

4482 Advanced Biochemistry Lab II. (2-8) The second of two laboratory courses providing instruction in the modern techniques of biochemistry. Experiments are performed on the isolation, manipulation and characterization of DNA, RNA, and proteins. Students will use their results and the scientific literature to prepare formal written reports and oral presentations. Prerequisite: CHEM 4481. (WI)

Department of Computer Science

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DEGREE PROGRAMS OFFERED

- BA, major in Computer Science
- BA, major in Computer Science (with Teacher Certification)
- BS, major in Computer Science
- BS, major in Computer Science
(with concentration in Computer Engineering)
- BS, major in Computer Science (with Teacher Certification)

MINOR OFFERED

Computer Science

CERTIFICATE OFFERED

Computer Science

Mission Statement

The Department of Computer Science mission is to advance the knowledge of computer science and technology through education, research, and service for the betterment of industry, government, and society.

Vision Statement

The department seeks to become a competitive doctoral-granting department and to expand its depth and breadth in the research and study of applied computing.

Computer Science Goals

1. Graduating students with strong technical backgrounds and communication skills.
2. Graduating students who understand the values and requirements of responsible professionalism and lifelong learning.
3. Building a sustainable research program.
4. Developing international visibility for our research.
5. Providing quality service to the university, the profession, and the community.

Overview

The Department of Computer Science offers two degree options for students—a Bachelor of Arts (BA) or a Bachelor of Science (BS). The Bachelor of Science degree program in

Computer Science is accredited by the Computing Accreditation Commission of ABET, Inc.

The department offers courses in computer architecture, data structures and algorithms, automata theory, compilers, operating systems, object-oriented design and implementation, Web programming, software engineering, computer graphics, computer networks, distributed systems, computer security, digital forensics, database design, data mining, machine learning, human computer interaction, artificial intelligence, and several programming languages including C, C++, Java, Assembly, LISP, HTML, Perl, PHP, and JavaScript.

Computer Science graduates can further their studies in graduate schools or seek employment in industry, such as, hardware manufacturing; software development; computer applications in the petroleum, aerospace, and chemical industries; and secondary school teaching.

Certificate in Computer Science

Additionally, for persons who already hold a baccalaureate degree, the department offers a Certificate in Computer Science. Refer to the Texas State graduate catalog for more information.

Secondary Teacher Certification

Students may pursue teacher certification in Computer Science for Texas public schools grades 8-12 through a BA or BS degree. Students interested in certification are strongly encouraged to see an academic advisor early in their undergraduate program or certification process. A student also may elect initial or additional certification as a post-baccalaureate or graduate student. Post-baccalaureate students should contact the Office of Educator Preparation for initial consultation. Students seeking initial teacher certification must complete 21 hours of the professional sequence courses under the College of Education: CI 3325, CI 4332, CI 4370, CI 4343, RDG 3323, and EDST 4681 (Student Teaching).

Admission to Teacher Education

Students who want to be certified to teach in Texas accredited schools should follow the curriculum sequence outlined by their major departments or colleges. The students should contact an academic advisor who will help plan schedules that will lead to graduation as well as certification. Students are encouraged to join student organizations related to the teaching profession.

The following criteria must be satisfied for admission to any teacher education program:

1. Junior standing (minimum 60 hours completed)
2. An overall Texas State GPA of 2.50 or higher
3. Texas Higher Education Assessment (THEA) scores of at least 220 in writing, and 230 in reading and mathematics or documentation of exemptions or equivalencies
4. Completion of the mathematics and science formative assessments
5. College level skills in reading, oral and written communication, critical thinking, and mathematics
 - o Reading: Successful completion of PHIL 1305/1320 or its equivalent

- o Oral Communication: Successful completion of COMM 1310 or its equivalent
- o Written Communication: Grades of C or higher in ENG 1310 and 1320 or their equivalents
- o Critical Thinking: Successful completion of PHIL 1305/1320 or its equivalent
- o Mathematics: Successful completion of the mathematics requirement in the selected major (MATH 1317 or 1319 or 2417 or 2471)

Second Teaching Field in Computer Science

For students who are seeking teacher certification in their major but would like a second teaching field in Computer Science for Texas public schools (grades 8-12), the requirements are: CS 1308, 1428, 2308, 2318, 3358, and 12 hours CS electives of which 9 hours must be advanced (3000-4000 level).

