COMM 4950 Senior Capstone Seminar 3(3)  In-depth exploration and analysis of a special topic in Communication Studies, culminating in a senior project documented in written, oral, visual and/or multimedia presentations. Topics vary based on faculty expertise and research interests. May be repeated for a maximum of six credits. Preq: Senior standing in Communication and one of the following courses with a C or better: COMM 3100 or COMM 3102 or COMM 3150.

COMM 4960 Honors Creative Inquiry Capstone 3(3)  Capstone course for honors students in the department's creative inquiry sequence. Working with their departmental honors advisor, students apply theoretical understanding and research skills in completing a written product of conference or publication length/quality. Must be taken for a total of six credits over the course of two semesters. Preq: Two of the following courses with a C or better in each: COMM 3060 or COMM 3100 or COMM 3110; and Senior standing in Communication.

COMM 4980 Communication Academic and Professional Development I 1(1)  Students reflect upon curricular relationships among general education, major, and minor courses. They complete and revise digital portfolios for presentation to the major, University, graduate schools, or potential employers. Students participate in resume building, job seeking, and interviewing activities. Preq or concurrent enrollment: COMM 4950 or COMM 4960.

COMM 4990 Independent Study 1-3(3)  Tutorial work for students with special interests or projects in communication studies outside the scope of existing courses. May be repeated for a maximum of nine credits. Preq: Consent of department chair.

COMPUTER SCIENCE


CPSC 1010 Computer Science I 4(3)  Introduction to modern problem solving and programming methods. Special emphasis is placed on algorithm development and software life cycle concepts. Includes use of appropriate tools, and ethical issues involving computing and society are discussed. Credit will only be given for one of CPSC 1010, 1060 or 1110. Includes Honors sections. Preq or concurrent enrollment: MATH 1020 or MATH 1040 or MATH 1050 or MATH 1060 or MATH 1070 or MATH 1080 or MATH 2070. Students who do not meet the prerequisite, but who score a satisfactory score on the Clemson Mathematics Placement Test, or have AP or transfer credit for their math requirements, may request a registration override from the instructor. Coreq: CPSC 1011.

CPSC 1011 Computer Science I Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1010. Coreq: CPSC 1010.

CPSC 1020 Computer Science II 4(3)  Continuation of CPSC 1010. Continued emphasis on problem solving and program development techniques. Examines typical numerical, nonnumerical, and data processing problems. Introduces basic data structures. Credit may not be received for both CPSC 1020 and 1070. Includes Honors sections. Preq: CPSC 1010 or CPSC 1110 with a C or better. Coreq: CPSC 1021.

CPSC 1021 Computer Science II Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1020. Coreq: CPSC 1020.

CPSC 1040 Introduction to the Concepts and Logic of Computer Programming 2(1)  Introduction to the concepts and logic of computer programming. Simple models are used to introduce basic techniques for developing a programmed solution to a given problem. Problem solving techniques are considered. Not open to students who have received credit for CPSC 1010, CPSC 1070, CPSC 1110, or CPSC 1570. Coreq: CPSC 1041.

CPSC 1041 Introduction to the Concepts and Logic of Computer Programming Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1040. Coreq: CPSC 1040.

CPSC 1060 Introduction to Programming in Java 4(3)  Principles of software development, style and testing. Topics include procedural and object-oriented programming in the context of real-world applications. Credit will be given for only one of CPSC 1010, 1060 or 1110. Preq or concurrent enrollment: MATH 1020 or MATH 1040 or MATH 1050 or MATH 1060 or MATH 1070 or MATH 1080 or MATH 2070. Students who do not meet the prerequisite, but who score a satisfactory score on the Clemson Mathematics Placement Test, or have AP or transfer credit for their math requirements, may request a registration override from the instructor. Coreq: CPSC 1061.

CPSC 1061 Introduction to Programming in Java Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1060. Coreq: CPSC 1060.

CPSC 1070 Programming Methodology 4(3)  Introduction to programming techniques and methodology. Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, and analysis of algorithms. Credit may not be received for both CPSC 1020 and 1070. Preq: CPSC 1060. Coreq: CPSC 1071.

CPSC 1071 Programming Methodology Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1070. Coreq: CPSC 1070.

CPSC 1100 Introduction to Programming in C 3(2)  Introduction to computer programming in C and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques, algorithms and standard Unix software development tools and utilities. Credit will be given for only one of CPSC 1010, 1060 or 1110. Coreq: CPSC 1111.

CPSC 1110 Introduction to Programming in C Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1110. Coreq: CPSC 1110.

CPSC 1150 Introduction to Computational Science 3(3)  Introduction to systems thinking. Includes development of dynamical systems models using visual modeling tools and development of dynamical systems using agent based software. Class material investigates elementary science and engineering models.

