

Department of Computer Science

College of Engineering

Engineering Technology, Room 240
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Chair and Professor: Murali Medidi. *Associate Professors:* Andersen, Buffenbarger, Jain, Uh. *Assistant Professors:* S. Medidi, Stark, Yeh. *Special Lecturer:* Cole.

Degrees Offered

- B.S. in Computer Science (B.S.C.S.)
- M.S. in Computer Science (See the *BSU Graduate Catalog*)

Department Statement

Computer science is a discipline which is concerned with the study of computing, which includes programming, automating tasks, creating tools to enhance productivity, and the understanding of the foundations of computation.

The computer science program provides the breadth and depth needed to succeed in this rapidly changing field. Graduates of this program are well-prepared for immediate employment in either the computer industry or many other businesses that increasingly rely on computer science. The Computer Science major is the primary avenue into jobs with titles like Software Engineer, Software Developer, Systems Analyst, Systems Engineer, and others. Our students have also been successful at strong graduate schools.

The B.S. in Computer Science is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone (410) 347-7700.

Educational Objectives

Graduates of the bachelor of science in Computer Science program are expected to:

- Use their expertise to solve problems in core areas of computer science.
- Apply written and oral communication skills individually and in team environments.
- Continue their education in computer science either formally or informally.
- Understand a professional code of ethics in computing.

Degree Requirements

Computer Science Bachelor of Science	
Course Number and Title	Credits
ENGL 101-102 Introduction to College Writing and Research	6
Area I— see page 44 for list of approved courses	
ENGR 102 The Ethical Dimensions of Technology OR PHIL 101 Introduction to Philosophy	3
Area I core course in a second field	3
Area I core course in a third field	3
Area I core course in any field	3
Area II— see page 44 for list of approved courses	
COMM 101 Fundamentals of Speech Communication	3
Area II core course in a second field	3
Area II core course in a third field	3
Area II core course in any field	3

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Computer Science (continued)	
Area III	
Area III requirements are automatically met by specific courses included in the major requirements below.	
A year's sequence in a laboratory science CHEM 111, 111L-112, 112L General Chemistry I & II with Labs OR PHYS 211, 211L-212, 212L Physics I & II with Calculus and Labs	8-10
COMPSCI 125 Introduction to Computer Science I	4
COMPSCI 225 Introduction to Computer Science II	4
COMPSCI 230 Ethical Issues in Computing	2
COMPSCI 253 Object-Oriented Program Development in C	2
COMPSCI 342 Data Structures and Algorithms	4
COMPSCI 354 Programming Languages	3
COMPSCI 361 Introduction to the Theory of Computation	3
COMPSCI 441 Computer Architecture	3
COMPSCI 450 Programming Language Translation	4
COMPSCI 453 Operating Systems	4
COMPSCI 471 Software Engineering	3
COMPSCI 488 Senior Outcome Assessment	0
COMPSCI 498 Seminar	1
ECE 230, 230L Digital Systems and Lab	4
ECE 332, 332L Microprocessors and Lab	4
ENGL 202 Technical Communication	3
Three additional computer science courses chosen from: COMPSCI 357 Introduction to Artificial Intelligence COMPSCI 367 Cryptology I OR COMPSCI 368 Cryptology II OR ECE 456 Pattern Recognition COMPSCI 410 Databases COMPSCI 425 Introduction to Computer Networks COMPSCI 430 Parallel Computing COMPSCI 455 Distributed Systems COMPSCI 464 Computer Graphics I COMPSCI 465 Computer Graphics II COMPSCI 472 Object-Oriented Design Patterns	9
Required mathematics courses: MATH 170 Calculus I	4
MATH 175 Calculus II	4
MATH 187 Discrete and Foundational Mathematics I	4
MATH 361 Probability and Statistics I	3
One mathematics course chosen from the following: MATH 275 Multivariate and Vector Calculus MATH 301 Introduction to Linear Algebra MATH 307 Cryptology I MATH 308 Cryptology II MATH 333 Differential Equations with Matrix Theory MATH 387 Discrete and Foundational Mathematics II	3-4
One additional science or engineering course chosen from approved list available in the department office.	3-5
Electives to total 128 credits	7-12
Total	128

Computer Science Minor	
Course Number and Title	Credits
COMPSCI 125 Introduction to Computer Science I	4
COMPSCI 225 Introduction to Computer Science II	4
COMPSCI 253 Object-Oriented Program Development in C	2
COMPSCI 342 Data Structures and Algorithms	4
MATH 170 Calculus I	4
MATH 187 Discrete and Foundational Mathematics I	4
Total	22

Course Offerings

See page 63 for a definition of the course-numbering system.

