

Course Schedule - Fall 2007

Computer Science

100 **Freshman Orientation in CS** credit: 1 hours.

Introduction to Computer Science as a field and career for computer science majors. Overview of the field is presented along with specific examples of problem areas and methods of solution. Recommended for all freshman Computer Science majors.

CRN	Type	Section	Time	Days	Location	Instructor
30094	lecture	U	04:00 PM - 04:50 PM	T	room 1320 Digital Computer Laboratory	Pitt, L
30094: Meets 02-Oct-07 - 07-Dec-07.						
30094: This course is for freshmen students, only. This course first meets on Tuesday, October 2, 2007.						

101 **Intro to Computing, Eng & Sci** credit: 3 hours.

Fundamental principles, concepts, and methods of computing, with emphasis on applications in the physical sciences and engineering. Basic problem solving and programming techniques; fundamental algorithms and data structures; use of computers in solving engineering and scientific problems. Credit is not given for both CS 101 and CS 105. Prerequisite: MATH 220 or MATH 221.

This course satisfies the General Education Criteria for a Quant Reasoning II course.

Students must register for one lab-discussion and one lecture section. Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

CRN	Type	Section	Time	Days	Location	Instructor
35879	lecture	AL1	01:00 PM - 01:50 PM	MW	room 114 David Kinley Hall	Gambill, T
35879: Quant Reasoning II course.						
35883	lecture	AL2	02:00 PM - 02:50 PM	MW	room 114 David Kinley Hall	Gambill, T
35883: Quant Reasoning II course.						
35886	laboratory-discussion	AYA	09:00 AM - 10:50 AM	M	room L520 Digital Computer Laboratory	Gambill, T; Eytani, Y
35886: Quant Reasoning II course.						
35889	laboratory-discussion	AYB	11:00 AM - 12:50 PM	M	room L520 Digital Computer Laboratory	Gambill, T; Bengtson, E
35889: Quant Reasoning II course.						
35890	laboratory-	AYC	03:00 PM - 04:50	M	room L520 Digital	Gambill, T; Ashnai, S

	discussion		PM		Computer Laboratory	
35890: Quant Reasoning II course.						
35893	laboratory-discussion	AYD	09:00 AM - 10:50 AM	T	room L520 Digital Computer Laboratory	Gambill, T; Ashnai, S
35893: Quant Reasoning II course.						
35896	laboratory-discussion	AYE	03:00 PM - 04:50 PM	T	room L520 Digital Computer Laboratory	Gambill, T; Popescu, A
35896: Quant Reasoning II course.						
35899	laboratory-discussion	AYF	09:00 AM - 10:50 AM	W	room L520 Digital Computer Laboratory	Gambill, T; Popescu, A
35899: Quant Reasoning II course.						
35902	laboratory-discussion	AYG	11:00 AM - 12:50 PM	W	room L520 Digital Computer Laboratory	Gambill, T; Bengtson, E
35902: Quant Reasoning II course.						
35907	laboratory-discussion	AYH	03:00 PM - 04:50 PM	W	room L520 Digital Computer Laboratory	Gambill, T; Bengtson, E
35907: Quant Reasoning II course.						
35910	laboratory-discussion	AYI	01:00 PM - 02:50 PM	R	room L520 Digital Computer Laboratory	Gambill, T
35910: Quant Reasoning II course.						
35913	laboratory-discussion	AYJ	03:00 PM - 04:50 PM	R	room L520 Digital Computer Laboratory	Gambill, T
35913: Quant Reasoning II course.						
35915	laboratory-discussion	AYK	10:00 AM - 11:50 AM	F	room L520 Digital Computer Laboratory	Gambill, T
35915: Quant Reasoning II course.						
35918	laboratory-discussion	AYL	12:00 PM - 01:50 PM	F	room L520 Digital Computer Laboratory	Gambill, T; Eytani, Y
35918: Quant Reasoning II course.						

105 **Intro to Computing, Non-Tech** credit: 3 hours.

Introduction to computing as an essential tool of academic and professional activities in disciplines other than science and engineering. Functions and interrelationships of computer system components: hardware, systems and applications software, and networks. Widely used application packages such as spreadsheets and databases. Concepts and practice of programming for the solution of simple problems in different application areas. Students interested in scientific and engineering applications of computing should take CS 101 instead of this course. Credit is not given for both CS 105 and CS 101. Prerequisite: MATH 012 or equivalent.

This course satisfies the General Education Criteria for a Quant Reasoning I course.

Students must register for one lab-discussion and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
35823	lecture	AL1	09:00 AM - 09:50 AM	MW	room 66 Library - Main	Gambill, T; Woodbury, M
35823: Quant Reasoning I course.						
35824	lecture	AL2	10:00 AM - 10:50 AM	MW	room 66 Library - Main	Gambill, T; Woodbury, M
35824: Quant Reasoning I course.						
35825	lecture	AL3	11:00 AM - 11:50 AM	MW	room 66 Library - Main	Gambill, T; Woodbury, M
35825: Quant Reasoning I course.						
35826	lecture	AL4	12:00 PM - 12:50 PM	MW	room 66 Library - Main	Gambill, T; Woodbury, M
35826: Quant Reasoning I course.						
47174	laboratory-discussion	AYA	03:00 PM - 03:50 PM	W	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Yasmeen, A
47174: Quant Reasoning I course.						
35827	laboratory-discussion	AYB	04:00 PM - 04:50 PM	W	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Jin, D
35827: Quant Reasoning I course.						
35828	laboratory-discussion	AYC	05:00 PM - 05:50 PM	W	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Jin, D
35828: Quant Reasoning I course.						
35831	laboratory-discussion	AYD	09:00 AM - 09:50 AM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Yershov, D
35831: Quant Reasoning I course.						
35832	laboratory-discussion	AYE	10:00 AM - 10:50 AM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Yershov, D
35832: Quant Reasoning I course.						

35833	laboratory-discussion	AYF	11:00 AM - 11:50 AM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Wang, M
35833: Quant Reasoning I course.						
35835	laboratory-discussion	AYG	12:00 PM - 12:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Wang, M
35835: Quant Reasoning I course.						
35836	laboratory-discussion	AYH	01:00 PM - 01:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Al-Shebli, B
35836: Quant Reasoning I course.						
35837	laboratory-discussion	AYI	02:00 PM - 02:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Al-Shebli, B
35837: Quant Reasoning I course.						
35838	laboratory-discussion	AYJ	03:00 PM - 03:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Lin, W
35838: Quant Reasoning I course.						
35840	laboratory-discussion	AYK	04:00 PM - 04:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Lin, W
35840: Quant Reasoning I course.						
35843	laboratory-discussion	AYL	05:00 PM - 05:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Jahid, S
35843: Quant Reasoning I course.						
35847	laboratory-discussion	AYM	06:00 PM - 06:50 PM	R	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Jahid, S
35847: Quant Reasoning I course.						
47175	laboratory-discussion	AYN	09:00 AM - 09:50 AM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Pham, C
47175: Quant Reasoning I course.						
35851	laboratory-discussion	AYO	10:00 AM - 10:50 AM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Pham, C
35851: Quant Reasoning I course.						
35854	laboratory-discussion	AYP	11:00 AM - 11:50 AM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Agarwal, G

35854: Quant Reasoning I course.						
35856	laboratory-discussion	AYQ	12:00 PM - 12:50 PM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Agarwal, G
35856: Quant Reasoning I course.						
35858	laboratory-discussion	AYR	01:00 PM - 01:50 PM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Pattabiraman, K
35858: Quant Reasoning I course.						
35873	laboratory-discussion	AYS	02:00 PM - 02:50 PM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Pattabiraman, K
35873: Quant Reasoning I course.						
47176	laboratory-discussion	AYT	03:00 PM - 03:50 PM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Guzman Rivera, A
47176: Quant Reasoning I course.						
47178	laboratory-discussion	AYU	04:00 PM - 04:50 PM	F	room 70B Wohlers Hall	Gambill, T; Woodbury, M; Guzman Rivera, A
47178: Quant Reasoning I course.						

125 **Intro to Computer Science** credit: 4 hours.

First course for computer science majors and others with a deep interest in computing. Introduces basic concepts in computing and fundamental techniques for solving computational problems. Credit is not given for both CS 125 and ECE 190. Prerequisite: Three years of high school mathematics or MATH 012.

