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Students will come to understand visualizing deep networks. Exploring the training and use of deep networks with visualization tools.
Students will learn design principles and best practices: design motifs that work well in particular domains, structure optimization and parameter optimization.

Understanding deep networks. Methods with formal guarantees: generative and adversarial models, tensor factorization.

Rules & Requirements

Prerequisites: MATH 53 and MATH 54 or equivalent; COMPSCI 70 or STAT 134; COMPSCI 61B or equivalent; COMPSCI 189 or COMPSCI 289A (recommended)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Canny

Designing, Visualizing and Understanding Deep Neural Networks: Read Less [-]

COMPSCI 284A Foundations of Computer Graphics 4 Units

Terms offered: Spring 2024, Spring 2023, Spring 2022
Techniques of modeling objects for the purpose of computer rendering: boundary representations, constructive solids geometry, hierarchical scene descriptions. Mathematical techniques for curve and surface representation. Basic elements of a computer graphics rendering pipeline; architecture of modern graphics display devices. Geometrical transformations such as rotation, scaling, translation, and their matrix representations. Homogeneous coordinates, projective and perspective transformations.
Foundations of Computer Graphics: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 61B or COMPSCI 61BL; programming skills in C, C++, or Java; linear algebra and calculus; or consent of instructor

Credit Restrictions: Students will receive no credit for Computer Science 284A after taking 184.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Agrawala, Barsky, O'Brien, Ramamoorthi, Sequin

Foundations of Computer Graphics: Read Less [-]

COMPSCI 284B Advanced Computer Graphics Algorithms and Techniques 4 Units

Terms offered: Spring 2024, Spring 2022, Spring 2019
This course provides a graduate-level introduction to advanced computer graphics algorithms and techniques. Students should already be familiar with basic concepts such as transformations, scan-conversion, scene graphs, shading, and light transport. Topics covered in this course include global illumination, mesh processing, subdivision surfaces, basic differential geometry, physically based animation, inverse kinematics, imaging and computational photography, and precomputed light transport.
Advanced Computer Graphics Algorithms and Techniques: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 184

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: O'Brien, Ramamoorthi

Formerly known as: Computer Science 283

Advanced Computer Graphics Algorithms and Techniques: Read Less [-]

COMPSCI 285 Deep Reinforcement Learning, Decision Making, and Control 3 Units

Terms offered: Fall 2023, Fall 2022, Fall 2021
Intersection of control, reinforcement learning, and deep learning. Deep learning methods, which train large parametric function approximators, achieve excellent results on problems that require reasoning about unstructured real-world situations (e.g., computer vision, speech recognition, NLP). Advanced treatment of the reinforcement learning formalism, the most critical model-free reinforcement learning algorithms (policy gradients, value function and Q-function learning, and actor-critic), a discussion of model-based reinforcement learning algorithms, an overview of imitation learning, and a range of advanced topics (e.g., exploration, model-based learning with video prediction, transfer learning, multi-task learning, and meta-learning).
Deep Reinforcement Learning, Decision Making, and Control: Read More [+]

Objectives & Outcomes

Student Learning Outcomes: Provide an opportunity to embark on a research-level final project with support from course staff.
Provide hands-on experience with several commonly used RL algorithms;
Provide students with an overview of advanced deep reinforcement learning topics, including current research trends;
Provide students with foundational knowledge to understand deep reinforcement learning algorithms;

Rules & Requirements

Prerequisites: CS189/289A or equivalent is a prerequisite for the course. This course will assume some familiarity with reinforcement learning, numerical optimization and machine learning, as well as a basic working knowledge of how to train deep neural networks (which is taught in CS182 and briefly covered in CS189)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Levine, Abbeel

Deep Reinforcement Learning, Decision Making, and Control: Read Less [-]

COMPSCI 286 Implementation of Data Base Systems 3 Units

Terms offered: Fall 2009, Spring 2009, Spring 2008
Implementation of data base systems on modern hardware systems. Considerations concerning operating system design, including buffering, page size, prefetching, etc. Query processing algorithms, design of crash recovery and concurrency control systems. Implementation of distributed data bases and data base machines.
Implementation of Data Base Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 162 and COMPSCI 186; or COMPSCI 286A

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Franklin, Hellerstein

Formerly known as: Computer Science 286B

Implementation of Data Base Systems: Read Less [-]

COMPSCI 286A Introduction to Database Systems 4 Units

Terms offered: Spring 2018, Fall 2017, Spring 2017
Access methods and file systems to facilitate data access. Hierarchical, network, relational, and object-oriented data models. Query languages for models. Embedding query languages in programming languages. Database services including protection, integrity control, and alternative views of data. High-level interfaces including application generators, browsers, and report writers. Introduction to transaction processing. Database system implementation to be done as term project.
Introduction to Database Systems: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 61B and COMPSCI 61C

Credit Restrictions: Students will receive no credit for CS 286A after taking CS 186.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Franklin, Hellerstein

Introduction to Database Systems: Read Less [-]

