COUN 581 Introduction to Chemical Dependency (1)

A survey course designed to provide a broad conceptual base regarding the major dimensions of dependence upon drugs/alcohol. Emphasis is on practical issues from the standpoint of the family and the community. The course explores historical and current modes of treatment, intervention, and prevention of alcoholism and alcohol-related problems. Students are expected to have a basic understanding of psychopathology and family systems prior to enrollment. This course is designed to provide specific instruction in alcoholism and other chemical substance dependency, and is designed to meet the requirements issued by the Board of Behavioral Sciences, State of California.

COUN 582 Psychopharmacology for Counselors (3)

This didactic course explores basic principles and applications of psychopharmacology in the mental health field. Emphasis is paid to neurotransmitter systems in the nervous system, principles of drug action, and clinical pharmacology (the use of medications to treat behavioral, psychological, and psychiatric conditions such as eating disorders, depressive disorders, hyperactivity, anxiety disorders, psychotic disorders, and dementia). Attention will be paid to the community counselor's role in the effective, multiculturally-competent, and ethical use of psycho-active medications (e.g., referral, consultation, monitoring) when psychopharmacological interventions are part of treatment as well as to the historical and sociopolitical contextual issues surrounding the prescription of psychiatric medication.

COUN 583 Substance Abuse and Dependence (2)

A didactic course designed to provide a broad conceptual base regarding major dimensions of alcohol and drug abuse and dependence disorders. The course explores theories of addiction; co-occurring disorders; and medical aspects, effects, and approaches to prevention, assessment, and treatment of alcohol and drug abuse/dependence disorders. The contextual role of the family and larger systems, including the legal system, are addressed. Risk factors, community resources, referral, and prevention information is discussed from developmental and cross-cultural perspectives.

COUN 595 Special Studies (1-4)

COUN 596 Clinical Consultation Seminar (1-2)

This seminar will provide a group discussion and supervision format in conjunction with the pre-M.A. Field Experience/Traineeship. This seminar's weekly small group meetings (max of 8 students) are designed to provide campus-based consultation surrounding the Pre-M.A. clinical Traineeship, using case presentation and group discussion. A key aim of the seminar is the development of a model of professional functioning through the integration of theoretical, practice and personal material. Integral to this experience is the exchange of feedback and support among group members. The course is designed to provide an opportunity for continuing evaluation of student growth and counseling efficacy. This component will include evaluation from faculty and site-supervisors, as well as students ongoing self-assessment. This course is designed to meet California Board of Behavioral Science requirements that allow Pre-M.A. Trainees to earn hours toward MFT licensure.

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 computing 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 processing, database, graphics, spreadsheets, etc.), basic networking, and computers in society. Weekly hands-on experience with a variety of operating systems, applications, 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, structured programming concepts; top-down design and refinements; techniques 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 concepts 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 Linux host, shells and shell commands, files and directories, Gnome desktop, jobs and processes, scripting, programming utilities (compiler, linker, debugger, make, hex dump, etc.). Prerequisites: Grade of C- or better in 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, encapsulation, member variables and member functions, inheritance and polymorphism, scoping, templates, iterators, and error handling techniques. Prerequisites: Grade of C- or better in 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: Grade of C- or better in CS 115 and MATH 161, 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: Grade of C- or better in 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: Grade of C- or better in 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: Grade of C- or better in 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:Grade of C- or better in 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: Grade of C- or better in 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; 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: Grade of C- or better in 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: Grade of C- or better in CS 215 or consent of instructor.

CS 360 Object-Oriented Programming (3)

Lecture, 2 hours; laboratory, 3 hours. 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: Grade of C- or better in 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: Grade of C- or better in CS 215 and CS 252, or consent of instructor.

CS 370 Software Design and Development (4)

Lecture, 4 hours. Techniques of software design and development. 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: Grade of C- or better in 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: Grade of C- or better in 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 386 Selected Topics in CS with Lab (3)

Lecture, 2 hours; laboratory, 3 hours. 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. May be repeated for credit; 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.

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. Prerequisites: 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 arithmetic. 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: Grade of C- or better in CS 315, or consent of instructor.

CS 425 Parallel Computing (3)

Lecture, 3 hours. Overview of parallel patterns, programming models, and hardware. Topics include parallel performance analysis; types of parallelism; parallel decomposition of tasks; shared vs. distributed memory; synchronization; hands-on experience with multiple parallel programming models; and architectural support for parallelism. Prerequisites: Grade of C- or better in CS 252 and 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 concurrent 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: Grade of C- or better in 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. Lexical scanning, top-down and bottom-up parsing; semantic analysis, code generation; optimization. Design and construction of parts of a simple compiler using compiler generation tools. Prerequisites: Grade of C- or better in 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: Grade of C- or better in 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: Grade of C- or better in 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: Grade of C- or better in CS 365, 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: Grade of C- or better in CS 315, CS 370, and senior-standing in the major; or consent of instructor.

CS 480 Artificial Intelligence (3)

Lecture, 3 hours. 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 algorithms. Prerequisite: Grade of C- or better in CS 315 or consent of instructor.

CS 495 Special Studies (1-4)

This course is intended for students who are doing advanced work in an area of computer science (e.g., a senior project). Prerequisites: an upper-division CS course in the area of interest and consent of instructor. May be repeated for credit.

CS 496 Senior Research Project (3)

Students, under the direction of one or more faculty members, undertake a substantial research project that is based on multiple upper-division CS courses. The result of the research is presented by the students in one of the Colloquium (CS 390) meetings. Senior-standing and approved contract are required.

CS 497 Internship (1-3)

Student projects conceived and designed in conjunction with an off-campus organization or group. The internship is intended to provide on-the-job experience in an area of computer science in which the student has no prior on-the-job experience. Computer hardware or computer time required for the internship, as well as regular supervision of the intern, must be provided by the off-campus organization. Prerequisite: student must be within 30 units of completion of the CS major. May be taken Cr/NC only. No more than 3 units can be applied to the CS major. Course may be repeated for credit.