This course satisfies the General Education Criteria for a Quant Reasoning I course.

Students must register for one lab-discussion and one lecture section. Engineering students must obtain a dean's approval to drop this course after the second week of instruction.

CRN	Type	Section	Time	Days	Location	Instructor
35876	lecture	AL1	02:00 PM - 02:50 PM	MWF	room 1404 Siebel Center for Comp Sci	Angrave, L
35876: Quant Reasoning I course.						
35881	laboratory-discussion	AYA	09:00 AM - 10:50 AM	T	room 1214 Siebel Center for Comp Sci	Angrave, L
35881: Quant Reasoning I course.						
35885	laboratory-discussion	AYB	11:00 AM - 12:50 PM	T	room 1214 Siebel Center for Comp Sci	Angrave, L

35885: Quant Reasoning I course.						
35888	laboratory-discussion	AYC	01:00 PM - 02:50 PM	T	room 1214 Siebel Center for Comp Sci	Angrave, L
35888: Quant Reasoning I course.						
35891	laboratory-discussion	AYD	03:00 PM - 04:50 PM	T	room 1214 Siebel Center for Comp Sci	Angrave, L
35891: Quant Reasoning I course.						
35898	laboratory-discussion	AYE	09:00 AM - 10:50 AM	W	room 1214 Siebel Center for Comp Sci	Angrave, L
35898: Quant Reasoning I course.						
50158	lecture-discussion	TPC	11:00 AM - 12:20 PM	MWF	room ARR Siebel Center for Comp Sci	Peiper, C
50158: Quant Reasoning I course.						
50158: Students who register for this specialized Tablet PC section of CS 125 will be involved in a research project exploring the potential for using Tablet PC's to collect data from students in UIUC classrooms and use that data to create useful computer applications for learning. Students enrolled in this pilot course will attend lectures in the Educational Technologies Laboratory in Siebel Center 1129 which is equipped with tablet computers for use by each student. Attendance is *mandatory* for students registered in this section.						

173 **Discrete Structures** credit: 3 hours.

Studies discrete mathematical structures frequently encountered in the study of Computer Science. Topics will include sets, propositions, boolean algebra, induction, recursion, relations, functions, and graphs. Credit is not given for both CS 173 and MATH 213.

CRN	Type	Section	Time	Days	Location	Instructor
30102	lecture-discussion	M	09:30 AM - 10:45 AM	TR	room 1404 Siebel Center for Comp Sci	Erickson, J; Heeren, C

196 **Freshman Honors Course in CS** credit: 1 hours.

Course is offered for honors credit in conjunction with other 100-level computer science courses, in which concurrent registration is required. A special examination may be required for admission to this course. May be repeated. Prerequisite: Concurrent registration in another 100-level computer science course (see Schedule).

CRN	Type	Section	Time	Days	Location	Instructor
31507	lecture-discussion	1	ARRANGED			Gambill, T

31507: SECTION 1 is for students registered in CS 101						
31508	lecture-discussion	25	ARRANGED			Angrave, L
31508: SECTION 25 is for students registered in CS 125						
31510	lecture-discussion	73	ARRANGED			Erickson, J; Heeren, C
31510: SECTION 73 is for students registered in CS 173						

199 **Undergraduate Open Seminar** credit: 1 to 5 hours.
May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
42790	lecture-discussion	100	04:00 PM - 04:50 PM	R		Pitt, L
42790: Meets 11-Oct-07 - 07-Dec-07.						
42790: 1 hoursTopic: Intro to Programming This course begins on Thursday, Oct. 11 in lab 0220, Siebel Center.						

210 **Ethical & Prof'l Issues in CS** credit: 2 hours.
Ethics for the computing profession. Ethical decision-making; licensing; intellectual property, freedom of information, and privacy. Includes oral presentations. Credit is not given for both CS 210 and ECE 316. Prerequisite: CS 225 and junior standing.

CRN	Type	Section	Time	Days	Location	Instructor
31516	lecture-discussion	1	12:00 PM - 01:50 PM	M	room 1103 Siebel Center for Comp Sci	Woodbury, M; Blake, R
31517	lecture-discussion	2	03:00 PM - 04:50 PM	M	room 1103 Siebel Center for Comp Sci	Woodbury, M; Blake, R
43359	lecture-discussion	3	02:00 PM - 03:50 PM	W	room 1103 Siebel Center for Comp Sci	Woodbury, M; Blake, R
43360	lecture-discussion	4	05:00 PM - 06:50 PM	W	room 1103 Siebel Center for Comp Sci	Woodbury, M; Blake, R

225 **Data Structure & Softw Prin** credit: 4 hours.
Data abstractions: elementary data structures: lists, stacks, queues, trees; searching and sorting techniques. Introduction to the principles of software engineering including term programming project. Prerequisite: CS 125 or ECE 190; CS 173 or MATH 213.

This course satisfies the General Education Criteria for a Quant Reasoning II course.

Students must register for one lecture-discussion and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
35917	lecture	AL1	12:00 PM - 12:50 PM	MWF	room 1404 Siebel Center for Comp Sci	Heeren, C
35917: Quant Reasoning II course.						
35919	lecture	AL2	01:00 PM - 01:50 PM	MWF	room 1404 Siebel Center for Comp Sci	Heeren, C
35919: Quant Reasoning II course.						
35923	laboratory-discussion	AYA	01:00 PM - 02:50 PM	W	room 1214 Siebel Center for Comp Sci	Heeren, C
35923: Quant Reasoning II course.						
35944	laboratory-discussion	AYC	09:00 AM - 10:50 AM	R	room 1214 Siebel Center for Comp Sci	Heeren, C
35944: Quant Reasoning II course.						
35947	laboratory-discussion	AYD	11:00 AM - 12:50 PM	R	room 1214 Siebel Center for Comp Sci	Heeren, C
35947: Quant Reasoning II course.						
35950	laboratory-discussion	AYE	01:00 PM - 02:50 PM	R	room 1214 Siebel Center for Comp Sci	Heeren, C
35950: Quant Reasoning II course.						
35952	laboratory-discussion	AYF	03:00 PM - 04:50 PM	R	room 1214 Siebel Center for Comp Sci	Heeren, C
35952: Quant Reasoning II course.						
35954	laboratory-discussion	AYG	09:00 AM - 10:50 AM	F	room 1214 Siebel Center for Comp Sci	Heeren, C
35954: Quant Reasoning II course.						
35956	laboratory-discussion	AYH	11:00 AM - 12:50 PM	F	room 1214 Siebel Center for Comp Sci	Heeren, C
35956: Quant Reasoning II course.						
35959	laboratory-	AYI	01:00 PM - 02:50	F	room 1214 Siebel	Heeren, C

	discussion		PM		Center for Comp Sci	
35959: Quant Reasoning II course.						
35960	laboratory-discussion	AYJ	03:00 PM - 04:50 PM	F	room 1214 Siebel Center for Comp Sci	Heeren, C
35960: Quant Reasoning II course.						

231 **Computer Architecture I** credit: 3 hours.

Introduction to computer architecture, working up from the logic gate level: combinational and sequential networks; computer arithmetic; arithmetic/logic units; memory organization; control unit design. Credit is not given for both CS 231 and ECE 290. Prerequisite: CS 125.

This course satisfies the General Education Criteria for a Quant Reasoning II course.

CRN	Type	Section	Time	Days	Location	Instructor
30105	lecture	X	11:00 AM - 11:50 AM	MW	room 1404 Siebel Center for Comp Sci	Kale, L; Smith, J
30105: Quant Reasoning II course.						
30105: A review session will be held each week at 11:00 on Friday, 1404 Siebel Center. Students should adjust their schedule accordingly.						

232 **Computer Architecture II** credit: 3 hours.

Second-level course in computer architecture: machine-level programming, instruction sets, data representations; subroutines; input/output hardware and software; linking and loading; relation to high-level languages. Credit is not given for both CS 232 and ECE 390. (Counts for advanced hours in LAS.) Prerequisite: CS 231.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
35968	laboratory	AB3	12:00 PM - 12:50 PM	M	room 1214 Siebel Center for Comp Sci	Zilles, C
35971	laboratory	AB4	02:00 PM - 02:50 PM	M	room 1214 Siebel Center for Comp Sci	Zilles, C; Chaudhary, A
35979	laboratory	AB5	02:00 PM - 02:50 PM	M	room 1103 Siebel Center for Comp Sci	Zilles, C; Young, P
35973	laboratory	AB6	04:00 PM - 04:50 PM	M	room 1214 Siebel Center for Comp Sci	Zilles, C; Young, P

35963	lecture	AL1	02:00 PM - 02:50 PM	WF	room 1310 Digital Computer Laboratory	Zilles, C
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241 **System Programming** credit: 4 hours.

