

Computer Science

Department of Computer Science
and Pre-Engineering

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CAREER OPPORTUNITIES

There are many opportunities for those educated in computer science, computer networking, computer engineering, and software engineering. Possible occupational areas include software engineering, software development, programming, network programming, systems analysis and design, consulting, customer support, maintaining software or networks or media systems, manufacturer's representative, client services, software testing, database administration, web programming, web design,

network management, and network engineering.

The employment outlook is excellent in the fields of computer science, computer engineering, software engineering, database and networking occupations.

PROGRAMS

Students majoring in Computer Science (CS) may receive either a two-year AS or AAS degree or a four-year bachelor degree. A certificate program is available for those seeking short-term specialized training.

The Associate in Science Degree in Computer Science (AS-CS) is a transfer degree and is available for those wishing to transfer to a bachelor degree program. The Associate in Applied Science Degree in Computer Science (AAS-CS) provides job-ready skills and includes areas of specialization in: Computer Engineering, Computing and Networking Sciences.

Note: Students may earn only one AAS Degree in Computer Science. Additional degrees will not be awarded for completing subsequent AAS-CS areas of specialization.

A four-year bachelor degree, accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (CAC of ABET, 111 Market Pl., Suite 1050, Baltimore, MD 21202, www.abet.org), is offered in Computer Science (BS-CS). There are four possible areas of specialization: Computer Engineering, Computer Networking, Computer Science, and Database Engineering.

The Computer Science areas of specialization conform to the Association of Computing Machinery (ACM) model curriculum. Students completing the Computer Science degree should be prepared to take professional programming and networking certification exams.

Note: Students may earn only one BS Degree in Computer Science. Additional degrees will not be awarded for completing subsequent BS-CS areas of specialization. A four year Bachelor Degree is also offered in Software Engineering.

In addition to regular programs, the Department also offers a variety of courses to provide skill upgrades, short-term intensive training, and other services for the community.

Classroom instruction is supported by well-equipped computer laboratories with over 180 computers interconnected through a series of Microsoft and Linux networks and servers.

Certificate in Programmer 30 CREDITS

This program is designed to prepare students for careers requiring knowledge and skills in computer programming and software maintenance. Students are prepared to pass programming certification examinations. The student is responsible for registering for and taking the required certification examinations.

Discipline Core Requirements: 24 Credits
Complete the following:

• CS 1400	Fundamentals of Programming	3.0
• CS 1410	Object-Oriented Programming	3.0
• CS 2300	Discrete Structures I	3.0
• CS 2420	Introduction to Algorithms and Data Structures	3.0
• CS 2600	Fundamentals of Data Communications	3.0
• CS 2810	Computer Organization and Architecture	3.0
• INFO 1510	Introduction to System Administration--Linux/UNIX	3.0
• ENGL 1010	Introduction to Writing	3.0
Elective Requirements:		6 Credits
Choose 6 credits from the following courses (Must be approved by CNS Department. See CNS advisor):		6.0
• CS 2220	Visual Basic Programming (3.0)	
or CS 3220	Visual Basic Software Development (3.0)	
• CS 2250	Java Programming (3.0)	
or CS 3250	Java Software Development (3.0)	
• CS 2370	C-plus-plus Programming (3.0)	
or CS 3370	C-plus-plus Software Development (3.0)	
• CS 2550	Internet Programming (3.0)	
or CS 3550	Internet Software Development (3.0)	
• CS 239R	Current Topics in Computer Science (1.0)	
• CS 3060	Operating Systems Theory (3.0)	
• CS 3260	CsharpNET Software Development (3.0)	
• CS 3520	Database Theory (3.0)	

Graduation Requirements:

- 1 Completion of a minimum of 30 semester credits.
- 2 Minimum grade of C- required in all courses.
- 3 Overall grade point average of 2.0 (C) or above.
- 4 Residency hours -- minimum of 10 credit hours through course attendance at UVU.

AAS in Computer Science 64 CREDITS

General Education Requirements: 13 Credits

A minimum of 16 credits of General Education requirements are required for graduation. Not all GE requirements are listed in this section (see Specialty Core requirements for more details).

• ENGL 1010	Introduction to Writing	3.0
• HUMANITIES/FINE ARTS/FOREIGN LANGUAGE	(COMM 1020 recommended)	3.0
• COMM 2110	Interpersonal Communication *	3.0
• BIOLOGY		3.0
or PHYS 2210	Physics for Scientists and Engineers I (4.0) *	
• PHYSICAL EDUCATION/HEALTH/SAFETY OR ENVIRONMENT		1.0

Discipline Core Requirements: 9 Credits

Complete the following:

• CS 1400	Fundamentals of Programming *	3.0
• CS 2600	Fundamentals of Data Communications *	3.0
• CS 2810	Computer Organization and Architecture *	3.0

Emphasis:

Complete one of the following:

• Computer Engineering	42.0
• Computing and Networking Sciences	42.0

Graduation Requirements:

- 1 Completion of a minimum of 64 semester credits.
- 2 Overall grade point average of 2.0 (C) or above.
- 3 Residency hours -- minimum of 20 credit hours through course attendance at UVU.