CPSC 1200 Introduction to Information Technology 3(2)  Investigation of ethical and societal issues based on the expanding integration of computers into our everyday lives. Considers historical background, terminology, new technologies and the projected future of computers. Includes practical experience with common computer software technologies. Will not satisfy Computer Science Requirements in any Computer Science major. Coreq: CPSC 1201.

CPSC 1201 Introduction to Information Technology Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1200. Coreq: CPSC 1200.

CPSC 1210 Computational Thinking 3(2)  Introduces the central idea of computer science, and instills ideas and practices of computational thinking. Students engage in creative activities to learn how computing can change the world. Coreq: CPSC 1211.

CPSC 1211 Computational Thinking Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1210. Coreq: CPSC 1210.

CPSC 1610 Introduction to Visual Basic Programming 3(2)  Introduction to programming using the Visual Basic language. Topics include simple and complex data types, arithmetic operations, control flow, files, and database programming. Several projects are implemented during the semester. Coreq: CPSC 1611.

CPSC 1611 Introduction to Visual Basic Programming Laboratory 0(2)  Non-credit laboratory to accompany CPSC 1610. Coreq: CPSC 1610.

CPSC 1990 Creative Inquiry in Computing I 3(1-3)  Students engage in faculty-led research in the context of a team effort. May be repeated for a maximum of six credits.

CPSC 2070 Discrete Structures for Computing 3(3)  Introduces ideas and techniques from discrete structures that are widely used in the computing sciences. Topics emphasize techniques of rigorous argumentation and application to the computing disciplines. Preq: CPSC 1010 or CPSC 1060 or CPSC 1110; and MATH 1020 or MATH 1060 or MATH 1070.

CPSC 2120 Algorithms and Data Structures 4(3)  Study of data structures and algorithms fundamental to computer science; abstract data-type concepts; measures of program running time and time complexity; algorithm analysis and design techniques. Preq: CPSC 1020 with a C or better or CPSC 1070 with a C or better. Coreq: CPSC 2121.

CPSC 2121 Algorithms and Data Structures Laboratory 0(2)  Non-credit laboratory to accompany CPSC 2120. Coreq: CPSC 2120.
CPSC 2150 Software Development Foundations (3) Intensive study of software development foundations. Advanced coverage of programming language primitives, function-level design principles, and standard development and debugging tools. Introductory coverage of module-level design principles, program specification and reasoning principles, and validation and verification techniques. Prereq: CPSC 1020 with a C or better or 1070 with a C or better. Coreq: CPSC 2151.

CPSC 2151 Software Development Foundations Laboratory (0) Non-credit laboratory to accompany CPSC 2150. Coreq: CPSC 2150.

CPSC 2200 Microcomputer Applications (3) Applications of microcomputers to formulate and solve problem models. Emphasizes applications development in database and spreadsheet environments. Current software products are used. Students are expected to have experience with word processing and spreadsheet applications.

CPSC 2310 Introduction to Computer Organization (4) Study of the machine architectures on which algorithms are implemented and requirements of architectures that support high-level languages, programming environments, and applications. Prereq: CPSC 1020 with a C or better or 1070 with a C or better. Coreq: CPSC 2311.

CPSC 2311 Introduction to Computer Organization Laboratory (0) Non-credit laboratory to accompany CPSC 2310. Coreq: CPSC 2310.

CPSC 2810 Selected Topics in Computer Science I (1-4) Areas of computer science in which new trends arise. Innovative approaches to a variety of problems in the use and understanding of basic computing concepts are developed and implemented. May be repeated for a maximum of eight credits, but only if different topics are covered.

CPSC 2910 Seminar in Professional Issues I (1) Considers the impact of computer use on society. Discusses ethical use of software and protection of intellectual property rights. Profession is viewed historically; organizations important to the profession are discussed; the development process for standards is presented; and students are introduced to the professional literature. Prereq: CPSC 1020 or CPSC 2100.

CPSC 2920 Computing, Ethics and Global Society (3) Discussion of the concern for the way in which computers pose new ethical questions or pose new versions of standard moral problems and dilemmas. Application of ethical concepts and frameworks to guide the computer professional. Topics include the digital divide, privacy, globalization, professional code of ethics, e-waste and intellectual property. Includes a small discussion breakout to discuss and analyze current topics related to computing and society. Prereq: ENGL 1030. Coreq: CPSC 2921.

CPSC 2921 Computing, Ethics and Global Society Recitation (0) Non-credit recitation to accompany CPSC 2920. Coreq: CPSC 2920.

CPSC 3220 Introduction to Operating Systems (3) Detailed study of management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. May also be offered as ECE 3220. Prereq: CPSC 2120 and CPSC 2310, each with a C or better; or ECE 2230 and ECE 2720, each with a C or better.