Introduction to systems programming: This course will cover the basics of system programming, including POSIX processes, process control, inter-process communication, synchronization, signals, simple memory management, file I/O and directories, shell programming, socket network programming, RPC programming in distributed systems, basic security mechanisms, and standard tools for systems programming such as debugging tools. Credit is not given for both CS 241 and ECE 391. Prerequisite: CS 225; credit or concurrent registration in CS 232.

CRN	Type	Section	Time	Days	Location	Instructor
45300	lecture-discussion	SP1	10:00 AM - 10:50 AM	MWF	room 1404 Siebel Center for Comp Sci	Abdelzاهر, T; Angrave, L

242 **Programming Studio** credit: 3 hours.

Intensive programming lab intended to strengthen skills in programming. Prerequisite: CS 241.

CRN	Type	Section	Time	Days	Location	Instructor
45328	laboratory	AB1	ARRANGED		room ARR Siebel Center for Comp Sci	Woodley, M
45325	lecture	AL1	04:00 PM - 04:50 PM	W	room 1404 Siebel Center for Comp Sci	Woodley, M; Ellison, C

257 **Numerical Methods** credit: 3 hours.

Introduction to numerical methods for students in science and engineering; topics include floating-point computation, systems of linear equations, approximation of functions and integrals, the single nonlinear equation, and the numerical solution of ordinary differential equations; discusses various applications in science and engineering; includes some programming as well as the use of high quality mathematical library routines. Same as MATH 257. Credit is not given if CS 450 credit has already been earned. (Counts for advanced hours in LAS.) Prerequisite: CS 101 or CS 125; MATH 225 or MATH 415; MATH 241 (formerly MATH 243) or MATH 242.

This course satisfies the General Education Criteria for a Quant Reasoning II course.

CRN	Type	Section	Time	Days	Location	Instructor
36131	lecture-discussion	M	12:30 PM - 01:45 PM	WF	room 1320 Digital Computer Laboratory	Hirani, A
36131: Quant Reasoning II course.						

273 **Intro to Theory of Computation** credit: 3 hours.

Finite automata and regular languages; pushdown automata and context-free languages; Turing machines and recursively enumerable sets; computability and the halting problem; undecidable problems. Prerequisite: CS 125 or ECE 190; CS 173 or MATH 213.

This course satisfies the General Education Criteria for a Quant Reasoning II course.

CRN	Type	Section	Time	Days	Location	Instructor
30107	lecture-discussion	P	12:30 PM - 01:45 PM	TR	room 1320 Digital Computer Laboratory	Fleck, M; Parthasarathy, M
30107: Quant Reasoning II course.						

296 **Honors Course in CS** credit: 1 hours.

Group projects for honors work in computer science. Sections of this course are offered in conjunction with other 200-level computer science courses, in which concurrent registration is required. A special examination may be required for admission to this course. May be repeated. Prerequisite: Concurrent registration in another 200-level computer science course (see Schedule).

CRN	Type	Section	Time	Days	Location	Instructor
31518	lecture-discussion	25	ARRANGED			Heeren, C
31518: Section 25 is for students registered in CS 225						
31519	lecture-discussion	31	ARRANGED			Kale, L; Smith, J
31519: Section 31 is for students registered is CS 231						
31520	lecture-discussion	32	ARRANGED			Zilles, C; Harrison, W
31520: Section 32 is for students registered in CS 232						
31521	lecture-discussion	57	ARRANGED			Hirani, A
31521: Section 57 is for students registered in CS 257						
31522	lecture-discussion	73	ARRANGED			Fleck, M; Parthasarathy, M
31522: Section 73 is for students registered in CS 273						

397 **Individual Study** credit: 1 to 3 hours.

May be repeated. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10464	independent study		ARRANGED			
10464: Instructor Approval Required						
10464: Students must see the CS Department to receive the appropriate CRN for the instructor.						

411 **Database Systems** credit: 3 or 4 hours.

Examines the logical organization of databases: the entity-relationship model; the hierarchical, network, and relational data models and their languages. Functional dependencies and normal forms. Design, implementation, and optimization of query languages; security and integrity; concurrency control, and distributed database systems. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225 or CS 400.

CRN	Type	Section	Time	Days	Location	Instructor
30109	lecture-discussion	Q3	03:30 PM - 04:45 PM	WF	room 1310 Digital Computer Laboratory	Winslett, M; Minami, K
30109: 3 hours						
40086	lecture-discussion	Q4	03:30 PM - 04:45 PM	WF	room 1310 Digital Computer Laboratory	Winslett, M; Minami, K
40086: 4 hours						

412 **Intro Data Mining** credit: 3 or 4 hours.

Introduction to the concepts, techniques, and systems of data warehousing and data mining, including (1) design and implementation of data warehouse and on-line analytical processing (OLAP) systems; and (2) data mining concepts, methods, systems, implementations, and applications. 3 undergraduate or graduate hours. 4 graduate hours. Prerequisite: CS 225 or CS 500.

CRN	Type	Section	Time	Days	Location	Instructor
48711	lecture-discussion	ADD	12:30 PM - 01:45 PM	WF		Han, J
48711: 3 hours Students registered in this section will watch the regular CS 412 lecture, online. This is an overflow accommodation for the course. Students in this section would take any exams with the regular section of CS 412.						
43357	lecture-discussion	P3	12:30 PM - 01:45 PM	WF	room 1310 Digital Computer Laboratory	Han, J
43357: 3 hours						
43358	lecture-discussion	P4	12:30 PM - 01:45 PM	WF	room 1310 Digital Computer Laboratory	Han, J

43358: 4 hours

418 **Computer Graphics** credit: 3 or 4 hours.

Introduction to basic mathematical tools and computational techniques for modeling, rendering, and animating 3-D scenes. Same as CSE 427. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225 or CS 400; one of MATH 225, MATH 241 (formerly MATH 243), MATH 242.

CRN	Type	Section	Time	Days	Location	Instructor
36119	lecture-discussion	P3	03:30 PM - 04:45 PM	TR	room 1404 Siebel Center for Comp Sci	Hart, J; Feng, W
36119: 3 hours						
36121	lecture-discussion	P4	03:30 PM - 04:45 PM	TR	room 1404 Siebel Center for Comp Sci	Hart, J; Feng, W
36121: 4 hours						

421 **Programming Lang and Compilers** credit: 3 or 4 hours.

Introduction to the structure of programming languages and their implementation. Basic language design principles; abstract data types; functional languages; type systems; object-oriented languages. Basics of lexing, parsing, syntax-directed translation, semantic analysis, and code generation. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225; CS 232 or ECE 390.

CRN	Type	Section	Time	Days	Location	Instructor
30128	lecture-discussion	D3	02:00 PM - 03:15 PM	TR	room 1404 Siebel Center for Comp Sci	Gunter, E
30128: 3 hours						
40087	lecture-discussion	D4	02:00 PM - 03:15 PM	TR	room 1404 Siebel Center for Comp Sci	Gunter, E
40087: 4 hours						

422 **Programming Language Design** credit: 3 or 4 hours.

Advanced course in principles of language design. Using imperative and functional programming as unifying themes, major language design paradigms will be explored. Tools in this study will include both practical language processor construction and theoretical models. Emphasis will be on reasoning about programs and languages. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 421.

CRN	Type	Section	Time	Days	Location	Instructor
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30132	lecture-discussion	T3	03:30 PM - 04:45 PM	TR	room 1302 Siebel Center for Comp Sci	Rosu, G
30132: 3 hours						
40088	lecture-discussion	T4	03:30 PM - 04:45 PM	TR	room 1302 Siebel Center for Comp Sci	Rosu, G
40088: 4 hours						

423 *Operating Systems Design* credit: 3 or 4 hours.