Bachelor of Arts Major in Computer Science Minimum required: 120 semester hours							
General Requirements: <ol style="list-style-type: none"> 1. A minimum of 120 hours is required for graduation. Of those hours, 9 hours must be writing intensive and 36 hours must be advanced. Advanced courses are numbered 3000-4000 level. 2. A minimum of 46 hours must be completed in the general education core. Refer to the University College section of this catalog for additional information about general education core curriculum requirements. 3. Computer Science majors must take eight hours (2 courses) from: BIO 1430 & 1431; PHYS 1410 & 1420 [or 1430 & 2425]; CHEM 1141 and 1341, plus 1142 and 1342; or GEOL 1410 & 1420. The eight hours (2 courses) must be from the same science (BIO, CHEM, GEOL, or PHYS) as listed above. 4. MATH 2417 or 2471 may substitute for the MATH 1317, 1319, 1329, or 2321 requirement. 5. Students pursuing the BA degree are required to complete 6 hours of modern language (2310 and 2320) in the same modern language. Most students will have to complete 1410 and 1420 as prerequisites before attempting 2310. 6. Students pursuing the BA degree are required to complete an additional 3 hours of English literature in addition to the core curriculum English literature requirement. Students may select from ENG 2310, 2320, 2340, 2359, 2360, ENG 3303 (Technical Writing), or ENG 3311 (Writing for the Computer Industry) to fulfill this requirement. 7. Computer Science majors must complete a CS project course from: CS 3468, 4326, or 4398. 8. A minor is required, and it is recommended that it be chosen in consultation with the academic advisor. 9. The minimum number of hours required for the degree is 120. The number of free electives a student will complete varies, depending on the number of hours needed to satisfy the 120 and/or the 36 advanced or 9 hours writing intensive requirements. Students should consult with the academic advisor before enrolling in any free elective courses to ensure that electives are needed. 							
Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	CS 2308	3	CS 2315	3	CS 3358	3
MATH 1317, 1319, 1329, or 2321 (see gen. req. 4)	3	MATH 2358	3	CS 2318	3	CS 2420	4
US 1100	1	Science (see gen. req. 3)	4	MATH 3398	3	Modern Language 1420	4
ENG 1310	3	ENG 1320	3	Modern Language 1410 (see gen. req. 5)	4	Science (see gen. req. 3)	4
COMM 1310	3	PHIL 1305 or 1320	3	ENG Lit 2310, 2320, 2330, 2340, 2359, 2360	3		
PFW one course	1						
Total	15	Total	16	Total	16	Total	15
Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 3398	3	CS Advanced Elective	3	CS 4354	3	CS Advanced Elective	3
Second ENG Lit 2310, 2320, 2330, 2340, 2359, 2360 or 3303 or 3311 (see gen. req. 6)	3	Modern Language 2320	3	CS Project (CS 3468, 4326, or 4398)	3	CS Advanced Elective	3
Modern Language 2310	3	Minor (see gen. req. 8)	3	Minor (see gen. req. 8)	3	Minor (see gen. req. 8)	3
Minor (see gen. req. 8)	3	ART, DAN, MU, or TH 2313	3	Social Science ANTH 1312, ECO 2301, ECO 2314, GEO 1310, SOC 1310, PSY 1300	3	POSI 2320	3
HIST 1310	3	HIST 1320	3	POSI 2310	3		
		PFW (one course)	1				
Total	15	Total	16	Total	15	Total	12

Bachelor of Arts
Major in Computer Science
(with Teacher Certification)
Minimum required: 129 semester hours

General Requirements:

1. A minimum of 129 hours will be completed for students pursuing teacher certification. Of those hours, 9 hours must be writing intensive, and 36 hours must be advanced. Advanced courses are 3000-4000 level courses.
2. A minimum of 46 hours must be completed in the general education core. Refer to the University College section of this catalog for additional information about general education core curriculum requirements.
3. Computer Science majors must take eight hours (2 courses) from: BIO 1430 & 1431; PHYS 1410 & 1420 [or 1430 & 2425]; CHEM 1141 and 1341, plus 1142 and 1342; or GEOL 1410 & 1420. The eight hours (2 courses) must be from the same science (BIO, CHEM, GEOL, or PHYS) as listed above.
4. MATH 2417 or 2471 may substitute for the MATH 1317, 1319, 1329, or 2321 requirement.
5. Students pursuing the BA degree are required to complete 6 hours of language (2310 and 2320) in the same modern language. Most students will have to complete 1410 and 1420 as prerequisites before attempting 2310.
6. Students pursuing the BA degree are required to complete an additional 3 hours of English literature in addition to the core curriculum English requirement. Students may select from ENG 2310, 2320, 2330, 2340, 2359, 2360, ENG 3303 (Technical Writing), or ENG 3311 (Writing for the Computer Industry) to fulfill this requirement.
7. Computer Science majors must complete a CS project course from: CS 3468, 4326, or 4398.
8. A minor is required. Students seeking teacher certification will automatically satisfy a minor in Secondary Education when they successfully complete the 21 hours of Professional Education sequence of courses under the College of Education (CI 3325, 4332, 4370, 4343, RDG 3323, and EDST 4681-Student Teaching).
9. The minimum number of hours required for the degree is 129 so in most cases, a student pursuing teacher certification in CS will not need to complete additional elective courses. Students should consult with the academic advisor before enrolling in any free elective courses.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	CS 2308	3	CS 2315	3	CS 3358	3
MATH 1317, 1319, 1329, or 2321 (see gen. req. 4)	3	MATH 2358	3	CS 2318	3	CS 2420	4
US 1100	1	Science (see gen. req. 3)	4	MATH 3398	3	Modern Language 1420	4
ENG 1310	3	ENG 1320	3	Modern Language 1410 (see gen. req. 5)	4	Science (see gen. req. 3)	4
COMM 1310	3	PHIL 1305 or 1320	3		3		
PFW one course	1						
Total	15	Total	16	Total	13	Total	15

Sophomore Year - Summer I		Sophomore Year - Summer II		Junior Year - 1st Semester		Junior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
ENG Lit 2310, 2320, 2330, 2340, 2359, 2360	3	ART, DAN, MU, or TH 2313	3	CS 3398	3	CS Advanced Elective	3
HIST 1310	3	HIST 1320	3	Second ENG Lit 2310, 2320, 2330, 2340, 2359, 2360	3	CS Advanced Elective	3
				CS 4354	3	CS Project Course CS 3468, 4326, 4398	3-4
				Modern Language 2310	3	Modern Language 2320	3
				CI 3325	3	CI 4332	3
Total	6	Total	6	Total	15	Total	15

Junior Year - Summer I		Junior Year - Summer II		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
POSI 2310	3	POSI 2320	3	CS Advanced Elective	3	EDST 4681 (Student Teaching)	6
Social Science ANTH 1312, ECO 2301, ECO 2314, GEO 1310, SOCI 1310, PSY 1300	3	PFW (one course)	1	CI 4370	3		
				CI 4343	3		
				RDG 3323	3		
Total	6	Total	4	Total	12	Total	6

Bachelor of Science
Major in Computer Science
Minimum required: 120 semester hours

General Requirements:

1. A minimum of 120 hours is required for graduation. Of those, 9 hours must be writing intensive and 36 hours must be advanced. Advanced courses are 3000-4000 level courses.
2. A minimum of 46 hours must be completed in the general education core. Refer to the University College section of this catalog for additional information about general education core curriculum requirements.
3. Computer Science majors must take sixteen hours (4 courses) from: BIO 1430 & 1431; PHYS 1410 & 1420 [or 1430 & 2425]; CHEM 1141 and 1341, plus 1142 and 1342; or GEOL 1410 & 1420. Eight hours (2 courses) must be from the same science (BIO, CHEM, GEOL, or PHYS) as listed above.
4. A minor is required, and it is recommended that it be chosen in consultation with the academic advisor.
5. Students pursuing the BS are required to complete a total of 17 hours in mathematics. Due to the number of Mathematics hours a student completes, a Mathematics minor is recommended because a student only needs to complete additional advanced MATH electives to satisfy the minor in mathematics.
6. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of language taken in high school, then two semesters of the same modern language must be taken at the college level.
7. Students pursuing the BS degree are required to complete an additional 3 hours of English literature in addition to the core curriculum English requirement. Students may select from ENG 2310, 2320, 2330, 2340, 2359, 2360, ENG 3303 (Technical Writing), or ENG 3311 (Writing for the Computer Industry) to fulfill this requirement.
8. Computer Science majors must complete one CS project course from: CS 3468, 4326, or 4398.
9. The minimum number of hours required for the degree is 120, so the number of free electives a student will complete will vary depending on the number of hours a student may need to achieve the 120 and/or the 36 advanced or 9 hours writing intensive requirements. Students need to consult with the academic advisor before enrolling in any free elective courses.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	CS 2308	3	CS 2315	3	CS 3358	3
MATH 2358		MATH 2471	4	CS 2318	3	CS 2420	4
US 1100	3	ENG 1320	3	MATH 3398	3	MATH 2472	4
ENG 1310	1	PHIL 1305 or 1320	3	Science (see gen. req. 3)	4	Science (see gen. req. 5)	4
COMM 1310	3	Social Science ANTH 1312, ECO 2301, ECO 2314, GEO 1310, SOCI 1310, PSY 1300	3	ENG Lit 2310, 2320, 2330, 2340, 2359, 2360	3		
PFW one course	1						
Total	15	Total	16	Total	16	Total	15

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 3398	3	CS 3339	3	CS 4354	3	CS Advanced Elective	3
CS Elective	3	CS Advanced Elective	3	CS Project Course CS 3468, 4326, 4398 (see gen. req. 8)	3-4	CS Advanced Elective	3
Second ENG Lit 2310, 2320, 2330, 2340, 2359, 2360 (see gen. req. 7)	3	MATH 3305	3	POSI 2310	3	Minor (see gen. req. 4)	3
Science (see gen. req. 3)	4	Science (see gen. req. 3)	4	ART, DAN, MU, or TH 2313	3	POSI 2320	3
HIST 1310	3	HIST 1320	3			Elective (see gen. req. 9)	0-1
		PFW one course	1				
Total	16	Total	17	Total	12-13	Total	12-13

**Bachelor of Science
Major in Computer Science
(with Concentration in Computer Engineering)
Minimum required: 120 semester hours**

General Requirements:

1. A minimum of 121 hours is required for graduation. Of those, 9 hours must be writing intensive and 36 hours must be advanced. Advanced courses are 3000-4000 level courses.
2. A minimum of 46 hours must be completed in the general education core. Refer to the University College section of this catalog for additional information about general education core curriculum requirements.
3. Computer Science majors must take sixteen hours (4 courses) from: BIO 1430 & 1431; PHYS 1410 & 1420 [or 1430 & 2425]; CHEM 1141 and 1341, plus 1142 and 1342; or GEOL 1410 & 1420. Eight hours (2 courses) must be from the same science (BIO, CHEM, GEOL, or PHYS) as listed above.
4. A minor is required, and it is recommended that it be chosen in consultation with the academic advisor.
5. Students pursuing the BS are required to complete a total of 17 hours in mathematics. Due to the number of mathematics hours a student completes, a mathematics minor is recommended because a student only needs to complete additional advanced MATH electives to satisfy the minor in mathematics.
6. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of language taken in high school, then two semesters of the same modern language must be taken at the college level.
7. Students pursuing the BS degree are required to complete an additional 3 hours of English literature in addition to the core curriculum English requirement. Students may select from ENG 2310, 2320, 2330, 2340, 2359, 2360, ENG 3303 (Technical Writing), or ENG 3311 (Writing for the Computer Industry) to fulfill this requirement.
8. Computer Science majors must complete one CS project course from: 4326 or 4398.
9. The concentration in computer engineering consists of EE 2400, CS 3468, and two courses chosen from CS 4310, CS 4318, CS 4328, or CS 4388.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	CS 2308	3	CS 2315	3	CS 3358	3
MATH 2358		MATH 2471	4	CS 2318	3	CS 2420	4
US 1100	3	ENG 1320	3	MATH 3398	3	MATH 2472	4
ENG 1310	1	PHIL 1305 or 1320	3	Science (see gen. req. 3)	4	Science (see gen. req. 5)	4
COMM 1310	3	Social Science ANTH 1312, ECO		ENG Lit 2310, 2320, 2330, 2340, 2359,			
PFW one course	3	2301, ECO 2314, GEO 1310,		2360	3		
	1	SOCI 1310, PSY 1300	3				
Total	15	Total	16	Total	16	Total	15

