COMS 470 Research Assistant in Communication Studies (1-4)
Intended to give selected students experience in the construction and implementa-
tion of a professor’s research project. Consent of instructor and department contract
required.

COMS 495 Special Studies (1-4)
Supervised study of a particular problem or area of interest in the media selected
by the student in consultation with a sponsoring faculty member. Meetings will be
arranged for discussions and progress evaluations. May be repeated for credit.
Consent of instructor and Special Study 495 contract required.

COMS 497 Journalism Field Study (1-3)
Students will travel to the national journalism conference where they will attend
educational seminars in all aspects of journalism from writing, to design photogra-
phy, to media convergence. They will attend lectures and speeches by both nation-
ally and internationally renowned journalists and scholars. To be taken with COMS
368. May be repeated for up to 3 units of credit.

COMS 499 Media Internship (1-4)
This class provides students with an opportunity to discover how to make an ef-
fective transition from the classroom to the workplace. For a semester, individuals
work in a media firm, business, newspaper, radio, or TV station. On the job, students
learn networking and negotiating skills. Assignments for class include: a resume,
workplace lingo, self-evaluation, profile of supervisor, and album with photos and
text that describe the experience. There is also an interview for a job. Seniors
only. Consent of instructor, internship agreement form, and department contracts
required. Can be taken for up to 12 units only.

Computer Science (CS)

CS 101 Introduction to Computers and Computing (3)
Lecture, 2 hours; laboratory, 2 hours. This course is an introduction to the concepts,
techniques, uses, applications, and terminology of computers, computing, and
networking. Emphasis is on the possibilities and limitations of computers and com-
puting in a wide range of personal, commercial, and organizational activities. Topics
include computer types, history of computing, computer organization and operation,
computer languages, program development, computer applications (word process-
ing, database, graphics, spreadsheets, etc.), basic networking, and computers in
society. Weekly hands-on experience with a variety of operating systems, applica-
tions, and computer programming. Not applicable to the CS major. Recommended
for all students. Satisfies GE Area B3.

CS 115 Programming I (4)
Lecture, 3 hours; laboratory, 3 hours. This course gives an overview of computer
organization; arithmetic and logical expressions, decision and iteration; simple I/O;
subprograms; principles of good programming style, readability, documentation,
and structured programming concepts; top-down design and refinements; tech-
niques of debugging; and testing. Use of the above concepts will be implemented in
a standard high-level programming language. Satisfies GE Area B3. Prerequisite: GE
math and English eligibility, or consent of instructor.

CS 115W Programming I Workshop (1)
A workshop designed to be taken with CS 115. Exploration of programming con-
cepts through problem solving in a group setting. Co-requisite: CS 115.

CS 175 Introduction to Computer Graphics (3)
Lecture, 2 hours; laboratory, 2 hours. This is the first course in computer graphics
hardware and software. Topics include graphics hardware, microcomputer graphics,
presentation and business graphics, graphics for artists, computer mapping, CAD/
CAM (drafting and environmental applications), animation, 3-dimensional graphics,
and desktop publishing. Students will have hands-on experience using a variety of
graphics programs on microcomputers. Not applicable to the CS major. Prerequisite:
previous computer courses or consent of instructor.

CS 185 Special Topics in Computer Science (1-4)
Content will be indicated by the specific topic. Prerequisite: consent of instructor.

CS 210 Introduction to Unix (1)
Laboratory, 3 hours. This course is an introduction to the use of Linux/Unix as a
programming environment. Communicating with a Unix host, shells and shell com-
mands, files and directories, Gnome desktop, jobs and processes, scripting, pro-
gramming utilities (compiler, linker, debugger, make, hex dump, etc.). Prerequisites:
CS 115 and previous or concurrent enrollment in CS 215, or consent of instructor.

CS 215 Programming II (4)
Lecture, 3 hours; laboratory, 3 hours. This course is the sequel to CS 115. Topics
include: pointers and dynamic allocation of storage linked lists, an introduction to
the object oriented programming (OOP) paradigm, classes and objects, encapsula-
tion, member variables and member functions, inheritance and polymorphism,
scoping, templates, iterators, and error handling techniques. Prerequisites: CS 115
and previous or concurrent enrollment in CS 210, or consent of instructor.

CS 242 Discrete Structures for Computer Science (4)
Lecture, 4 hours. This course covers fundamental mathematical concepts blended
with their applications in Computer Science. Topics include: sets, functions and
relations, Boolean algebra, normal forms, Karnaugh map and other minimization
techniques, predicate logic, formal and informal proof techniques, relational algebra,
basic counting techniques, recurrence relations, and an introduction to graph
theory. Prerequisites: CS 115 and MATH 161 or 161X, or consent of instructor.
CS 252 INTRODUCTION TO COMPUTER ORGANIZATION (4)
Lecture, 3 hours; laboratory 3 hours. This course looks at the interface between computer hardware and software by introducing computer architecture and low-level programming. Topics to be covered include: data representations, digital logic, combinational and sequential circuits, computer system organization from the machine language point of view, and assembly language implementation of high-level constructs. Prerequisites: CS 215 and CS 242, or consent of instructor.