The organization and structure of modern operating systems and concurrent programming concepts. Deadlock, virtual memory, processor scheduling, and disk systems. Performance, security, and protection. Same as CSE 423. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 241 or ECE 391.

CRN	Type	Section	Time	Days	Location	Instructor
36113	lecture-discussion	S3	10:00 AM - 10:50 AM	MWF	room 1304 Siebel Center for Comp Sci	Nahrstedt, K; King, S
36113: 3 hours						
36115	lecture-discussion	S4	10:00 AM - 10:50 AM	MWF	room 1304 Siebel Center for Comp Sci	Nahrstedt, K; King, S
36115: 4 hours						

425 *Distributed Systems* credit: 3 hours.

Covers topics needed for a basic understanding of distributed computer systems: Protocols, specification techniques, global states and their determination, reliable broadcast, transactions and commitment, security, and real-time systems. Same as CSE 424 and ECE 428. Prerequisite: CS 241 or ECE 391.

CRN	Type	Section	Time	Days	Location	Instructor
36091	lecture-discussion	P	11:00 AM - 12:15 PM	TR	room 1105 Siebel Center for Comp Sci	Gupta, I

426 *Compiler Construction* credit: 3 or 4 hours.

Compiler structure, syntax analysis, syntax-directed translation, automatically constructed recognizers, semantic analysis, code generation, intermediate language, optimization techniques. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 421.

CRN	Type	Section	Time	Days	Location	Instructor
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43355	lecture-discussion	N3	12:30 PM - 01:45 PM	TR	room 1302 Siebel Center for Comp Sci	Adve, V
43355: 3 hours						
43356	lecture-discussion	N4	12:30 PM - 01:45 PM	TR	room 1302 Siebel Center for Comp Sci	Adve, V
43356: 4 hours						

427 **Software Engineering I** credit: 3 or 4 hours.

Software process, analysis and design. Topics include: software development paradigms, system engineering, function-based analysis and design, and object-oriented analysis and design. Course will use team-projects for hands-on exercises. Same as CSE 426. 3 undergraduate hours. 3 or 4 graduate hours. CS 427 combined with CS 429 fulfills the Advanced Composition Requirement. Prerequisite: CS 225 and CS 273.

This course satisfies the General Education Criteria for a Advanced Composition course.

CRN	Type	Section	Time	Days	Location	Instructor
36104	lecture-discussion	S3	12:30 PM - 01:45 PM	TR	room 1310 Digital Computer Laboratory	Johnson, R
36104: Advanced Composition course.						
36104: 3 hours						
36107	lecture-discussion	S4	12:30 PM - 01:45 PM	TR	room 1310 Digital Computer Laboratory	Johnson, R
36107: Advanced Composition course.						
36107: 4 hours						

431 **Embedded Sys Arch and Software** credit: 0 to 4 hours.

Survey of sampled data systems and embedded architecture; overview of the key concepts in common embedded system applications; signal processing and control; embedded microprocessor and device interface; time-critical I/O handling; data communications; real-time operating systems and techniques for the development and analysis of embedded real-time software; hands-on laboratory projects. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 241 or ECE 391.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
40100	laboratory	AB1	10:00 AM - 11:50 AM	T	room ARR Siebel Center for Comp Sci	Sha, L
40101	laboratory	AB2	02:00 PM - 03:50	T	room ARR Siebel	Sha, L

			PM		Center for Comp Sci	
31526	laboratory	AB3	03:00 PM - 04:50 PM	W	room ARR Siebel Center for Comp Sci	Sha, L
40102	laboratory	AB4	05:00 PM - 06:50 PM	W	room ARR Siebel Center for Comp Sci	Sha, L
40667	lecture-discussion	AE3	11:00 AM - 12:15 PM	WF	room 1310 Digital Computer Laboratory	Sha, L
40667: 3 hours						
40668	lecture-discussion	AE4	11:00 AM - 12:15 PM	WF	room 1310 Digital Computer Laboratory	Sha, L
40668: 4 hours						

433 Computer System Organization credit: 3 or 4 hours.

Computer system analysis and design. Organizational dependence on computations to be performed. Speed and cost of parts and overall machines. Instruction set design. Pipeline and vector machines. Memory hierarchy design. Same as CSE 422. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 232 or ECE 390.

CRN	Type	Section	Time	Days	Location	Instructor
36069	lecture-discussion	T3	09:30 AM - 10:45 AM	TR	room 1310 Digital Computer Laboratory	Torrellas, J; Hameed Chaudhry, J
36069: 3 hours						
43363	lecture-discussion	T4	09:30 AM - 10:45 AM	TR	room 1310 Digital Computer Laboratory	Torrellas, J; Hameed Chaudhry, J
43363: 4 hours						

435 Intro VLSI System Design credit: 3 hours.

Same as CSE 433 and ECE 425. See ECE 425.

CRN	Type	Section	Time	Days	Location	Instructor
48122	laboratory	AB1	ARRANGED			
36903	lecture	AL1	01:00 PM - 02:20 PM	TR	room 260 Everitt Elec and Comp Engr Lab	Wong, M

438 **Communication Networks** credit: 3 hours.

Layered architectures and the OSI Reference Model; design issues and protocols in the transport, network, and data link layers; architectures and control algorithms of local-area, point-to-point, and satellite networks; standards in networks access protocols; models of network interconnection; overview of networking and communication software. Same as CSE 425 and ECE 438. Prerequisite: CS 241 or ECE 391; one of MATH 461, MATH 463, ECE 313.

CRN	Type	Section	Time	Days	Location	Instructor
36061	lecture-discussion	X	02:00 PM - 03:15 PM	WF	room 1105 Siebel Center for Comp Sci	Borisov, N
36061: 3 hours						

440 **Intro Artificial Intelligence** credit: 3 or 4 hours.

Introductory description of the major subjects and directions of research in artificial intelligence; topics include AI languages (LISP and PROLOG), basic problem solving techniques, knowledge representation and computer inference, machine learning, natural language understanding, computer vision, robotics, and societal impacts. Same as ECE 448. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225 or ECE 390.

CRN	Type	Section	Time	Days	Location	Instructor
36047	lecture-discussion	Q3	12:30 PM - 01:45 PM	TR	room 1404 Siebel Center for Comp Sci	Dejong, G
36047: 3 hours						
36053	lecture-discussion	Q4	12:30 PM - 01:45 PM	TR	room 1404 Siebel Center for Comp Sci	Dejong, G
36053: 4 hours						

443 **Introduction to Robotics** credit: 4 hours.

Same as ECE 470, GE 421, and ME 445. See ECE 470.

CRN	Type	Section	Time	Days	Location	Instructor
36936	laboratory	AB1	01:00 PM - 02:50 PM	T	room 267 Everitt Elec and Comp Engr Lab	Spong, M; Candido, S
36948	laboratory	AB2	01:00 PM - 02:50 PM	R	room 267 Everitt Elec and Comp Engr Lab	Spong, M; Kartan, S

41574	laboratory	AB3	03:00 PM - 04:50 PM	T	room 267 Everitt Elec and Comp Engr Lab	Spong, M; Candido, S
36967	lecture	AL1	11:30 AM - 12:50 PM	TR	room 112 Transportation Bldg	Spong, M

446 **Machine Learning & Pattern Rec** credit: 3 or 4 hours.

Organized review of basic theoretical concepts and methods of machine learning and recognition; decision space and linguistic and relational representation of objects; statistical and deterministic recognition algorithms; various types of learning, including adaptive, procedural, and inductive; selected applications; and medical consulting, determination of cost-optimal classification rules, inferential information systems, and computer vision. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 273 and CS 440.

CRN	Type	Section	Time	Days	Location	Instructor
46792	lecture	D3	09:30 AM - 10:45 AM	TR	room 1105 Siebel Center for Comp Sci	Roth, D
46792: 3 hours						
46793	lecture	D4	09:30 AM - 10:45 AM	TR	room 1105 Siebel Center for Comp Sci	Roth, D
46793: 4 hours						

450 **Intro to Numerical Analysis** credit: 3 or 4 hours.

Introduction to numerical analysis, including linear system solvers, optimization techniques, interpolation and approximation of functions, solving systems of nonlinear equations, eigenvalue problems, least squares, and quadrature; numerical handling of ordinary and partial differential equations. Same as CSE 401, ECE 491, and MATH 450. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 101 or CS 125; CS 257 or MATH 415; MATH 385.