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 3398	3	CS 3339	3	CS 4354	3	Two of CS 4310, 4318, 4328,	
EE 2400	4	CS 3468	4	CS Project Course CS 4326 or		or 4388	6
Second ENG Lit 2310, 2320, 2330,		MATH 3305	3	4398 (see gen. req. 8)	3	Minor (see gen. req. 4)	3
2340, 2359, 2360 (see gen. req. 7)	3	Science (see gen. req. 3)	4	HIST 1320	3	POSI 2320	3
Science (see gen. req. 3)	4	HIST 1310	3	ART, DAN, MU, or TH 2313	3		
POSI 2310	3	PFW one course	1				
Total	17	Total	18	Total	12	Total	12

**Bachelor of Science
Major in Computer Science
(with Teacher Certification)
Minimum required: 129 semester hours**

General Requirements:

1. A minimum of 129 hours is required for graduation. Of those hours, 9 hours must be writing intensive hours, and 36 must be advanced. Advanced courses are 3000-4000 level courses.
2. A minimum of 46 hours must be completed in the general education core. Refer to the University College section of this catalog for general education core curriculum requirements.
3. Computer Science majors must take sixteen hours (4 courses) from: BIO 1430 & 1431; PHYS 1410 & 1420 [or 1430 & 2425]; CHEM 1141 and 1341, plus 1142 and 1342; or GEOL 1410 & 1420. Eight hours (2 courses) must be from the same science (BIO, CHEM, GEOL, or PHYS) as listed above.
4. A minor is required. Students seeking teacher certification automatically satisfy a minor in Secondary Education when they successfully complete the 21 hours of Professional Education sequence of courses under the College of Education (CI 3325, CI 4332, CI 4343, RDG 3323, and EDST 4681—Student Teaching).
5. Students pursuing the BS are required to complete a total of 17 hours in mathematics.
6. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of language taken in high school, then two semesters of the same modern language (1410 and 1420) must be taken at the college level.
7. Students pursuing the BS degree are required to complete an additional 3 hours of English literature in addition to the core curriculum English requirement. Students may select from ENG 2310, 2320, 2330, 2340, 2359, 2360, ENG 3303 (Technical Writing), or ENG 3311 (Writing for the Computer Industry) to fulfill this requirement.
8. Computer Science majors must complete one CS project course from: CS 3468, 4326, or 4398.
9. The minimum number of hours required for the degree is 129 so in most cases, a student pursuing teacher certification will not need to complete additional elective courses. Students should consult with the academic advisor before enrolling in any free elective courses.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	CS 2308	3	CS 2315	3	CS 3358	3
MATH 2358	3	MATH 2471	4	CS 2318	3	CS 2420	4
US 1100	1	ENG 1320	3	MATH 3398	3	MATH 2472	4
ENG 1310	3	PHIL 1305 or 1320	3	Science (see gen. req. 3)	4	Science (see gen. req. 3)	4
COMM 1310	3	Social Science ANTH 1312, ECO 2301, ECO 2314,		ENG Lit ENG 2310, 2320, 2330, 2340,			
PFW one course	1	GED 1310, SOCI 1310, PSY 1300	3	2359, 2360	3		
Total	15	Total	16	Total	16	Total	15