COMPSCI—Computer Science

Lower Division

COMPSCI 115 INTRODUCTION TO C (2-0-2)(F/S). An introduction to the syntactic and execution characteristics of C, including selection statements, loops, arrays, functions, and pointers. Construction, compilation, debugging, and execution of complete programs that implement given algorithms or solve simple problems. Previous programming experience is recommended, though not mandatory; C is not ideal as a first programming language. PREREQ: Satisfactory placement score.

COMPSCI 117 INTRODUCTION TO C++ (3-0-3)(F/S). An introductory course in computer programming, using the C++ language in a Unix environment. Topics include: scalar types; aggregate types; pointers and reference types; statements; expressions; functions; libraries; and a brief introduction to classes, objects, and overloading. Emphasis is on: development, compilation, debugging, and execution of complete programs implementing given algorithms for numerical, scientific, and engineering applications. PREREQ: MATH 147 or satisfactory placement score.

COMPSCI 119 INTRODUCTION TO JAVA (2-0-2)(F,S). Syntactic and execution characteristics of Java. Translating simple algorithms into Java programs; coding, compiling, finding, and correcting errors, and executing the programs. PREREQ: MATH 108 or a satisfactory math placement score.

COMPSCI 120 INTRODUCTION TO PROGRAMMING CONCEPTS (2-0-2)(F,S). Fundamental programming concepts using the Alice interactive 3-D programming system. Intended as preparation for COMPSCI 125.

COMPSCI 125 INTRODUCTION TO COMPUTER SCIENCE I (4-0-4)(F,S). Data and procedure abstraction. Problem solving techniques, recursive algorithms, basic searching and sorting techniques. Introduction to object-based programming. Software development process (specification, design, stepwise refinement). Note: COMPSCI 115, 117, 119, or 120 recommended for students with no programming experience. PREREQ: MATH 144 or MATH 147 or satisfactory math placement score.

COMPSCI 221 INTRODUCTION TO COMPUTER GRAPHICS AND INTERFACE DESIGN (3-0-3)(F)(Even years). Includes elementary rasterization, perspective and viewport transformations. Basics of graphical user interface design and construction, event-driven programming, callbacks, and Web programming. PREREQ: COMPSCI 125.

COMPSCI 225 INTRODUCTION TO COMPUTER SCIENCE II (4-0-4)(F,S). Introduction to notions of program correctness and to analysis of time and space requirements. Object-oriented programming, including hierarchies and inheritance. Abstract data types both basic (list, tree, set, and relation) and derived (queues, stacks, priority queues, and dictionaries) and their implementation and applications. Concrete data structures (linked lists, binary search trees, hash tables, etc.). PREREQ: COMPSCI 125.

COMPSCI 230 ETHICAL ISSUES IN COMPUTING (2-0-2)(F/S). Privacy, intellectual property rights, computer crime, codes of conduct. Risks and liabilities of computer-based systems. Electronic information and free speech. PREREQ: COMPSCI 225 and ENGL 102 and ENGR 102 or PHIL 101.

COMPSCI 253 OBJECT-ORIENTED PROGRAM DEVELOPMENT IN C (2-0-2)(S). Introduction to object-oriented style of programming in C. Basic structure of C programs, function pointers, variable argument lists, other generic programming techniques. Building software with Make. Testing and debugging techniques. Case studies. (Pass/Fail.) PREREQ: COMPSCI 225.

Upper Division

COMPSCI 342 DATA STRUCTURES AND ALGORITHMS (4-0-4)(F,S). Basic data structures (continued from COMPSCI 225), introduction to design and analysis of algorithms, fundamental algorithms for sequences, sets, graphs and combinatorial problems, introduction to complexity of problems. Examples are drawn from various areas of computer science. PREREQ: COMPSCI 225, MATH 170, and MATH 187.