CRN	Type	Section	Time	Days	Location	Instructor
36016	lecture-discussion	B3	09:00 AM - 09:50 AM	MWF	room 1310 Digital Computer Laboratory	Bond, S
36016: 3 hours						
36020	lecture-discussion	B4	09:00 AM - 09:50 AM	MWF	room 1310 Digital Computer Laboratory	Bond, S
36020: 4 hours						

458 **Numerical Linear Algebra** credit: 3 or 4 hours.

Direct and iterative methods for systems of linear equations; over determined systems of equations; eigenvalue problems; nonlinear systems of equations. Same as CSE 412 and MATH 458. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 257.

CRN	Type	Section	Time	Days	Location	Instructor
41131	lecture-discussion	A3	11:00 AM - 12:15 PM	TR	room 1302 Siebel Center for Comp Sci	Heath, M
41131: 3 hours						
41132	lecture-discussion	A4	11:00 AM - 12:15 PM	TR	room 1302 Siebel Center for Comp Sci	Heath, M
41132: 4 hours						

461 **Intro to Information Assurance** credit: 3 or 4 hours.

Fundamental principles of computer and communications security and information assurance: Ethics, privacy, notions of threat, vulnerabilities, and risk in systems, information warfare, malicious software, data secrecy and integrity issues, network security, trusted computing, mandatory and discretionary access controls, certification and accreditation of systems against security standards. Security mechanisms: Authentication, auditing, intrusion detection, access control, cryptography, security protocols, key distribution. Same as ECE 422. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225.

CRN	Type	Section	Time	Days	Location	Instructor
49546	lecture	A3	11:00 AM - 12:15 PM	WF	room 1304 Siebel Center for Comp Sci	Hinrichs, S
49546: 3 hours						
49547	lecture	A4	11:00 AM - 12:15 PM	WF	room 1304 Siebel Center for Comp Sci	Hinrichs, S
49547: 4 hours						
50236	lecture	ADD	ARRANGED		room ARR Siebel Center for Comp Sci	Hinrichs, S
50236: 3 hours Students registered in this section will watch the regular CS 461 lecture, online. This is an overflow accommodation for the course. Students in this section would take any exams with the regular section of CS 461.						

463 **Computer Security** credit: 3 or 4 hours.

Program security, trusted base, privacy, anonymity, non-interference, information flow, confinement, advanced auditing, forensics, intrusion detection, key management and distribution, policy composition and analysis, formal approaches to specification and verification of secure systems and protocols, topics in applied cryptography. Same

as ECE 424. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 461. Recommended: CS 475.

CRN	Type	Section	Time	Days	Location	Instructor
49550	lecture	B3	02:00 PM - 03:15 PM	TR	room 1103 Siebel Center for Comp Sci	Hu, Y
49550: 3 hours						
49551	lecture	B4	02:00 PM - 03:15 PM	TR	room 1103 Siebel Center for Comp Sci	Hu, Y
49551: 4 hours						

465 **Princ of User Interface Design** credit: 3 or 4 hours.

This is a project-focused course that covers fundamental principles of user interface design, implementation, and evaluation. Students work in small teams on a semester-long project that includes: analysis of the problem domain, user skills, and tasks; iterative prototyping of interfaces to address user needs; conducting several forms of evaluation such as cognitive walkthroughs and usability tests; and implementation of the final prototype. Students from non-technical disciplines may enroll in the course as non-programmers who participate in all aspects of the projects with the possible exception of implementation. Same as LIS 465. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225 or CS 400.

CRN	Type	Section	Time	Days	Location	Instructor
43388	lecture-discussion	M3	12:30 PM - 01:45 PM	WF	room 1302 Siebel Center for Comp Sci	Bailey, B
43388: 3 hours						
43389	lecture-discussion	M4	12:30 PM - 01:45 PM	WF	room 1302 Siebel Center for Comp Sci	Bailey, B
43389: 4 hours						

473 **Algorithms** credit: 3 or 4 hours.

Advanced data structures, graph algorithms, arithmetic algorithms, geometric algorithms, string problems, parallel algorithms, NP-completeness. Same as CSE 414 and MATH 473. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225 and CS 273.

CRN	Type	Section	Time	Days	Location	Instructor
35846	lecture-discussion	G3	11:00 AM - 12:15 PM	TR	room 1304 Siebel Center for Comp Sci	Har-Peled, S

35846: 3 hours This section is for GRADUATE students.						
35859	lecture-discussion	G4	11:00 AM - 12:15 PM	TR	room 1304 Siebel Center for Comp Sci	Har-Peled, S
35859: 4 hours This section is for GRADUATE students.						
43365	lecture-discussion	UG3	11:00 AM - 12:15 PM	TR	room 1404 Siebel Center for Comp Sci	Chekuri, C
43365: 3 hours This course is for UNDERGRADUATE students, only.						

476 **Program Verification** credit: 3 or 4 hours.

Examines formal methods for demonstrating correctness and other properties of programs; includes an overview of predicate calculus. Topics include: invariant assertions, Hoare axiomatics, well-founded orderings for proving termination, structural induction, computational induction, data structures, and parallel programs. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: CS 225; CS 273 or MATH 414.

CRN	Type	Section	Time	Days	Location	Instructor
35855	lecture-discussion	D3	09:30 AM - 10:45 AM	TR	room 1103 Siebel Center for Comp Sci	Meseguer, J
35855: 3 hours						
35852	lecture-discussion	D4	09:30 AM - 10:45 AM	TR	room 1103 Siebel Center for Comp Sci	Meseguer, J
35852: 4 hours						

491 **Seminar in Computer Science** credit: 0 to 4 hours.

Seminar course for advanced undergraduate and graduate students. Topics will vary. Approved for S/U grading only. May be repeated to a maximum of 4 hours. May be repeated if topics vary. Prerequisite: As specified for each topic offering, see Schedule or departmental course description.

CRN	Type	Section	Time	Days	Location	Instructor
40557	lecture-discussion	LP1	ARRANGED		room ARR Siebel Center for Comp Sci	Pitt, L
40557: 1 hours Topic: Squeaky Outreach in Computer Science. Students learn a fun programming language, help elementary, middle school, and teachers in the community. There are two requirements of this course. The first is to learn Squeak-Etoys. The second is a service-learning component.						
43827	lecture-discussion	LP2	ARRANGED		room ARR Siebel Center for Comp Sci	Pitt, L

43827: 2 hours Topic: Squeaky Outreach in Computer Science. Students learn a fun programming language, help elementary, middle school, and teachers in the community. There are two requirements of this course. The first is to learn Squeak-Etoys. The second is a service-learning component.

492 Senior Project in CS, I credit: 3 hours.

First part of a project course in computer science. Students work in teams to solve typical commercial or industrial problems. Work involves planning, design, and implementation. Extensive oral and written work is required both on-campus and possibly off-campus at sponsors' locations. CS 492 must be taken as a sequence with either CS 493 or CS 494. CS 492 combined with CS 493 fulfills the Advanced Composition Requirement. 3 undergraduate hours. Credit is not given for both CS 492 and a project course in another engineering department for the same project. For Computer Science majors with senior standing.

This course satisfies the General Education Criteria for a Advanced Composition course.

CS 492 and CS 493 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
30139	lecture-discussion	CS	03:00 PM - 04:50 PM	M	room 1105 Siebel Center for Comp Sci	Johnson, R; Woodley, M
30139: Advanced Composition course.						

498 Special Topics in CS credit: 0 to 4 hours.

Lectures in topics of current interest. See Schedule for current topics. Approved for both letter and S/U grading. May be repeated. Prerequisite: As specified for each topic offering, see Schedule or departmental course description.

