COMPUTER SCIENCE (CSCI)

CSCI 187. Creative Computing and Society: Computing, Creativity and the Social Good. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Other:2
Introduces computing through creativity and examining social problems, guiding students to create visual artifacts that empower them to draw insights from data, complemented by discussions on computing's societal impact. This course does not count towards the computer science minor. Prerequisite: permission of the instructor. Not open to computer science majors and computer science engineering majors.

CSCI 1NT. Computer Science Non-traditional Study. .25-2 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies
Non-traditional study in computer science. Prerequisite: permission of the instructor.

CSCI 201. Computer Science Seminar. .5 Credits.
Offered Fall Semester Only; Lecture hours:1.5
A variety of Computer Science related topics presented by faculty, alumni, student speakers, and other relevant guests. Presentations and discussions on the frontier of the discipline, professional development, ethics and societal issues, and other topics relevant to the profession. Prerequisite: open to sophomores. Others by permission of the instructor.

CSCI 202. Research Methods. .5 Credits.
Offered Spring Semester Only; Lecture hours:1.5
An introduction to research methodology in Computer Science, involving reading scientific literature, developing presentation skills, and learning to use various software packages. Prerequisites: open to first years and sophomores. Others by permission of the instructor.

CSCI 203. Introduction to Computer Science. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Students will learn the python programming language in order to explore the capabilities, limits, and social impact of computing. Application areas include image manipulation, data manipulation and visualization, introductions to predictive models, and ethical programming practices. Not open to students who have taken ANOP 203 or ECEG 230.

CSCI 204. Data Structures & Algorithms. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Introduction to data structures and algorithms using an object-oriented approach. Topics include software-engineering principles, object-oriented programming, recursion, basic data structures, algorithm analysis and team programming. Prerequisite: CSCI 203 or ECEG 230 or permission of the instructor.

CSCI 205. Software Engineering and Design. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Fundamentals of software design and software engineering. Students will participate in large-scale, team-based software development project. Prerequisite: CSCI 204 or permission of the instructor.

CSCI 278. Computer Science Individual Study. .5-1 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies,Other:Varies; Repeatable
Independent study or project in computer science. Prerequisite: permission of the instructor.

CSCI 279. Topics in Computer Science. .5-1 Credits.
Offered Either Fall or Spring; Lecture hours:Varies
Current topics of interest. Prerequisite: permission of the instructor.

CSCI 2NT. Computer Science Non-traditional Study. .25-2 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies
Non-traditional study in computer science. Prerequisite: permission of the instructor.

CSCI 306. Computer Systems. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Fundamental concepts showcasing the integration of hardware and software. Topics include data representation, processor, memory, I/O, Unix system programming in C and assembly, introduction to operating systems, and development tools. Prerequisite: CSCI 204 or permission of the instructor. Not open to students who have taken CSCI 206.

CSCI 307. Computer Networks and Security. .5 Credits.
Offered Spring Semester Only; Lecture hours:1.5
Introduction to network programming including datagram and virtual circuit protocols. Introduction to topics in computer security such as authentication, integrity, access control, applied cryptography and secure programming. Prerequisite: CSCI 206 or CSCI 306.

CSCI 308. Programming Language Design. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Study of modern programming language paradigms (procedural, functional, logic, object-oriented). Introduction to the design and implementation of programming languages including syntax, semantics, data types and structures, control structures, run-time environments. Prerequisite: CSCI 205 or permission of the instructor. Not open to students who have taken CSCI 208.

CSCI 311. Algorithm Design & Analysis. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Recitation:1
An introduction to standard patterns and techniques in algorithm design and tools for analyzing algorithmic performance. Students learn to evaluate algorithms, design new algorithmic solutions, and communicate the correctness and usefulness of their solutions. Prerequisite: MATH 241 or (MATH 240 and MATH 280) and CSCI 204.

CSCI 315. Operating Systems Design. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3,Lab:2
Introduction to operating system design including processor management, scheduling, memory management, resource allocation, file systems and concurrency. Prerequisite: CSCI 306.

CSCI 320. Computer Architecture. 1 Credit.
Offered Fall Semester Only; Lecture hours:3
Explores two important topics in computer architecture today: memory hierarchy and parallelism in all its forms. Students will use a hardware description language to implement concepts including pipelining, cache and branch prediction. Prerequisite: CSCI 206 or CSCI 306 or ECEG 247 or permission of the instructor. Crosslisted as ECEG 443 and ECEG 643.

CSCI 331. Compiler Optimization. 1 Credit.
Offered Occasionally; Lecture hours:3
Project based introduction to compiler optimization for theoretical and practical issues such as run-time, memory usage, code robustness, and security. Prerequisite: CSCI 308.

CSCI 332. The Internet of Things. 1 Credit.
Offered Either Fall or Spring; Lecture hours:3
A broad investigation into the design of internet-connected physical objects and the infrastructure that supports them. This hands-on course covers topics including embedded systems, wireless communication, internet protocols, cloud computing and security. Students will develop their own IoT system. Prerequisite: (CSCI 206 or CSCI 306) or ECEG 247. Crosslisted as ECEG 432 and ECEG 632.