CPSC 3300 Computer Systems Organization (3) Introduction to the structure of computer systems. Various hardware/software configurations are explored and presented as integrated systems. Topics include digital logic, basic computer organization, computer arithmetic, memory organization, input/output organizations, interrupt processing, microprocessors, and cluster computers. Prereq: CPSC 2120 and CPSC 2310, each with a C or better.

CPSC 3500 Foundations of Computer Science (3) Development of the theoretical foundations of programming, algorithms, languages, automata, computability, complexity, data structures, and operating systems; a broad range of fundamental topics is consolidated and extended in preparation for further study. Prereq: CPSC 2070 and CPSC 2120, each with a C or better.

CPSC (ECE) 3520 Programming Systems (3) An advanced course in programming languages and systems for computer engineering and computer science majors. The course objective is to enable a more complete understanding of programming topics and related supporting tools, including philosophy, methodology, formal syntax and semantics, and examples of programming paradigms, languages and development approaches. May also be offered as ECE 3520. Prereq: ECE 2230; or CPSC 2120 and CPSC 2310, each with a C or better.

CPSC (ECE) 3520 Programming Systems (3) An advanced course in programming languages and systems for computer engineering and computer science majors. The course objective is to enable a more complete understanding of programming topics and related supporting tools, including philosophy, methodology, formal syntax and semantics, and examples of programming paradigms, languages and development approaches. May also be offered as ECE 3520. Prereq: ECE 2230; or CPSC 2120 and CPSC 2310, each with a C or better.

CPSC 3600 Networks and Network Programming (3) Intensive introduction to software engineering. Focuses on each major phase of the software lifecycle. Introductory coverage of requirements analysis, requirements modeling, design modeling, and project management. Intermediate coverage of module-level design principles, program specification and reasoning principles, and program validation and verification techniques. Prereq: CPSC 2120 and CPSC 2150, each with a C or better.

CPSC 3950 Honors Seminar I (1) Research topics in various areas of computer science are presented. Methods for identifying and initiating research projects are considered. May be repeated for a maximum of two credits. Prereq: Admission to Departmental Honors Program.

CPSC 3990 Advanced Creative Inquiry in Computing I (1-3) Upper-division students engage in faculty-led research in the context of a team effort. May be repeated for a maximum of six credits. Includes Honors sections. Prereq: Junior standing.

CPSC 4040* Computer Graphics Images (3) Presents the theory and practice behind the generation and manipulation of two-dimensional digital images within a computer graphics context. Image representation and storage, sampling and reconstruction, color systems, affine and general warps, enhancement and morphology, compositing, morphing, and non-photorealistic transformations. Prereq: CPSC 2120 and MATH 3110; or DPA 4010.

CPSC 4050* Computer Graphics Images (3) Computational, mathematical, physical and perceptual principles underlying the production of effective three-dimensional computer graphics imagery. Prereq: CPSC 2120 and MATH 3110; or DPA 4010.

CPSC 4100* Virtual Reality Systems (3) Design and implementation of software systems necessary to create virtual environments. Discusses techniques for achieving real-time, dynamic display of photorealistic, synthetic images. Includes hands-on experience with electromagnetically-tracked, head-mounted displays and requires, as a final project, the design and construction of a virtual environment. Prereq: CPSC 2120 and 2150, both with a C or better.

CPSC 4120* Eye Tracking Methodology and Applications (3) Introduction to the human visual system; visual perception; eye movements; eye tracking systems and applications in psychology, industrial engineering, marketing, and computer science; hands-on experience with real time, corneal-reflection eye trackers, experimental issues. Prereq: CPSC 2120 or MKT 4310 or PSYC 3100.

CPSC 4140* Human and Computer Interaction (3) Survey of human and computer interaction, its literature, history, and techniques. Covers cognitive and social models and limitations, hardware and software interface components, design methods, support for design, and evaluation methods. Prereq: CPSC 2120 and 2150, each with a C or better.
CPSC 4240* System Administration and Security 3(3)
Covers principles of information systems security, including security policies, cryptography, authentication, access control mechanisms, system evaluation models, auditing, and intrusion detection. Computer security system case studies are analyzed. Preq: CPSC 3220 or ECE 3220; and 3600, each with a C or better.

CPSC 4200* Computer Security Principles 3(3)
In-depth study of computer security system case studies are analyzed. Preq: CPSC 3220 or ECE 3220; and 3600, each with a C or better.

CPSC 4630* On-line Systems 3(3)
In-depth study of computer security system case studies are analyzed. Preq: CPSC 3220 or ECE 3220; and 3600, each with a C or better.

CPSC 4240* System Administration and Security 3(3)
Covers principles of information systems security, including security policies, cryptography, authentication, access control mechanisms, system evaluation models, auditing, and intrusion detection. Computer security system case studies are analyzed. Preq: CPSC 3220 or ECE 3220; and 3600, each with a C or better.