CRN	Type	Section	Time	Days	Location	Instructor
42376	lecture	DF3	12:30 PM - 01:45 PM	TR	room 1131 Siebel Center for Comp Sci	Forsyth, D
42376: 3 hours Topic: Signals/AI. This course will deal with the signals and systems aspects of AI, covering: statistics and smoothing in natural language processing; hidden Markov models in speech, NLP and visual tracking; classifiers, fitting and robust methods in computer vision; and planning and more traditional AI topics in the context of game AI. Evaluation by MP's, exams and a final project. This section is for undergraduate OR graduate students.						
49172	lecture	DF4	12:30 PM - 01:45 PM	TR	room 1131 Siebel Center for Comp Sci	Forsyth, D
49172: 4 hours Topic: Signals/AI. This course will deal with the signals and systems aspects of AI, covering: statistics and smoothing in natural language processing; hidden Markov models in speech, NLP and visual tracking; classifiers, fitting and robust methods in computer vision; and planning and more traditional AI topics in the context of game AI. Evaluation by MP's, exams and a final project. This section is for graduate students only.						
42391	lecture	JH3	02:00 PM - 03:15 PM	TR	room 1111 Siebel Center for Comp Sci	Hockenmaier, J

42391: 3 hoursTopic: Expressive grammar formalisms for natural language: Theory and Applications. This course will give an overview over the most commonly used formalisms in natural language processing and current research on grammar extraction and wide-coverage parsing. Prerequisites: basic exposure to AI and /or machine learning, or an intro to natural language processing. This section is for either undergraduate or graduate students.						
50658	lecture	JH4	02:00 PM - 03:15 PM	TR	room 1111 Siebel Center for Comp Sci	Hockenmaier, J
50658: 4 hoursTopic: Expressive grammar formalisms for natural language: Theory and Applications. This course will give an overview over the most commonly used formalisms in natural language processing and current research on grammar extraction and wide-coverage parsing. Prerequisites: basic exposure to AI and /or machine learning, or an intro to natural language processing. This section is for graduate students only.						
49192	lecture	KK3	02:00 PM - 03:15 PM	TR	room 1131 Siebel Center for Comp Sci	Karahalios, K
49192: 3 hoursTopic: Social Visualization - visualization of social data for social purposes. By social data we mean the traces that people leave as they go about their daily routine. These data may come from different sources such as the online world (i.e. email, IM logs, blogs, etc.) and the physical world (i.e. captured through sensors such as voice by microphone, movement and location data by camera, gps, ubisense device, etc.) Visualizations of these kinds of data can be used for increasing awareness of one's social environment and for highlighting cues and patterns implicit in communication. This section is for undergraduate OR graduate students.						
49193	lecture	KK4	02:00 PM - 03:15 PM	TR	room 1131 Siebel Center for Comp Sci	Karahalios, K
49193: 4 hoursTopic: Social Visualization - visualization of social data for social purposes. By social data we mean the traces that people leave as they go about their daily routine. These data may come from different sources such as the online world (i.e. email, IM logs, blogs, etc.) and the physical world (i.e. captured through sensors such as voice by microphone, movement and location data by camera, gps, ubisense device, etc.) Visualizations of these kinds of data can be used for increasing awareness of one's social environment and for highlighting cues and patterns implicit in communication. This section is for graduate students only.						
43501	lecture	MG3	11:00 AM - 12:15 PM	WF	room 1131 Siebel Center for Comp Sci	Garzaran, M
43501: 3 hoursTopic: Program Optimization: Prerequisites: CS 232 and CS 225. The course will cover techniques to improve program execution speed and energy consumption. The objective is to prepare students to program future systems where performance improvements will not be, as it was in the past, the direct result of faster clock rates, but must instead be laboriously obtained by applying programming techniques that effectively exploit parallelism and locality. This section is for either undergraduate or graduate students.						
40096	lecture	MG4	11:00 AM - 12:15 PM	WF	room 1131 Siebel Center for Comp Sci	Garzaran, M
40096: 4 hoursTopic: Program Optimization: Prerequisites: CS 232 and CS 225. The course will cover techniques to improve program execution speed and energy consumption. The objective is to prepare students to program future systems where performance improvements will not be, as it was in the past, the direct result of faster clock rates, but must instead be laboriously obtained by applying programming techniques that effectively exploit parallelism and locality. This section is for graduate students only.						
49190	lecture	MV3	12:30 PM - 01:45 PM	TR	room 1111 Siebel Center for Comp Sci	Viswanathan, M

49190: 3 hours Topic: The course will provide an introduction to mathematical logic from the perspective of computer science, emphasizing decidable fragments of logic and decision algorithms. The topics covered will be motivated by applications in artificial intelligence, databases, formal methods and theoretical computer science. The goal of the course is to prepare students for using logic as a formal tool in computer science. The course will roughly cover the following topics (in this order): syntax, semantics and proof theory of propositional logic, sat-solvers, syntax of first-order and second-order logic, connections between monadic second order logic and regular languages (word and tree, finite and infinite), tree-width and Courcelle's theorem with applications to parametric complexity, finite model theory and descriptive complexity, games and inexpressiveness. Prerequisites: Courses CS 173, CS 225, and CS 273 (new version since Spring 2006), or instructor's consent. This section is for undergraduate OR graduate students.

49191	lecture	MV4	12:30 PM - 01:45 PM	TR	room 1111 Siebel Center for Comp Sci	Viswanathan, M
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49191: 4 hours Topic: The course will provide an introduction to mathematical logic from the perspective of computer science, emphasizing decidable fragments of logic and decision algorithms. The topics covered will be motivated by applications in artificial intelligence, databases, formal methods and theoretical computer science. The goal of the course is to prepare students for using logic as a formal tool in computer science. The course will roughly cover the following topics (in this order): syntax, semantics and proof theory of propositional logic, sat-solvers, syntax of first-order and second-order logic, connections between monadic second order logic and regular languages (word and tree, finite and infinite), tree-width and Courcelle's theorem with applications to parametric complexity, finite model theory and descriptive complexity, games and inexpressiveness. Prerequisites: Courses CS 173, CS 225, and CS 273 (new version since Spring 2006), or instructor's consent. This section is for graduate students only.

40094	lecture	PR3	09:30 AM - 10:45 AM	WF	room 1111 Siebel Center for Comp Sci	Prabhakaran, M
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40094: 3 hours Topic: Theoretical Foundations of Cryptography This course is an introduction to the theoretical foundations of cryptography. Emphasis will be on rigorous mathematical definitions of security, and proofs of security. Prerequisite: CS 173 and 273 or consent of instructor. Some mathematical maturity will be expected. Familiarity with basic theory of computation and complexity theory will be helpful. This section is for undergraduate or graduate students.

47171	lecture	PR4	09:30 AM - 10:45 AM	WF	room 1111 Siebel Center for Comp Sci	Prabhakaran, M
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47171: 4 hours Topic: Theoretical Foundations of Cryptography This course is an introduction to the theoretical foundations of cryptography. Emphasis will be on rigorous mathematical definitions of security, and proofs of security. Prerequisite: CS 173 and 273 or consent of instructor. Some mathematical maturity will be expected. Familiarity with basic theory of computation and complexity theory will be helpful. This section is for graduate students only.

31537	lecture	SJ3	03:00 PM - 04:15 PM	MW	room 1109 Siebel Center for Comp Sci	Jacobson, S
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31537: 3 hours Topic: Stochastic Processes. Modeling and analysis of stochastic processes. Familiarity with discrete-time Markov chains, Poisson processes, and birth-and-death processes is assumed. Topics include the transient and steady-state behavior of continuous-time Markov chains; renewal processes; models of queuing systems (birth-and-death models, embedded-Markov-chain models, queuing networks); reliability models; and inventory models. This section is for undergraduate OR graduate students.

49838	lecture	SJ4	03:00 PM - 04:15 PM	MW	room 1109 Siebel Center for Comp Sci	Jacobson, S
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49838: 4 hours Topic: Stochastic Processes. Modeling and analysis of stochastic processes. Familiarity with

discrete-time Markov chains, Poisson processes, and birth-and-death processes is assumed. Topics include the transient and steady-state behavior of continuous-time Markov chains; renewal processes; models of queuing systems (birth-and-death models, embedded-Markov-chain models, queuing networks); reliability models; and inventory models. This section is for graduate students only.

40093	lecture	SS3	09:30 AM - 10:45 AM	TR	room 1131 Siebel Center for Comp Sci	Sinha, S
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40093: 3 hours Topic: Algorithms in Bioinformatics. Prerequisite: Programming skills such as CS 225 as well as basic probability and statistics. This course will be geared towards undergraduate and Masters level students in computer science. We shall see how state-of-the-art techniques in computer science, especially in sequence analysis and machine learning, are applied to problems in bioinformatics. The student will learn how to formulate important biological problems as computable problems, and develop algorithms to solve such problems efficiently. An application-oriented project will give students hands-on experience with biological data sets. This section is for undergraduate or graduate students.