Sophomore Year - Summer I		Sophomore Year - Summer II		Junior Year - 1st Semester		Junior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
HIST 1310	3	HIST 1320	3	CS 3398	3	CS 3339	3
POSI 2310	3	POSI 2320	3	CS 4354	3	CS Advanced Elective	3
				CI 4332	3	CS Project Course (see gen. req. 5)	3
				Second ENG Lit (see gen. req. 7) or 3303 or 3313	3	CI 3325	3
				Science (see gen. req. 3)	3	Science (see gen. req. 4)	4
Total	6	Total	6	Total	16	Total	16

Junior Year - Summer I		Junior Year - Summer II		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS Advaned Elective	3	ART, DAN, MU, or TH 2313	3	CI 4370	3	EDST 4681 (Student Teaching)	6
CS Advanced Elective	3	PFW one course	1	CI 4343	3		
				RDG 3323	3		
				MATH 3305	3		
Total	6	Total	4	Total	12	Total	6

Minor in Computer Science

A minor in Computer Science consists of CS 1428, 2308, 2318, 2420, 3358, at least six advanced CS hours, plus MATH 2358 and 3398.

Courses in Computer Science (CS)

- 1308 (COSC 1300) Computer Literacy and the Internet. (2-2) A study of the uses of computers and their effects on society. Text processing, spreadsheets, databases, and Web programming. Does not count for computer science credit towards a minor, a BS, or a BA in computer science.
- 1319 Fundamentals of Computer Science. (3-0) Provides fundamental knowledge of the six layers of computer science as per the ACM CS0 curriculum. The information, hardware, programming, operating system, applications, and communications layers are presented plus appropriate open computer laboratory exercises. Does not count for computer science credit towards a minor, BS, or BA in computer science.
- 1428 (COSC 1415) Foundations of Computer Science I. (3-2) Introductory course for computer science majors, minors and others desiring technical introduction to computer science. Contains overview of history and structure of the digital computer, including binary data representation. Problem solving, algorithm development, structured programming, good coding style, and control structures of C++ are emphasized. Prerequisite or co-requisite: MATH 1315.
- 2308 (COSC 2320) Foundations of Computer Science II. (3-0) Fundamentals of object-oriented programming. Introduction to abstract data types (ADTs) including lists, stacks, and queues. Searching and sorting. Pointers and dynamic memory allocation. A continuation of CS 1428. Prerequisite: C or higher in CS 1428.
- 2315 Computer Ethics. (3-0) Primarily for computer science majors, focusing on the ethical codes of the professional societies, the philosophical bases of ethical decision-making, and the examination of several contemporary case studies. Prerequisites: CS 1428, ENG 1310, COMM 1310, and PHIL 1305 with grades of C or higher. (WI)
- 2318 (COSC 2325) Assembly Language. (3-0) A course covering the organization of digital computers; assembly language programming including addressing, looping, logic, shifting and masking operations, macros, subroutines, co-routines, arithmetic algorithms, and recursion. Prerequisite: MATH 2358 with a grade of C or higher. Prerequisite or Co-requisite: CS 2308 with a grade of C or higher.
- 2358 (COSC 2315) Introduction to Data Structures. (3-0) A course covering classic data structures and an introduction to object-oriented development. Prerequisite: CS 2308 with a grade of C or higher. Co-requisite: MATH 3398.
- 2378 Topics in Computer Science. (3-0) Selected topics in computer science. May be repeated with different emphasis for additional credit. Prerequisite: Consent of instructor.
