COMMUNICATION ARTS AND SCIENCES

CAS

College of Communication Arts and Sciences

192 Environmental Issues Seminar
Fall, Spring. 1 credit. A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Natural Science; Agriculture and Natural Resources; Engineering; Social Science. Administered by College of Natural Science. R: Open only to students in the College of Agriculture and Natural Resources or College of Engineering or College of Natural Science or College of Communication Arts and Sciences or College of Social Science. Approval of college.

Environmental issues and problems explored from a variety of perspectives, including legal, scientific, historical, political, socio-economic, and technical points of view.

299 Media Writing
Fall, Spring, Summer. 3(1-4)

Writing for mass media.

492 Special Topics
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 16 credits in all enrollments for this course. R: Approval of college.

Varied topics pertaining to the study of communication processes.

COMPUTER SCIENCE AND ENGINEERING

CSE

Department of Computer Science and Engineering
College of Engineering

101 Computing Concepts and Competencies
Fall, Spring, Summer. 3(2-2) SA: CPS 100, CPS 130

Core concepts in computing including information storage, retrieval, management, and representation. Applications from specific disciplines. Applying core concepts to design and implement solutions to various focal problems, using hardware, multimedia software, communication and networks.

103 Introduction to Databases in Information Technology
Fall, Spring, Summer. 3(2-2) P:M: (CSE101) R: Approval of Department.

Core concepts in database organization and use including information storage, retrieval, management, and representation via databases. Application of database concepts to develop and implement solutions to various problems including Web-to-database issues inherent in e-commerce.

131 Introduction to Technical Computing
Fall, Spring. 3(2-2) P:M: (MTH 103 or MTH 110 or MTH 116 or LBS 117 or MTH 124 or concurrently or MTH 132 or concurrently or LBS 118 or concurrently) SA: CPS 131

Use of computing systems for technical communications and problem solving in engineering, mathematics, and science. Development and use of mathematical models suitable for computer representation, solution, graphical display, and animation.

231 Introduction to Programming I
Fall, Spring. 4(3-2) P:M: (LBS 118 or concurrently or MTH 124 or concurrently or MTH 132 or concurrently or MTH 152H or concurrently) RB: (CSE 131) SA: CSE 230

Introduction to object-centered programming using C++. Design, implementation and testing of programs to solve problems in engineering, mathematics and science. Programming fundamentals, functions, classes, arrays, and pointers.

232 Introduction to Programming II
Fall, Spring. 4(3-2) P:M: (CSE231) and (LBS118 or MTH124 or MTH132 or MTH152H) SA: CSE 330

Continuation of object-centered programming using C++. Development of classes and reliable software. Data structures and their encapsulation; stacks, queues, lists, trees, and hash tables. Algorithms operating on data structures. Object-oriented design and programming.

240 Informatics
Fall, Spring, Summer. 3(3-0) P:M: (CSE 103 or CSE 131 or CSE 231) and (MTH 103 or MTH 116 or MTH 124 or MTH 132 or LBS 117) or designated score on Mathematics placement test. R: Approval of department.

Digital representation of objects such as numbers, signals, and 3D shapes. Algorithms that operate on digital objects. Storage devices and network distribution of digital objects. How information systems support various applications.

260 Discrete Structures in Computer Science
Fall, Spring. 4(4-0) P:M: (MTH 133 or MTH 126 or MTH 153H or LBS 119) SA: CPS 260

Propositional and first order logic. Equivalence, inference and method of proof. Mathematical induction, diagonalization principle. Basic counting. Set operations, relations, functions. Grammars and finite state automata. Boolean algebra. Truth tables and minimization of Boolean expressions. Applications to computer science and engineering.

290 Independent Study in Computer Science
Fall, Spring. 1 credit. A student may earn a maximum of 3 credits in all enrollments for this course. R: Approval of department; application required. SA: CPS 290

Supervised individual study in an area of computer science.

291 Selected Topics in Computer Science
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department. SA: CPS 291

Topics selected to supplement and enrich existing courses and lead to the development of new courses.

320 Computer Organization and Assembly Language Programming
Fall, Spring. 4(3-2) P:M: (CSE 232 and CSE 260) SA: CPS 320 Not open to students with credit in EE 331.

Machine representation of data and instructions. Machine organization, primary storage, registers, arithmetic logic unit, control unit, operations. Assembly language programming, interface to high level languages. Assemblers and loaders.

331 Algorithms and Data Structures
Fall, Spring. 4(3-2) P:M: (CSE 232 and CSE 260) R: Open only to students in the Department of Computer Science and Engineering or Computer Engineering majors or the LBS Computer Science coordinate major or the Computer Science disciplinary minor.

Linear data structures, trees, and graphs and algorithms which operate on them. Fundamental algorithms for searching, sorting, string matching, graph problems, and their analysis.

370 Software Engineering
Fall, Spring. 4(3-2) P:M: (CSE 232 and CSE 260) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 470, CSE 470

Software life cycle including specification, design, coding, testing, and verification of a software product. Stepwise refinement and rapid prototyping. Software portability, reusability and maintenance.

410 Operating Systems
Fall, Spring. 4(3-2) P:M: (CSE 232 and CSE 260) and (CSE 320 or ECE 331) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 410

History and evolution of operating systems. Process and processor management. Primary and auxiliary storage management. Performance evaluation, security, distributed systems. Case studies of modern operating systems.

420 Computer Architecture
Fall, Spring. 4(3-2) P:M: (CSE 232 and CSE 260) and (CSE 320 or ECE 331) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 420

Digital logic and sequential machine design. Computer organization, control unit and arithmetic logic unit implementation. Input-output, memory organization, parallel operations. Digital system simulation.