COMPSCI 287 Advanced Robotics 3 Units

Terms offered: Fall 2019, Fall 2015, Spring 2015
Advanced topics related to current research in algorithms and artificial intelligence for robotics. Planning, control, and estimation for realistic robot systems, taking into account: dynamic constraints, control and sensing uncertainty, and non-holonomic motion constraints.
Advanced Robotics: Read More [+]
Rules & Requirements

Prerequisites: Instructor consent for undergraduate and masters students

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Abbeel

Advanced Robotics: Read Less [-]

COMPSCI 287H Algorithmic Human-Robot Interaction 4 Units

Terms offered: Spring 2023, Spring 2021, Spring 2020
As robot autonomy advances, it becomes more and more important to develop algorithms that are not solely functional, but also mindful of the end-user. How should the robot move differently when it's moving in the presence of a human? How should it learn from user feedback? How should it assist the user in accomplishing day to day tasks? These are the questions we will investigate in this course.
We will contrast existing algorithms in robotics with studies in human-robot interaction, discussing how to tackle interaction challenges in an algorithmic way, with the goal of enabling generalization across robots and tasks. We will also sharpen research skills: giving good talks, experimental design, statistical analysis, literature surveys.
Algorithmic Human-Robot Interaction: Read More [+]
Objectives & Outcomes

Student Learning Outcomes: Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
apply Bayesian inference and learning techniques to enhance coordination in collaborative tasks.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
apply optimization techniques to generate motion for HRI.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
contrast and relate model-based and model-free learning from demonstration.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
develop a basic understanding of verbal and non-verbal communication.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
ground algorithmic HRI in the relvant psychology background.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to
tease out the intricacies of developing algorithms that support HRI.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to analyze and diagram the literature related to a particular topic.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to communicate scientific content to a peer audience.
Students will have gained both knowledge/abilities related to human-robot interaction, as well as to research and presentation skills including being able to critique a scientific paper's experimental design and analysis.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Dragan

COMPSCI 288 Natural Language Processing 4 Units

Terms offered: Fall 2024, Fall 2023, Spring 2023
Methods and models for the analysis of natural (human) language data. Topics include: language modeling, speech recognition, linguistic analysis (syntactic parsing, semantic analysis, reference resolution, discourse modeling), machine translation, information extraction, question answering, and computational linguistics techniques.
Natural Language Processing: Read More [+]
Rules & Requirements

Prerequisites: COMPSCI 188; and COMPSCI 170 is recommended

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructor: Klein

Natural Language Processing: Read Less [-]

COMPSCI 289A Introduction to Machine Learning 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
This course provides an introduction to theoretical foundations, algorithms, and methodologies for machine learning, emphasizing the role of probability and optimization and exploring a variety of real-world applications. Students are expected to have a solid foundation in calculus and linear algebra as well as exposure to the basic tools of logic and probability, and should be familiar with at least one modern, high-level programming language.
Introduction to Machine Learning: Read More [+]
Rules & Requirements

Prerequisites: MATH 53, MATH 54, COMPSCI 70, and COMPSCI 188; or consent of instructor

Credit Restrictions: Students will receive no credit for Comp Sci 289A after taking Comp Sci 189.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Instructors: Listgarten, Malik, Recht, Sahai, Shewchuk

Introduction to Machine Learning: Read Less [-]

COMPSCI 294 Special Topics 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Topics will vary from semester to semester. See Computer Science Division announcements.
Special Topics: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring:
4 weeks - 3-15 hours of lecture per week
6 weeks - 3-9 hours of lecture per week
8 weeks - 2-6 hours of lecture per week
10 weeks - 2-5 hours of lecture per week
15 weeks - 1-3 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Letter grade.

Special Topics: Read Less [-]

COMPSCI 297 Field Studies in Computer Science 12.0 Units

Terms offered: Fall 2022, Spring 2016, Fall 2015
Supervised experience in off-campus companies relevant to specific aspects and applications of electrical engineering and/or computer science. Written report required at the end of the semester.
Field Studies in Computer Science: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-12 hours of independent study per week

Summer:
6 weeks - 1-30 hours of independent study per week
8 weeks - 1.5-22.5 hours of independent study per week
10 weeks - 1-18 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Field Studies in Computer Science: Read Less [-]

COMPSCI 298 Group Studies Seminars, or Group Research 1 - 4 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
Advanced study in various subjects through seminars on topics to be selected each year, informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for analysis and experimentation.
Group Studies Seminars, or Group Research: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction. Students may enroll in multiple sections of this course within the same semester.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: The grading option will be decided by the instructor when the class is offered.