COMPSCI 354 PROGRAMMING LANGUAGES (3-0-3)(F). Principles of programming languages: design, syntax, semantics, information binding, strings, arithmetic, input/output, recursion and extensibility. PRE/COREQ: COMPSCI 342.

COMPSCI 357 INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3-0-3)(F)(Odd years). Topics in artificial intelligence: heuristic search, game playing, rule-based systems, genetic algorithms, and neural networks. Significant project work demonstrating various AI techniques. PREREQ: COMPSCI 225.

COMPSCI 361 INTRODUCTION TO THE THEORY OF COMPUTATION (3-0-3)(S). Grammars, automata, Turing machines, decidability and complexity, language hierarchies, and normal forms. Concepts of NP completeness and reducibilities. Applications will be drawn from various areas of computer science. PREREQ: COMPSCI 342.

COMPSCI 367 (MATH 307) CRYPTOLOGY I (4-0-4)(F). Introduction to modular arithmetic. The study of: the RSA, El-Gamal, Diffie-Hellman, and Blum-Blum-Shrub public key cryptosystems, authentication and digital signatures, anonymity protocols. Protocol failures for these systems. Crosslisted with COMPSCI 367 and COMPSCI 567; credit may be received for only one of these three courses. PREREQ: MATH 170 and MATH 187.

COMPSCI 368 (MATH 308) CRYPTOLOGY II (4-0-4)(S). Introduction to groups, fields, polynomial rings and Lucas numbers. The study of: the Elliptic Curve, LUC, and NTRU public keys cryptosystems, authentication and digital signatures, anonymity protocols. Cross listed with MATH 308 and COMPSCI 368/568; credit may be received for only one of these three courses. PREREQ: MATH 170 and MATH 187.

COMPSCI 410 DATABASES (3-0-3)(S)(Odd years). Foundations of database management systems. Database models: relational, object and others. Database design: entity-relationship modeling, logical relational schema design, functional dependencies and normalization, and database tuning. Database application development using database interfaces embedded in host languages. PREREQ: COMPSCI 342.

COMPSCI 425 INTRODUCTION TO COMPUTER NETWORKS (3-0-3)(S). Concepts and implementation of TCP/IP internetworking: link, network, and transport layer protocols. Application layer services. Wireless networking basics. PREREQ: COMPSCI 253 and COMPSCI 342.

COMPSCI 430 PARALLEL COMPUTING (3-0-3)(F)(Even years). Models of parallel computation. Fundamental design patterns used in parallel algorithms: partitioning, divide and conquer, software pipelining, synchronous computations and load balancing. Implementation on parallel clusters. Design of parallel systems. PREREQ: COMPSCI 253 and COMPSCI 342.

COMPSCI 441 (ECE 432) COMPUTER ARCHITECTURE (3-0-3)(S). Structure of computer systems using processors, memories, input/output (I/O) devices as building blocks. Computer system instruction set design and implementation, including memory hierarchies, microprogramming, pipelining and multiprocessors. Issues and trade-offs involved in the design of computer system architectures with respect to the design of instruction sets. Applications of Hardware Description Languages (HDL) in the design of computer systems. May be taken for either COMPSCI or ECE credit, but not both. PREREQ: COMPSCI 117 or COMPSCI 125, and ECE 332.

COMPSCI 450 PROGRAMMING LANGUAGE TRANSLATION (4-0-4)

(S). Theory and practice of formal language translation, experience with compiler construction tools under UNIX. Students work on significant projects. PREREQ: COMPSCI 253 and COMPSCI 342 and COMPSCI 354.

COMPSCI 453 OPERATING SYSTEMS (4-0-4) (F). Process management, concurrency, inter-process communication, synchronization, scheduling, memory management, file systems and security. Case studies of multiple operating systems. PREREQ: COMPSCI 253 and COMPSCI 342 and ECE 332.