- 2388 Internet Programming on the World Wide Web. (3-0) An introductory course covering Web page construction using HTML and JavaScript. Does not count for computer science credit towards a minor, BS, or BA in computer science.
- 2420 Digital Logic. (3-2) An introduction to fundamental computer technologies, including Boolean logic design, logic circuits and devices, and basic computer hardware. A laboratory providing hands-on experience with electricity, combinational and sequential digital circuits, and computer hardware. Prerequisite: C or higher in CS 1428.
- 2428 Applications Programming in Visual Basic. (3-2) A self-contained programming course using Visual Basic. Does not count for computer science credit towards a BS in computer science.
- 3320 Internet Software Development. (3-0) A course providing foundations for the construction and design of static and dynamic Web pages with database applications. This will include server-side and client-side software development. Prerequisite: C or higher in CS 2308 or consent of instructor.
- 3339 Computer Architecture. (3-0) Use of fundamental hardware components. Topics include ALU's, single and multiple cycle datapath and control, RISC vs. CISC, pipelining, caches, I/O, virtual memory and related performance issues. Prerequisites: (CS 2420 or EE 2420), (CS 2315 or EE 2400), and (CS 2318 or EE 3420) with grades of C or higher.
- 3358 Data Structures. (3-0) A course covering classic data structures and an introduction to object-oriented development. Prerequisite: CS 2308 with a grade of C or higher. Prerequisite or Co-requisite: MATH 3398 with a grade of C or higher.
- 3378 Theory of Automata. (3-0) An introduction to automata theory, computability, and formal languages. Prerequisite: CS 3358 with a grade of C or higher.
- 3398 Software Engineering. (3-0) The study of software design, implementation, and validation techniques through team projects. Structured analysis, programming style, and project documentation are emphasized in large software projects. Prerequisites: (CS 2315 or EE 2400) and CS 3358 with grades of C or higher. (WI)
- 3468 Embedded Computer Systems. (3-2) Studies the architecture of embedded systems, micro-controllers, their peripherals, languages, and operating systems and the special techniques required to use them. Prerequisites: C or higher in CS 2318 and CS 2420.
- 4100 Computer Science Internship. (0-20) Provides on-the-job training supervised by computer scientists in industry internship programs approved by the department. Prerequisite: CS majors and minors only.
- 4298 Undergraduate Research I. (1-2) Supervised individual research project in a mentor-student relationship with a computer science faculty member. Cannot be given degree credit until the satisfactory completion of CS 4299. Prerequisites: Junior standing; major GPA of 3.00; departmental approval.
- 4299 Undergraduate Research II. (1-2) Supervised individual research projects in a mentor-student relationship with a computer science faculty member. Prerequisites: CS 4298 and departmental approval.
- 4310 Computer Networks. (3-0) A survey of network architectures and their components. Emphasis will be on media access, network and transport layer protocols. Prerequisite: CS 3358 with a grade of C or higher.
- 4318 Program Translators. (3-0) A study of computer languages, data structures, algorithms, and theory used in constructing compilers and other program translators. Prerequisite: CS 3358 with a grade of C or higher.