CS 285 SELECTED TOPICS IN COMPUTER SCIENCE (1-4)
This lower-division course may be repeated with different subject matter. Content will be indicated by the specific topic. Prerequisite: as indicated in the specific topic description or consent of instructor.

CS 315 DATA STRUCTURES (4)
Lecture, 3 hours; laboratory, 3 hours. This course introduces the concept of the organization of data into different structures to support the efficient implementation of computer algorithms. The emphasis of the course is on the internal representation of the elementary and intermediate data structures, their time and space requirements, and their applications. A second component of the course is the study of more advanced features of object-oriented programming. Prerequisite: CS 210, CS 215, and CS 242, or consent of instructor.

CS 330 INTRODUCTION TO GAME PROGRAMMING (3)
Lecture, 2 hours; laboratory, 2 hours. This course is an introduction to the theory and practice of video game design and programming. Video games combine, in real-time, concepts in computer graphics, human-computer interaction, networking, artificial intelligence, computer aided instruction, computer architecture, and databases. This course introduces students to a variety of game engines and frameworks and explores artificially intelligent agents. Students will work as part of a team to create a complete description document for a computer game and implement a prototype of the game. Prerequisite: CS 315 or instructor consent.

CS 340 COMPUTER SECURITY AND MALWARE (3)
Lecture, 2 hours; laboratory, 2 hours. Current methods for increasing security, protecting privacy, and guaranteeing degrees of confidentiality of computer records; ensuring computer installation safety; protecting software products; preventing and dealing with crime; value systems, ethics, and human factors affecting use; and misuse of computers. Discussion of recent technical, legal, and sociopolitical issues influencing computer security problems, with an emphasis on malware. Prerequisites: CS 215 and CS 252, or consent of instructor.

CS 349 PROBLEM SOLVING IN A TEAM ENVIRONMENT (1)
Laboratory, 2 hours. This course focuses on problem solving and program development in a team programming environment. Topics include: techniques for problem analysis and algorithm design, rapid implementation and pair programming methods, use of standard container classes, and library functions. Different types of problems will be selected each semester. May be repeated for credit. A maximum of 3 units can be applied to the Computer Science major. Prerequisite: CS 315 or consent of instructor. SSU students taking this course participate in regional and national programming competitions.

CS 351 COMPUTER ARCHITECTURE (4)
Lecture, 4 hours. This course is the sequel to CS 252 and includes the following topics: instruction set design; stages of instruction execution: data, and control path design; pipelining; program optimization techniques; memory hierarchy; cache models and design issues; virtual memory and secondary storage; and I/O interfacing. Advanced topics to include some of the following: parallel architectures, DSP or other special purpose architecture, FPGA, reconfigurable architecture, and asynchronous circuit design. Prerequisites: CS 215 and CS 252, or consent of instructor.

CS 355 DATABASE MANAGEMENT SYSTEMS DESIGN (4)
Lecture, 4 hours. This course focuses on the theoretical as well as the practical aspects of modern database systems. Topics include the study of the entity-relationship (E/R) model, relational algebra, data normalization, XML as a semi-structured data model, data integrity, and database administration. Current tools and technologies are used to create and manipulate sample databases. Prerequisite: CS 215 or consent of instructor.

CS 360 OBJECT-ORIENTED PROGRAMMING (3)
Principles of object-oriented programming, including encapsulation, inheritance, polymorphism, and design patterns. Specific applications are developed in one or more object-oriented programming languages and will cover the use of application frameworks and graphical user interfaces based on object-oriented principles. Prerequisites: CS 315, or consent of instructor.

CS 365 COMPUTER NETWORKING AND THE INTERNET (3)
Lecture, 2 hours; laboratory, 3 hours. This course introduces the theory and practice of computer networking, with coverage of key theories in data communication and how these theories relate to current practices and will drive future practices. Network hardware implementations of local area networks, wide area networks, telephone networks, and wireless networks are investigated. Network software implementations of switches and routers, peer-to-peer networking, and hosted applications are investigated with exercises in writing and debugging network protocols in the laboratory. Prerequisites: CS 215 and CS 252, or consent of instructor.

CS 370 SOFTWARE DESIGN AND DEVELOPMENT (4)
Lecture, 4 hours. This course discusses techniques of software design and development such as software lifecycle, requirements, formal specification, metrics, design, functional and structural testing, rapid prototyping, complexity, version control, and team management. Software metrics, tools for component-based software development, Team-based, agile, and scrum methodologies emphasized. Prerequisite: CS 215 or consent of instructor.