43670	lecture	SS4	09:30 AM - 10:45 AM	TR	room 1131 Siebel Center for Comp Sci	Sinha, S
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43670: 4 hours Topic: Algorithms in Bioinformatics. Prerequisite: Programming skills such as CS 225 as well as basic probability and statistics. This course will be geared towards undergraduate and Masters level students in computer science. We shall see how state-of-the-art techniques in computer science, especially in sequence analysis and machine learning, are applied to problems in bioinformatics. The student will learn how to formulate important biological problems as computable problems, and develop algorithms to solve such problems efficiently. An application-oriented project will give students hands-on experience with biological data sets. This section is for graduate students only.

499 **Senior Thesis in CS** credit: 3 hours.

Research and thesis development experience in computer science. A student works with a faculty member on a mutually agreed upon thesis topic and completes a written thesis. Work involves literature search, oral presentation, analysis and/or implementation, paper preparation, and a written thesis. 3 undergraduate hours. May be repeated to a maximum of 6 hours. Prerequisite: Senior standing in CS and consent of instructor.

This course satisfies the General Education Criteria for a Advanced Composition course.

CRN	Type	Section	Time	Days	Location	Instructor
10465	independent study		ARRANGED			
10465: Advanced Composition course. Instructor Approval Required						
10465: Students must see the CS Department to receive the appropriate CRN for the instructor.						

505 **Numerical Fluid Dynamics** credit: 4 hours.

Same as ATMS 502 and CSE 566. See ATMS 502.

CRN	Type	Section	Time	Days	Location	Instructor
37125	lecture-discussion	A	03:00 PM - 04:15 PM	TR	room 109 Atmospheric	Jewett, B

					Sciences Bldg	
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511 **Adv Database Mgt Systems** credit: 4 hours.

Advanced concepts in database management system design and implementation, and an introduction to the major recent developments in the field. Topics include the relational roots, distributed and parallel databases, object databases and extensibility, semistructured data and XML, web research, benchmarks, and current directions in the field. Prerequisite: CS 411.

CRN	Type	Section	Time	Days	Location	Instructor
43351	lecture-discussion	P	02:00 PM - 03:15 PM	WF	room 1304 Siebel Center for Comp Sci	Zhai, C
43351: 4 hours						

527 **Adv Topics in Software Eng** credit: 4 hours.

Advanced topics in software engineering, including fault-tolerant software, software architecture, software patterns, multi-media software, and knowledge-based approaches to software engineering. Course also includes a number of case studies. Same as CSE 529. Prerequisite: CS 428 or CS 429.

CRN	Type	Section	Time	Days	Location	Instructor
35912	lecture-discussion	S	02:00 PM - 03:15 PM	TR	room 1302 Siebel Center for Comp Sci	Marinov, D

541 **Computer Systems Analysis** credit: 4 hours.

Same as CSE 524 and ECE 541. See ECE 541.

CRN	Type	Section	Time	Days	Location	Instructor
35921	lecture-discussion	B	09:30 AM - 10:45 AM	TR	room 1304 Siebel Center for Comp Sci	Nicol, D

549 **Seminar in Cognitive Science** credit: 2 or 4 hours.

Same as PSYC 514, ANTH 514, EPSY 551, LING 570, and PHIL 514. See PSYC 514.

CRN	Type	Section	Time	Days	Location	Instructor
48226	lecture-discussion	JH4	01:30 PM - 02:45 PM	MW	room 29 Psychology Building	Hummel, J

48226: Meets with Psyc 496 JH3.

558 **Topics in Numerical Analysis** credit: 4 hours.

Same as CSE 513. May be repeated. Prerequisite: As specified for each topic offering, see Schedule or departmental course description.

CRN	Type	Section	Time	Days	Location	Instructor
35929	lecture-discussion	P	11:00 AM - 12:15 PM	TR	room 1103 Siebel Center for Comp Sci	Olson, L

571 **Combinatorial Mathematics** credit: 4 hours.

Same as MATH 580. See MATH 580.

CRN	Type	Section	Time	Days	Location	Instructor
33563	lecture-discussion	F1	02:00 PM - 02:50 PM	MWF	room 441 Altgeld Hall	West, D

572 **Extremal Graph Theory** credit: 4 hours.

Same as MATH 581. See MATH 581.

CRN	Type	Section	Time	Days	Location	Instructor
50012	lecture-discussion	X1	12:00 PM - 12:50 PM	MWF	room 347 Altgeld Hall	West, D

577 **Coding Theory** credit: 4 hours.

Same as ECE 556 and MATH 579. See ECE 556.

CRN	Type	Section	Time	Days	Location	Instructor
37138	discussion-recitation	L	10:00 AM - 11:20 AM	TR	room 256 Mechanical Engineering Bldg	Milenkovic, O
37138: 4 hours						

578 **Information Theory** credit: 4 hours.

Same as ECE 563 and STAT 563. See ECE 563.

CRN	Type	Section	Time	Days	Location	Instructor
37142	discussion-recitation	A	01:30 PM - 02:50 PM	MW	room 106B1 Engineering Hall	Moulin, P
37142: 4 hours						

591 **Advanced Seminar in CS** credit: 0 to 4 hours.

Seminar on topics of current interest. Subjects will be announced in the Schedule. Approved for S/U grading only. May be repeated in the same or subsequent terms if topics vary. Prerequisite: As specified for each topic offering, see Schedule or departmental course description.

CRN	Type	Section	Time	Days	Location	Instructor
35941	lecture-discussion	ACT	ARRANGED		room ARR Siebel Center for Comp Sci	Garzaran, M; Padua, D; Adve, V
35941: 1 hoursTopic: Advanced Compiler Technology. Prerequisite: CS 426.						
43832	lecture-discussion	BIO	ARRANGED		room ARR Siebel Center for Comp Sci	Liu, L; Han, J; Schatz, B; Zhai, C; Sinha, S; Zhong, S
43832: 1 hoursTopic: Advanced Seminar on Biomedical Informatics.						
35972	lecture-discussion	CZ	ARRANGED		room ARR Siebel Center for Comp Sci	Zilles, C
35972: 1 hoursTopic: Considering Computer Architecture Patents.						
35937	lecture-discussion	DCS	04:00 PM - 04:50 PM	M	room 1404 Siebel Center for Comp Sci	Chekuri, C
35937: 1 hoursTopic: Department of CS Research Seminar.						
35953	lecture-discussion	HAN	ARRANGED		room ARR Siebel Center for Comp Sci	Han, J
35953: 1 hoursTopic: Data Mining for Advanced Applications. Prerequisite: Credit or concurrent registration in CS 412 or equivalent.						
35974	lecture-discussion	HCI	ARRANGED		room ARR Siebel Center for Comp Sci	Bailey, B; Karahalios, K
35974: 1 hoursTopic: Seminar in Human-Computer Interaction.						
43828	lecture-discussion	IG	ARRANGED		room ARR Siebel Center for Comp Sci	Gupta, I
43828: 1 hoursTopic: Advanced Seminar in Distributed Systems. Prerequisite: CS 598IG or CS 425 or any basic course on distributed systems.						

35949	lecture-discussion	JE	ARRANGED		room ARR Siebel Center for Comp Sci	Erickson, J
35949: 1 hoursTopic: Topics in Algorithms. Prerequisite: CS 473G.						
35964	lecture-discussion	JM	ARRANGED		room ARR Siebel Center for Comp Sci	Meseguer, J
35964: 1 hoursTopic: Maude: Theory and Applications. Prerequisite: Credit or concurrent registration in CS 476, or consent of instructor.						
43833	lecture-discussion	KN	ARRANGED		room ARR Siebel Center for Comp Sci	Nahrstedt, K; Pena-Mora, F; Poole, M
43833: 1 hoursTopic: Special Topics on Group Communication in Collaborative Spaces.						
35957	lecture-discussion	MH	ARRANGED		room ARR Siebel Center for Comp Sci	Heath, M
35957: 1 hoursTopic: Scientific and Parallel Computing.						
41193	lecture-discussion	MSW	ARRANGED		room ARR Siebel Center for Comp Sci	Winslett, M
41193: 1 hoursTopic: Database and Information Systems Seminar.						
41977	lecture	PHD	05:00 PM - 05:50 PM	W	room 1404 Siebel Center for Comp Sci	Belford, G
41977: 1 hoursTopic: Orientation for new PhD students.						
35958	lecture-discussion	REJ	ARRANGED		room ARR Siebel Center for Comp Sci	Johnson, R
35958: 1 hoursTopic: Software Architecture Seminar.						
41614	lecture-discussion	RHC	11:30 AM - 12:20 PM	M	room ARR Siebel Center for Comp Sci	Campbell, R
41614: 1 hoursTopic: Security Reading Seminar. Prerequisite: A prior course in security or CS423 or consent of instructor.						
49716	lecture-discussion	SE	ARRANGED		room ARR Siebel Center for Comp Sci	Johnson, R; Marinov, D
49716: 1 hoursTopic: Software Engineering Seminar.						
46060	lecture-discussion	SN	01:00 PM - 01:50 PM	F	room 1109 Siebel Center for Comp Sci	Vaidya, N; Kravets, R; Nahrstedt, K; Gupta, I
46060: 1 hoursTopic: New Systems and Networking Seminar.						