Group Studies Seminars, or Group Research: Read Less [-]

COMPSCI 299 Individual Research 1 - 12 Units

Terms offered: Fall 2023, Fall 2022, Summer 2017 Second 6 Week Session
Investigations of problems in computer science.
Individual Research: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0-1 hours of independent study per week

Summer:
6 weeks - 8-30 hours of independent study per week
8 weeks - 6-22.5 hours of independent study per week
10 weeks - 1.5-18 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Graduate

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Research: Read Less [-]

COMPSCI 302 Designing Computer Science Education 3 Units

Terms offered: Spring 2023, Spring 2022, Spring 2021
Discussion and review of research and practice relating to the teaching of computer science: knowledge organization and misconceptions, curriculum and topic organization, evaluation, collaborative learning, technology use, and administrative issues. As part of a semester-long project to design a computer science course, participants invent and refine a variety of homework and exam activities, and evaluate alternatives for textbooks, grading and other administrative policies, and innovative uses of technology.
Designing Computer Science Education: Read More [+]

Rules & Requirements

Prerequisites: COMPSCI 301 and two semesters of GSI experience

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Professional course for teachers or prospective teachers

Grading: Letter grade.

Instructor: Garcia

Designing Computer Science Education: Read Less [-]

COMPSCI 365 Introduction to Instructional Methods in Computer Science for Academic Interns 2 - 4 Units

Terms offered: Not yet offered
This is a course for aspiring Academic Interns (AIs). It provides pedagogical training and guidance to students by introducing them to the Big Ideas of Teaching and Learning, and how to put them into practice. The course covers what makes a safe learning environment, how students learn, how to guide students toward mastery, and psychosocial factors that can negatively affect even the best students and best teachers. Class covers both theoretical and practical pedagogical aspects of teaching STEM subjects—specifically Computer Science. An integral feature of the course lies in the weekly AI experience that students perform to practice their teaching skills.
Introduction to Instructional Methods in Computer Science for Academic Interns: Read More [+]

Rules & Requirements

Prerequisites: Completion of any DS or CS lower-division course and concurrent participation in the Academic Intern experience in EECS at UC Berkeley

Hours & Format

Fall and/or spring: 15 weeks - 2-2 hours of lecture and 3-9 hours of fieldwork per week

Summer: 8 weeks - 4-4 hours of lecture and 6-18 hours of fieldwork per week

Additional Details

Subject/Course Level: Computer Science/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Hunn, Garcia

Introduction to Instructional Methods in Computer Science for Academic Interns: Read Less [-]

COMPSCI 370 Adaptive Instruction Methods in Computer Science 3 Units

Terms offered: Fall 2024, Spring 2024, Fall 2023
This is a course for aspiring teachers or those who want to instruct with expertise from evidence-based research and proven equity-oriented practices. It provides pedagogical training by introducing the big ideas of teaching and learning, and illustrating how to put them into practice. The course is divided into three sections—instructing the individual; a group; and psycho-social factors that affect learning at any level. These sections are designed to enhance any intern's, tutor's, or TA's teaching skillset. Class is discussion based, and covers theoretical and practical pedagogical aspects to teaching in STEM. An integral feature of the course involves providing weekly tutoring sessions.
Adaptive Instruction Methods in Computer Science: Read More [+]
Rules & Requirements

Prerequisites: Prerequisite satisfied Concurrently: experience tutoring or as an academic intern; or concurrently serving as an academic intern while taking course

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details

Subject/Course Level: Computer Science/Professional course for teachers or prospective teachers

Grading: Letter grade.

Instructor: Hunn

Adaptive Instruction Methods in Computer Science: Read Less [-]

COMPSCI 375 Teaching Techniques for Computer Science 2 Units

Terms offered: Fall 2024, Spring 2024, Spring 2023
Discussion and practice of techniques for effective teaching, focusing on issues most relevant to teaching assistants in computer science courses.
Teaching Techniques for Computer Science: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of discussion per week

Summer: 8 weeks - 4 hours of discussion per week

Additional Details

Subject/Course Level: Computer Science/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Instructors: Barsky, Garcia, Harvey

Teaching Techniques for Computer Science: Read Less [-]

COMPSCI 399 Professional Preparation: Supervised Teaching of Computer Science 1 or 2 Units

Terms offered: Spring 2020, Fall 2018, Fall 2016
Discussion, problem review and development, guidance of computer science laboratory sections, course development, supervised practice teaching.
Professional Preparation: Supervised Teaching of Computer Science: Read More [+]
Rules & Requirements

Prerequisites: Appointment as graduate student instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-2 hours of independent study per week

Summer: 8 weeks - 1-2 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Professional course for teachers or prospective teachers

Grading: Offered for satisfactory/unsatisfactory grade only.

Professional Preparation: Supervised Teaching of Computer Science: Read Less [-]

COMPSCI 602 Individual Study for Doctoral Students 1 - 8 Units

Terms offered: Fall 2015, Fall 2014, Spring 2014
Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees).
Individual Study for Doctoral Students: Read More [+]
Rules & Requirements

Credit Restrictions: Course does not satisfy unit or residence requirements for doctoral degree.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Summer: 8 weeks - 6-45 hours of independent study per week

Additional Details

Subject/Course Level: Computer Science/Graduate examination preparation

Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Students: Read Less [-]