CS 375 COMPUTER GRAPHICS (3)
Lecture, 2 hours; Laboratory, 2 hours. An introduction to computer graphics. Survey of the fundamental algorithms and methodologies, including, but not limited to, polygon fill, line-drawing, antialiasing, geometric transformations, viewing and clipping, spline representation, occlusion and visible surface detection, illumination, texturing, color models, rendering, shaders, animation, and emerging techniques. Prerequisites: CS 215 and MATH 161, or consent of instructor.

CS 380 ETS MAJOR FIELD TEST (1)
The focus of this course is preparation for the Major Field Test in Computer Science. Students will review material in the basic knowledge areas of computer science including: discrete structures, programming, algorithms and complexity, systems, software engineering, and information management. The course will culminate with students taking the Major Field Test in Computer Science administered through Educational Testing Services. This course is intended for students whom have completed the majority of required coursework in the CS major and are within one semester of graduation.

CS 385 SELECTED TOPICS IN COMPUTER SCIENCE (1-4)
This course may be repeated with different subject matter for credit in the CS major. Prerequisites: upper-division standing with consent of a CS advisor and consent of instructor.

CS 390 COMPUTER SCIENCE COLLOQUIUM (1)
Series of lectures on current developments in computer science. A maximum of 3 units can be applied to the CS major. Students will be required to attend all presentations, take notes, and research each of these presentations. Contact the department for specific information. Cr/NC only. May be repeated for credit.
CS 395 COMMUNITY INVOLVEMENT PROGRAM (1-4)
CIP involves students in basic community problems. The most common task for a 
CS student will be tutoring at a local school. Not applicable to the CS major. Prereq-
uisites: CS 115 and consent of instructor.

CS 415 ALGORITHM ANALYSIS (4)
Lecture, 4 hours. This course provides a systematic approach to the design and 
analysis of algorithms with an emphasis on efficiency. Topics include algorithms 
for searching and sorting, hashing, exploring graphs, and integer and polynomial 
algorithmic. Foundations in recurrence relations, combinatorics, probability, and 
graph theory as used in algorithm analysis are covered. Standard design techniques 
such as divide-and-conquer, greedy method, dynamic programming, heuristics, and 
probabilistic algorithms along with NP-completeness and approximation algorithms 
are included. Prerequisite: CS 315, or consent of instructor.

CS 450 OPERATING SYSTEMS (4)
Lecture, 4 hours. This course covers the fundamental concepts of operating system 
design and implementation; the study of problems, goals, and methods of concur-
rent programming; and the fundamentals of systems programming. Topics include 
resource-management, process and thread scheduling algorithms, inter-process 
communication, I/O subsystems and device-drivers, memory management including 
virtual memory, segmentation, and page-replacement policies. These topics will be 
covered in theory and in practice through the study of the source-code of a working 
operating system. Prerequisites: CS 252 and CS 315, or consent of instructor.

CS 452 COMPILER DESIGN AND CONSTRUCTION (3)
Lecture, 2 hours; laboratory, 2 hours. Application of language and automata theory 
to the design and construction of compilers aswell as Lexical scanning, top-down 
and bottom-up parsing, semantic analysis, code generation, and optimization. De-
sign and construction of parts of a simple compiler using compiler generation tools. 
Prerequisites: CS 315 and 252, or consent of instructor.

CS 454 THEORY OF COMPUTATION (4)
Lecture, 4 hours. Overview of various kinds of computability, unsolvability, and 
decidability. The P versus NP problem. Abstract mathematical models of computing 
devices and language specification systems with focus on regular and context-free 
languages. Classification of computer-solvable problems. Prerequisite: CS 315, or 
consent of instructor.

CS 460 PROGRAMMING LANGUAGES (4)
Lecture, 4 hours. This course provides a survey of the syntactic, semantic, and 
implementation features of functional, procedural, object-oriented, logic, and 
concurrent programming languages. Prerequisites: CS 252 and CS 315, or consent 
of instructor.

CS 465 DATA COMMUNICATIONS (3)
Lecture, 2 hours; laboratory, 3 hours. The ISO reference model, theoretical basis for 
data communications, data transmission theory and practice, telephone systems, 
protocols, networks, internetworks, with examples. Prerequisite: CS 351, or consent 
of instructor.

CS 470 ADVANCED SOFTWARE DESIGN PROJECT (3)
Lecture, 3 hours. This course is a project-based course designed to provide a 
“real world, team oriented” capstone experience for Computer Science majors. 
Coursework will be organized around large programming projects. The content of 
the projects may vary depending on the interests of the instructor and may include 
industry, government, nonprofit organization, or other affiliations. Prerequisites: CS 
315, CS 370, and senior-standing in the major; or consent of instructor.

CS 480 ARTIFICIAL INTELLIGENCE (3)
This course is a survey of techniques that simulate human intelligence. Topics 
may include: pattern recognition, general problem solving, adversarial game-tree 
search, decision-making, expert systems, neural networks, fuzzy logic, and genetic 
algorithm. Prerequisite: CS 315 or consent of instructor.