422 Computer Networks
Fall, Spring. 4(3-2) P:M: (STT 351) and (CSE 320 or ECE 331) and (CSE 410 or concurrently) R: Open only to students in the Department of Computer Science or the Computer Engineering or LBS Computer Science major or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 422

Computer network architectures and models. Medium access control. Physical, data link, network, transport, and session layers. Local-area and wide-area networks.

440 Artificial Intelligence and Symbolic Programming
Fall. 4(3-2) P:M: (CSE 331 or CSE 370) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 440

Machine intelligence. Heuristic programming. Representation and control in LISP and PROLOG. Applications to search, rule-based diagnosis, and parsing.

444 Information Technology Project Management
Spring. 3(3-0) Interdepartmental with Information Technology Management; Telecommunication. Administered by The Eli Broad College of Business. P:M: (ITM 311) R: Open only to seniors in the Specialization in Information Technology.

Practical training and experiences in design, testing, and launch of new information technologies and systems.

450 Translation of Programming Languages
Spring. 4(3-2) P:M: (CSE 331 or CSE 370) and (CSE 320 or ECE 331) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 450

Theory and practice of programming language translation. Languages, grammars and parsing. Lexical, syntactic and semantic analysis. Compile-time error handling. Code optimization and code generation.

452 Organization of Programming Languages
Fall. 4(3-2) P:M: (CSE 331 or CSE 370) and (CSE 320 or ECE 331) R: Open only to students in the Department of Computer Science and Engineering or Computer Engineering major or the LBS Computer Science coordinate major or the LBS Computer Science field of concentration or the Computer Science disciplinary minor. SA: CPS 452

Organization of programming languages including language processors, syntax, data types, sequence control, storage management. Comparison of language features from the functional, imperative, logical and object-oriented paradigms.

460 Computability and Formal Language Theory
Fall, Spring. 3(3-0) P:M: (CSE 331) R: Open only to students in the Department of Computer Science and Engineering or Computer Engineering major or LBS Computer Science coordinate major or the LBS Computer Science field of concentration or the Computer Science disciplinary minor. SA: CSE 360

Formal models of computation such as finite state automata, pushdown automata and Turing machines. Formal definitions of languages, problems, and language classes including recursive, recursively enumerable, regular, and context free languages. The relationships among various models of computation, language classes, and problems. Church's thesis and the limits of computability. Proofs of program properties including correctness.

471 Media Processing and Multimedia Computing
Fall. 4(3-2) P:M: (CSE 320) and (CSE 331 or CSE 370) R: Open only to students in the Department of Computer Science and Engineering or Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor.

Basic operations for processing images, video, and audio; devices for input and output; data formats and compression; tools for processing images and sound; multimedia authoring tools; applications.

472 Computer Graphics
Spring. 4(3-2) P:M: (MTH 314) and (CSE 331 or CSE 370) R: Open only to juniors or seniors or graduate students in the Department of Computer Science and Engineering or to juniors or seniors in the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major. SA: CPS 472

Graphics hardware. Fundamental algorithms. Two- and three-dimensional imaging geometry and transformations. Curve and surface design, rendering, shading, color, and animation.

480 Database Systems
Spring. 4(3-2) P:M: (CSE 331) and (CSE 320 or ECE 331) R: Open only to students in the Department of Computer Science and Engineering or the Computer Engineering major or the LBS Computer Science field of concentration or the LBS Computer Science coordinate major or the Computer Science disciplinary minor. SA: CPS 480

Storage of and access to physical databases including indexing, hashing, and range accesses. Data models, query languages, transaction processing, recovery techniques. Object-oriented and distributed database systems. Database design.

490 Independent Study in Computer Science
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to students in the Department of Computer Science or the Computer Engineering major. Approval of department; application required. SA: CPS 490

Supervised individual study in an area of computer science.

491 Selected Topics in Computer Science
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to students in the Department of Computer Science or the Computer Engineering major. Approval of department. SA: CPS 491

Topics selected to supplement and enrich existing courses and lead to the development of new courses.

498 Collaborative Design (W)
Fall, Spring. 4(2-4) P:M: (CSE 370 and CSE 410) and (CSE 420 or CSE 422 or CSE 440 or CSE 450 or CSE 452 or CSE 460 or CSE 471 or CSE 472 or CSE 480) R: Open only to majors in the Department of Computer Science and Engineering. SA: CSE 449, CSE 478, CSE 479

Development of a comprehensive software and/or hardware solution to a problem in a team setting with emphasis on working with a client. Participation in a design cycle including specification, design, implementation, testing, maintenance, and documentation. Issues of professionalism, ethics, and communication.

COUNSELING, CEP EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION

Department of Counseling, Educational Psychology and Special Education
College of Education

150 Reflections on Learning
Fall, Spring, Summer. 3(3-0) Interdepartmental with Teacher Education. Administered by Department of Teacher Education.

Students' experiences as learners in comparison to psychological, sociological, and anthropological theories and assumptions about learning and teaching in and out of school.

240 Diverse Learners in Multicultural Perspective
Fall, Spring, Summer. 3(2-2) Interdepartmental with Teacher Education. Not open to students with credit in TE 250.

Communicative, linguistic, physical, sensory, behavioral, affective, and cognitive differences in learning in multicultural classrooms. Factors that mediate access to knowledge.

260 Dynamics of Personal Adjustment
Fall, Spring, Summer. 3(3-0)

Psychological theories of human adjustment. Implications for effective learning, self-development, and adaptation.

261 Substance Abuse
Fall, Spring. 3(3-0)

Effects of mood-altering chemicals. Treatment approaches and resources. Special emphasis on adolescent users.