- 4326 Human Factors of Computer Systems. (3-0) Principles and methods in human factors and ergonomics applied to the design and use of computer systems. Prerequisite: CS 3358 with a grade of C or higher. (WI)
- 4328 Operating Systems. (3-0) Principles of operating systems. Algorithms for CPU scheduling, memory management, cooperating sequential processes and device management. Prerequisites: (CS 2318 or EE 3420) and CS 3358 with a grade of C or higher.
- 4332 Introduction to Database Systems. (3-0) Introduction to database concepts, data models, file structures, query languages, database management systems. Prerequisite: CS 3358 with a grade of C or higher.
- 4335 Digital Signal Processing. (3-0) The course will introduce the techniques of discrete-time systems, Z transform analysis, and filter design techniques, including lab programming with National Instruments LabVIEW and TI signal processors. Prerequisites: MATH 2472 and CS 3358 with grades of C or higher.
- 4346 Introduction to Artificial Intelligence. (3-0) An introduction to the basic concepts of artificial intelligence; search techniques, knowledge representation, problem solving. Prerequisite: CS 3358 with a grade of C or higher.
- 4350 Unix Systems Programming. (3-0) Fundamentals of Unix operating systems, Unix file system and environment, C memory allocation, development tools, processes and signals, threads, device drivers, and programming for security. Prerequisite: CS 3358 with a grade of C or higher.
- 4354 Object-Oriented Design and Implementation. (3-0) An in-depth study of object-oriented design and implementation issues with emphasis on understanding the life cycle of object-oriented software, Unified Modeling Language, inheritance and polymorphism, designing remote and persistent objects, and exception handling. In-depth study of Java object-oriented language. Java will be used for implementing the exercises. Prerequisite: CS 3398.
- 4368 Survey of Computer Languages. (3-0) A survey of computer languages. Criteria for choosing languages to be covered include history, important development paradigms and environments, and language implementations. Prerequisite: CS 3358 with a grade of C or higher.
- 4371 Computer System Security. (3-0) Course covers practical aspects of computer system security including managing and producing code for secure systems. Theory, such as cryptography, is introduced as needed. Prerequisite: CS 3358 with a grade of C or higher.
- 4378 Special Topics in Computer Science. (3-0) Selected topics in computer science. May be repeated with different emphasis for additional credit. Prerequisite: Consent of instructor.
- 4378P Introduction to Digital Multimedia. (3-0) Concepts, problems and techniques in digital multimedia. Topics include digital representation of video and data compression. Applications, primarily in education and business presentations, and new and potential capabilities, such as video on demand and virtual reality. Prerequisite: Grade of C or higher in CS 3358.
- 4378T Parallel Programming. (3-0) This course teaches practical aspects of parallel programming. The covered topics include multi-core processors and shared-memory programming, hardware accelerator programming, and distributed-memory machines and message-passing programming. The students will gain the knowledge and skills needed for developing parallel software by writing programs for a variety of parallel computers. Prerequisite: a grade of C or higher in CS 3339 or instructor consent.
- 4378U Data Mining. (3-0) An introduction to data mining techniques including classification and predication as well as cluster analysis. Students will be familiarized with fields which data mining draws from like database technology, artificial intelligence, machine learning, and neural networks. Prerequisite: CS 3358.
- 4378V Introduction to Machine Learning. (3-0) Provides systematic introduction to machine learning, covering basic theoretical as well as practical aspects of the use of machine learning methods. Topics include learning theory, learning methods, recent learning models, etc. Application examples include multimedia information retrieval, text recognition, computer vision, etc. Prerequisite: CS 3358 grade of C or higher.
- 4378W Introduction to Human Computer Interaction (HCI). (3-0) Introduces HCI topics specifically highlighted by new input modalities such as eye-tracking. Considers new input modalities as new channels for data gathering including multimedia compression, interface design, usability evaluation, biometrics. Application of HCI as interdisciplinary research tool also will be discussed. Prerequisite: CS 3358 with grade of C or higher.
- 4378Y Forensic Systems. (3-0) This course is a survey of computing systems as tools and as targets in investigations, including technical and legal issues and investigative procedures in both civil and criminal domains, ethical issues, software tools for evidence discovery and gathering, and case studies. Prerequisite: CS 4350 or consent of instructor.
- 4378Z Practical Game Development. (3-0) Course teaches practical aspects of computer game design and implementation. Topics include graphics game engines, game physics, AI methods applied to games, and software architectures for computer games. Students will gain knowledge and skills needed for game development via team projects. Prerequisite: CS 3398 with grade of C or higher.
- 4388 Computer Graphics. (3-0) A study of the hardware and software used in graphic representation and interpretation of data. Prerequisites: CS 3358 with a grade of C or higher and familiarity with trigonometric functions.
- 4395 Independent Study in Computer Science. (3-0) Open to undergraduate students on an independent basis by arrangement with the faculty member concerned. Requires department chair approval. Repeatable for credit with different emphasis.
- 4398 Software Engineering Project. (3-0) Students undertake a software development project. They work in teams, developing requirements and designs which they will implement and test. Prerequisite: CS 3398 with a grade of C or higher.