COMPSCI 455 DISTRIBUTED SYSTEMS (3-0-3) (S) (Even years). Principles and paradigms of distributed systems. Communication, processes, naming, synchronization, consistency and replication, fault tolerance and security. In-depth coverage of Remote Procedure Call (RPC), Remote Method Invocation (RMI) and socket programming. Survey of major distributed systems. Several software projects. PREREQ: COMPSCI 453.

COMPSCI 464 COMPUTER GRAPHICS I (3-0-3) (F) (Even years). Mathematics and programming techniques for computer graphics emphasizing raster graphics, rasterization algorithms, and scanline rendering. Two- and three-dimensional transformations, homogeneous coordinates, projections; clipping, hidden-surface removal. PREREQ: COMPSCI 342 and MATH 301; MATH 275 recommended.

COMPSCI 465 COMPUTER GRAPHICS II (3-0-3) (S) (Odd years). Polygonal representation of 3D objects, lighting models, shading and shadows, texture mapping, antialiasing, interactive graphics. Nonrecursive and recursive ray tracing. PREREQ: COMPSCI 464.

COMPSCI 471 SOFTWARE ENGINEERING (3-0-3) (F). A formal study of the software development process. Topics include: life cycle models, requirements definition, specification, design, implementation, validation, verification, maintenance, and reuse. Students work in small teams on significant projects. PREREQ: COMPSCI 342.

COMPSCI 472 OBJECT-ORIENTED DESIGN PATTERNS (3-0-3) (F) (Even years). Reviews object-oriented design principles, explains the goals and form of design patterns, and examines several well-known patterns. PREREQ: COMPSCI 342.

COMPSCI 488 SENIOR OUTCOME ASSESSMENT (0-0-0) (F,S). Required to graduate. In their last semester, senior students will take an outcome-assessment examination. (Pass/Fail.) PREREQ: Senior Standing.

COMPSCI 498 SEMINAR (1-0-1) (F/S). Research, writing, and an oral presentation of a current topic in computer science. (Pass/Fail.) PREREQ: COMPSCI 342.

Department of Construction Management

College of Engineering

Engineering Technology Building, Room 201
<http://coen.boisestate.edu/cm/home.asp>

Phone: (208) 426-3764
 Fax: (208) 426-4800

Chair and Associate Professor: Rebecca Mirsky. *Associate Chair and Associate Professor:* Songer. *Assistant Professors:* Cline, Davis. *Lecturer:* Mincks

Degrees Offered

- B.S. and Minor in Construction Management (B.S.C.M.)

Program Statement

The vision of the Construction Management program is to be recognized for providing consistent, high quality education for construction management professionals.

The mission of the Construction Management program is to provide a comprehensive education for the development of professional constructors who, through innovation, character and ability are prepared to meet the construction needs of society. The Construction Management program is accredited by the American Council for Construction Education (ACCE).

Students interested in the Construction Management program should note the following:

1. All construction management majors must complete at least 45 credits, be in Good Academic Standing, and make application to the department chair before being admitted to any upper-division construction management classes. Students will be evaluated based upon departmental policy CMGT04-002 found on the departmental website.
2. All construction management classes take several field trips during the semester (normally scheduled on Friday afternoons).
3. No more than 32 credits may be taken from the College of Business and Economics.
4. Where a class is included in more than one list of electives, it may be used to fulfill only one requirement.

The program in construction management is accredited by the American Council for Construction Education, 1717 North Loop 1604 East, Suite 320; San Antonio, Texas 78232-1570, telephone (210) 495-6161, <http://acce-hq.org/>

Degree Requirements

Construction Management B.S.C.M.	
Course Number and Title	Credits
ENGL 101-102 Introduction to College Writing and Research	6
Area I— see page 44 for list of approved courses	
Area I core course in one field	3
Area I core course in a second field	3
Area I core course in any field	3
Area II— see page 44 for list of approved courses	
COMM 101 Fundamentals of Speech Communication	3
ECON 202 Principles of Microeconomics	3
Area II core course in any field	3
Area III	
MATH 160 Survey of Calculus OR MATH 170 Calculus I	4
PHYS 111 General Physics OR PHYS 211, 211L, Physics I with Calculus and Lab	4-5
PHYS 112 General Physics OR PHYS 212, 212L Physics II with Calculus and Lab	4-5

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