35965	lecture-discussion	SRR	04:00 PM - 05:20 PM	R		Ray, S
35965: Topic: Artificial Neural Networks and Computational Brain Theory. Prerequisite: Background in CS, AI and interest in neuroscience topics. Credit: 1 or 2 hours. (Two hour credit entails leading the discussion one time.)						

597 **Individual Study** credit: 2 to 16 hours.
Individual study or reading in a subject not covered in normal course offerings. May be repeated. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10467	independent study		ARRANGED			
10467: Instructor Approval Required						
10467: Students must see the CS Department to receive the appropriate CRN for the instructor.						

598 **Special Topics in CS** credit: 2 to 4 hours.
Lecture course in topics of current interest. See Schedule for current topics. May be repeated. Prerequisite: As specified for each topic offering, see Schedule or departmental course description.

CRN	Type	Section	Time	Days	Location	Instructor
42377	lecture-discussion	CAG	11:00 AM - 12:15 PM	TR	room 1131 Siebel Center for Comp Sci	Gunter, C
42377: 4 hoursTopic: Advanced Computer Security. Prerequisite: a 400 level course in security or consent of instructor. Research projects in security in the areas of monitoring and surveillance, critical infrastructure protection, unwanted traffic on the Internet, secure web services, tamper-resistant security architectures.						
46983	lecture-discussion	DAF	ARRANGED		room ARR Siebel Center for Comp Sci	Forsyth, D
46983: 4 hoursTopic: Optimization in computer vision and machine learning. We will discuss applications of current optimization methods to problems in computer vision and machine learning.						
49828	lecture-discussion	HI	01:00 PM - 03:50 PM	M	room 1131 Siebel Center for Comp Sci	Schatz, B
49828: 4 hoursTopic: Healthcare Infrastructure. Healthcare is the largest industry in the country, but the current infrastructure for providing healthcare is not viable. Recent advances in information technology promise radically different infrastructure that could provide a viable model for providing healthcare. This course will examine healthcare infrastructure through lectures and discussions, through text readings and web sites. There is a particular focus on measuring the health of populations, in the demographic era of chronic illness. Information sources are discussed in detail from medical literature and records to health brochures and monitors. There are no pre-requisites for this course, but students encouraged to use background experiences. Practical topics will be						

emphasized with the aim of revolutionizing an industry in transition. A semester project will be required, on information technology aspects of population health measurement.

49221	lecture-discussion	JH	09:30 AM - 10:45 AM	TR	room 1302 Siebel Center for Comp Sci	Hou, J
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49221: 4 hoursTopic: Advanced Wireless Networking. Prerequisite: CS 438. In this course, we will discuss issues that better define and characterize wireless links and their implications for higher-layer protocol design and optimization. Specifically, we will study the following issues: (T1) control knobs for improving network performance, including power control, physical carrier sense turning, rate control, interference mitigation, channel diversity, and multi-radio and multi-path routing; (T2) modeling and analysis of these control knobs and their effects on the performance; and (T3) cross-layer design and optimization that allow higher-layer protocols to take advantage of these control knobs. We will also study several representative wireless networks, such as wireless sensor networks and wireless mesh networks.

35992	lecture-discussion	MC	11:00 AM - 12:15 PM	TR	room 1111 Siebel Center for Comp Sci	Caccamo, M
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35992: 4 hoursTopic: Advanced Topics in Real-Time Embedded Systems. Prerequisite: CS 424 (Real-Time Systems), or CS 431 (Embedded System Architecture), or consent of the instructor. In this course, we will discuss topics about the design and theoretical analysis of distributed real-time embedded systems. The goal of this course is to provide a deep understanding about resource management in modern networked embedded systems composed of diverse activities with different degrees of criticality and with different forms of timing requirements. This course is structured to improve students' research skill and their ability of critical thinking. Specifically, the course will include the following topics: (T1) design of predictable and efficient soft real-time systems; (T2) real-time resource management for multi-processor platforms; (T3) principles of real-time wireless networking.

49196	lecture-discussion	RHC	09:30 AM - 10:45 AM	TR	room 1111 Siebel Center for Comp Sci	Campbell, R
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49196: 4 hoursTopic: Ubiquitous Systems. Ubiquitous and pervasive computing is a new and exciting platform and paradigm for anywhere, anyhow services and information systems. This new research area is a natural outcome of the tremendous advances in wireless networks, mobile computing, sensor networks, distributed computing, and agent technologies. This advanced graduate course is project and reading based and explores issues of applications, privacy, infrastructure, mobile, wireless, and distributed computing in an Internet environment with advanced human-computer interfaces, high-definition multimedia, and powerful, efficient computing. As prerequisites, the students should have basic knowledge of systems and networking, security, and system design.

36005	lecture-discussion	RHK	02:00 PM - 03:15 PM	TR	room 1304 Siebel Center for Comp Sci	Kravets, R
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36005: 4 hoursTopic: Advanced Topics in Network Protocols, Architectures and Applications. Prerequisite: CS 438 or equivalent is required; CS 423 or equivalent is recommended. The goal of this course is to expose students to the current state of research in network protocols, architectures and applications as well as to challenge students with the design, organization and implementation of a semester-long research project. This course is aimed at students with some background in networking and communications who wish to explore advanced research topics.

43668	lecture-discussion	SML	12:30 PM - 01:45 PM	TR	room 1103 Siebel Center for Comp Sci	Lavalle, S
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43668: 4 hoursTopic: Sensing, Actuation, and Computation. Material: Sensor models, visibility sensors, sensor networks, inference problems, information spaces, actuation models, minimalist planning, visual sweeps, searching with limited information, pursuit-evasion games, sensor-based navigation tasks, coordinate-free

models, stochastic models, nontraditional communication models, sensor-centric models of computation, decidability and complexity for actuated sensor systems.

49197	lecture-discussion	SNK	09:30 AM - 10:45 AM	WF	room 1103 Siebel Center for Comp Sci	Kamin, S
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49197: 4 hours Topic: Program Generation. Program generation can be used to increase programmer productivity and program efficiency. Though it is normally used in an ad hoc way, there are experimental approaches to program generation that can make it easier and safer. We will review the research in this area, including methods, tools, and applications.

49198	lecture-discussion	SVA	02:00 PM - 03:15 PM	WF	room 1131 Siebel Center for Comp Sci	Adve, S
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49198: 4 hours Topic: Reliability-Aware Computer Architecture. Hardware unreliability is projected to be a major obstacle to reaping the performance benefits predicted by Moore's law over the next decade. A recent conference articulated "Systems You Can Count On" as one of the grand challenges facing computer architects. This course will discuss why reliability is a grand challenge for the future and how computer architects can address this challenge by building reliable systems from unreliable components. We will focus on hardware reliability (including errors due to wear-out, thermal variation, radiation, inadequate burn-in, process variation), but will also cover some material on software reliability. The class will consist of readings from recent literature and a project. Prerequisite: CS 433 or equivalent.

599 **Thesis Research** credit: 0 to 16 hours.
Approved for S/U grading only. May be repeated.

CRN	Type	Section	Time	Days	Location	Instructor
10469	independent study		ARRANGED			

10469: Instructor Approval Required

10469: Students must see the CS Department to receive the appropriate CRN for the instructor.