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 depen-
dency, 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 psychopharma-
cology 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, psychot-
ic 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 ex-
plores 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 profes-
sional 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 con-
tinuing 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 con-
cepts, 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 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 graph-
ics, 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.). Prerequi-
sites: 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, encapsula-
tion, 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 minimiza-
tion 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 life-cycle, 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 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 252 and 315, 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.