CSCI 341. Theory of Computation. 1 Credit.
Offered Fall Semester Only; Lecture hours:3,Recitation:1
Finite automata, regular sets, pushdown automata, context-free grammars. Turing machines, recursive functions and undecidability. Prerequisite: MATH 241 or MATH 280.

CSCI 345. Computers and Society. 1 Credit.
Offered Both Fall and Spring; Lecture hours:3
Analysis of the impact of computing on society through the application of deontological and consequence-based ethical theories and professional codes of ethics. Students will learn to analyze the impacts of computing on the fundamental values of society so as to be able to create systems that don't oppose social progress.

CSCI 349. Introduction to Data Mining. 1 Credit.
Offered Occasionally; Lecture hours:3
Data preprocessing, statistical modeling, basic machine learning algorithms for mining large datasets. Topics include association analysis, frequent pattern mining, classification, and clustering. Prerequisites: CSCI 311 and (MATH 216 or MATH 226 or MATH 227).

CSCI 351. Distributed Computing. 1 Credit.
Offered Occasionally; Lecture hours:3
An introduction to concurrency, communication, and fault-tolerance. Students learn fundamental models of distributed computing and use them to study classic problems and their solutions or impossibility. Examples include consensus, mutual exclusion, distributed data structures and more. We focus primarily on theoretical results, also applying them in practical implementations.

CSCI 358. Human Computer Interaction. 1 Credit.
Offered Occasionally; Lecture hours:3
In this interdisciplinary course, we will study research at the intersection of people and computing. Through a variety of prototypes that we'll build (3D user interfaces, visual design, data communication, intelligent user interfaces, etc), we will deliberately practice processes that result in useful, usable and maybe even inspirational computer interfaces.

CSCI 359. Fairness, Privacy, & Transparency When Learning From Data. 1 Credit.
Offered Either Fall or Spring; Lecture hours:3
The course enables students to audit and analyze data-centric systems and processes that are used to make decisions about people's lives and understand the bias, fairness, privacy, and transparency implications of these systems. We will read, discuss, and implement ideas from recently published research articles in this upcoming area.

CSCI 363. Computer Networks. 1 Credit.
Offered Occasionally; Lecture hours:3
Principles and design of networked computing systems and application programs. Topics include reliable communications medium access control, security, routing, transport, congestion control and networked applications. Prerequisite: CSCI 306 or ECEG 247.

CSCI 365. Image Processing & Analysis. 1 Credit.
Offered Either Fall or Spring; Lecture hours:3,Other:1
Imaging is everywhere! In this course, we will cover broadly the acquisition, processing, and analysis of digital images, covering topics ranging from the human visual system, to image and video compression algorithms, to pattern recognition and machine learning within the context of automatic image understanding.

CSCI 368. Wireless Networks & Applications. 1 Credit.
Offered Either Fall or Spring; Lecture hours:4
This course explores the realm of modern wireless technologies and their practical applications, familiarizing students with the ever-evolving landscape of wireless networks. It equips students with a profound understanding of wireless communication principles, protocols and network architectures, covering fundamental concepts such as radio frequency fundamentals, as well as advanced topics. Crosslisted as ECEG 479 and ECEG 679.

CSCI 375. Teaching Assistant in CSCI. .25-1 Credits.
Offered Both Fall and Spring; Lecture hours:Varies,Other:Varies; Repeatable
Teaching assistant to support mastery in a core computer science course. Written learning objectives and assessment policies will be developed with the course instructor. Prerequisites: by permission only.

CSCI 376. Computer Science Honors Thesis. .5-1 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies; Repeatable
Independent work on computer science honors thesis. Prerequisite: permission of the instructor.

CSCI 378. Individual Study in Computer Science. .5-1 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies; Repeatable
Independent study in computer science. Recent areas include graph algorithms, computer security, distributed computing, graphics, programming languages, software engineering, web information retrieval. Prerequisites: junior standing and permission of the instructor.

CSCI 379. Topics in Computer Science. .25-1 Credits.
Offered Either Fall or Spring; Lecture hours:Varies; Repeatable
Current topics of interest.

CSCI 3NT. Computer Science Non-traditional Study. .25-4 Credits.
Offered Fall, Spring, Summer; Lecture hours:Varies,Other:3
Non-traditional study course in computer science. Prerequisite: permission of the instructor.

CSCI 475. Senior Design I. .5 Credits.
Offered Fall Semester Only; Lecture hours:1,Other:2
A recognized software engineering methodology will be used with all phases of a senior design project. Written work will include a technical report about the project, a feasibility report, and a requirements specification document. Prerequisite: permission of the instructor. Not open to students who have taken ENGR 452.

CSCI 476. Senior Design II. 1 Credit.
Offered Spring Semester Only; Lecture hours:2,Other:2
Students undertake several cycles of delivery, each including a design document, product implementation, testing, and feedback. Students produce technical and user's manuals for the final version. Class presentations of designs and implementations. Includes public presentation of the final product and design process. Prerequisites: CSCI 475 and permission of the instructor.