CPSC 4280* Design and Implementation of Programming Languages 3(3)
Overview of programming language structures and features and their implementation. Control and data structures found in various languages are studied. Also includes runtime organization and environment and implementation models. Preq: CPSC 2310 and 3500, each with a C or better.

CPSC 4550* Computational Science 3(3)
Introduction to the methods and problems of computational science. Uses problems from engineering and science to develop mathematical and computational solutions. Case studies use techniques from Grand Challenge problems. Emphasizes the use of networking, group development, and modern programming environments. Preq: MATH 1080 and MATH 3110. Students are expected to have previous programming experience in a higher level language.

CPSC 4620* Database Management Systems 3(3)
Introduction to database/data communication concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining, and accessing multiple user databases are presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems is made. Includes Honors sections. Preq: CPCS 2120 and CPSC 2150, each with a C or better.

CPSC 4630* On-line Systems 3(3)
In-depth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. Preq: CPSC 4620.

CPSC 4700* Software Development Methodology 3(3)
Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs are discussed and used in a major project. Emphasizes the application of these techniques to large-scale software implementation projects. Also includes additional topics such as mathematical foundations of structured programming and verification techniques. Includes Honors sections. Preq: CPSC 3720 with a C or better.

CPSC (ECE) 4780* General Purpose Computation on Graphical Processing Units 3(3)
Instruction in the design and implementation of highly parallel, GPU-based systems to computationally intensive problems from a variety of disciplines. The OpenGL language with interoperable OpenGL components is used. Applications to models of physical systems are discussed in detail. May also be offered as ECE 4780. Preq: CPSC 2120 or ECE 2230.

CPSC 4810* Selected Topics 1-3(1-3)
A survey of topics related to the administration and security of computer systems. Primary emphasis is on the administration and security of contemporary operating systems. Preq: CPSC 3220 or ECE 3220; and 3600, each with a C or better.

CPSC 4550* Computational Science 3(3)
Introduction to the methods and problems of computational science. Uses problems from engineering and science to develop mathematical and computational solutions. Case studies use techniques from Grand Challenge problems. Emphasizes the use of networking, group development, and modern programming environments. Preq: MATH 1080 and MATH 3110. Students are expected to have previous programming experience in a higher level language.

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CRP 4010* Introduction to City and Regional Planning 3(3)
Introduces students from other disciplines to city and regional planning. Spatial and nonspatial areas of the discipline are explored through a wide ranging lecture/seminar program. Preq: Consent of instructor.

CRP 4030* Seminar on Planning Communication 3(3)
In-depth analysis of methods to communicate planning and policy decisions effectively. Familiarizes students with the various communication skills needed by planners, policy makers, and other professionals to become successful practitioners. Preq: Consent of instructor.

CRP (CE) 4120* Urban Transportation Planning 3(3)
Consideration of urban travel characteristics, characteristics of transportation systems, transportation and land-use studies, trip distribution and trip assignment models, city patterns and subdivision layout. May also be offered as CE 4120. Preq: CE 3110.

CRP 4301* The Nature of Geographic Information Systems (GIS) 3(3)
Introduction to the theory and practical use of Geographic Information Systems (GIS). The course emphasizes geographic and statistical information and how it is represented and analyzed with computers. It introduces the concepts and components of GIS and how they affect societal issues. Coreq: CRP 4301.

CRP 4300* The Nature of Geographic Information Systems (GIS) Laboratory 0(3)
Non-credit laboratory to accompany CRP 4300. Coreq: CRP 4300.

CONSTRUCTION SCIENCE AND MANAGEMENT

Professors: D.C. Bausman, S.N. Clarke, R.W. Liska, C.A. Piper; Assistant Professors: J.M. Burgett, J.D. Lucas

CSM 1000 Introduction to Construction Science and Management 3(3)
Introduction to the construction industry and the Construction Science and Management Department. Preq: Construction Science and Management major.

CSM 1500 Construction Problem Solving 3(3)

CSM 2010 Structures I 3(3)
Study of statically determinate structural components and systems, including force applications and distributions in structural elements and the resulting stress-strain patterns in axial, shear, and bearing mechanisms. Preq: MATH 1020 or MATH 1060; and PHYS 2070 and PHYS 2090; and Construction Science and Management major.

CSM 2020 Structures II 4(3)
Study of force distribution and behavior in statically determinate structural components and systems; analysis and design of basic reinforced concrete, steel, wood, and formwork components and systems, including shear and moment stress, combined loading/ stress conditions, and deflections. Preq: CSM 2010; and Construction Science and Management or Architecture major. Coreq: CSM 2021.

CSM 2021 Structures II Laboratory 0(2)