Footnotes:

* Minimum grade of C- required

Emphasis in Computer Engineering 42 Credits

This program is designed to prepare students for careers in the many areas of computer science requiring a knowledge of computer systems hardware, software, device drivers, and peripheral devices. Computer Science Engineers have strong technical skills and an understanding of and ability to work with both computer hardware and software that are scientific and technical in nature.

Emphasis Requirements: 22 Credits

Complete the following (minimum grade of C- required):

• CS 1030	Foundations of Computer Science	3.0
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- EENG 1020 Computer Engineering Problem Solving with Matlab 1.0
- EENG 2270 Circuit Theory 3.0
- EENG 2275 Circuit Theory Lab 1.0
- EENG 2700 Digital Design I 3.0
- EENG 3740 Digital Design II 3.0
- INFO 1510 Introduction to System Administration--Linux/UNIX 3.0
- MATH 1210 Calculus I (fulfills GE requirement) 5.0

Emphasis Elective Requirements: 20 Credits

Complete 20 credits from the following courses (minimum grade of C- required). (Must be approved by CNS Department. See CNS Advisor):

- CS 1410 Object-Oriented Programming (3.0)
- CS 2300 Discrete Structures I (3.0)
- CS 2420 Introduction to Algorithms and Data Structures (3.0)
- CS 2450 Software Engineering (3.0)
- CS 2550 Internet Programming (3.0)
- or CS 3550 Internet Software Development (3.0)
- CS 3060 Operating Systems Theory (3.0)
- CS 3520 Database Theory (3.0)
- EENG 3750 Engineering Analysis (3.0)
- EENG 3770 Signals and Systems (3.0)
- EENG 4730 Embedded Systems (3.0)
- EENG 4750 Digital Signal Processing (3.0)
- EENG 4760 Electronic Systems (3.0)
- EENG 4765 Electronics Systems Lab (1.0)
- MATH 1220 Calculus II (5.0)
- PHYS 2215 Physics for Scientists and Engineers I Lab (1.0)

Emphasis in Computing and Networking Sciences 42 Credits

This program is designed to prepare students for careers in the many areas of computer science and networking requiring a knowledge of both computer software and computer networking. The Computer Networking program is a comprehensive curriculum which covers the range of networking and data communications technologies. Students in this program are provided instruction in analysis, installation, maintenance and management of local and wide area networks, and world wide web servers.

Emphasis Requirements: 24 Credits

Complete the following:

- CS 1410 Object-Oriented Programming* 3.0
- CS 2300 Discrete Structures I* 3.0
- CS 2420 Introduction to Algorithms and Data Structures* 3.0
- CS 3060 Operating Systems Theory* 3.0
- CS 3220 Visual Basic Software Development* 3.0
- or CS 3250 Java Software Development (3.0)*
- or CS 3260 CsharpNET Software Development (3.0)*
- CS 3520 Database Theory* 3.0
- CS 3690 Advanced Topics in Data Communications* 3.0
- MATH 1060 Trigonometry (fulfills GE requirement)* 3.0

Emphasis Elective Requirements: 18 Credits

Complete 18 credits from the following courses (minimum grade of C- required). (Must be approved by CNS Department. See CNS Advisor):

- CS 1030 Foundations of Computer Science (3.0)
- CS 2220 Visual Basic Programming (3.0)
- or CS 3220 Visual Basic Software Development (3.0)
- CS 2250 Java Programming (3.0)
- or CS 3250 Java Software Development (3.0)
- CS 2370 C-plus-plus Programming (3.0)
- or CS 3370 C-plus-plus Software Development (3.0)
- CS 2450 Software Engineering (3.0)
- CS 2550 Internet Programming (3.0)
- or CS 3550 Internet Software Development (3.0)
- CS 281R Internship (3.0 credits max.) (1.0)
- CS 3260 CsharpNET Software Development (3.0)
- CS 3410 Human Factors in Software Engineering (3.0)
- CS 3660 Web Server Programming (3.0)
- CS 3670 Network Programming (3.0)

- CS 4470 Artificial Intelligence (3.0)
- CS 4600 Enterprise Architecture (3.0)
- CS 4610 TCP/IP Internet Architecture (3.0)
- EENG 2700 Digital Design I (3.0)
- EENG 2705 Digital Design I Lab (1.0)
- EENG 3750 Engineering Analysis (3.0)
- INFO 1510 Introduction to System Administration--Linux/UNIX (3.0)
- INFO 3510 Advanced System Administration--Linux/UNIX (3.0)
- MATH 1210 Calculus I (5.0)
- MATH 1220 Calculus II (5.0)
- PHYS 2215 Physics for Scientists and Engineers I Lab (1.0)

Footnotes:

- * Minimum grade of C- required.

AS Pre Major in Computer Science 64 CREDITS

General Education Requirements: 39 Credits

- ENGL 1010 Introduction to Writing 3.0
- ENGL 2020 Intermediate Writing--Science and Technology 3.0

Complete one of the following: 3.0

- MATH 1030 Quantitative Reasoning (recommended for Humanities or Arts majors) (3.0)
- MATH 1040 Introduction to Statistics (recommended for Social Science majors) (3.0)
- MATH 1050 College Algebra (recommended for Business, Education, Science, and Health Professions majors) (4.0)

Complete one of the following: 3.0

- HIST 2700 US History to 1877 (3.0)
- and HIST 2710 US History since 1877 (3.0)
- HIST 1700 American Civilization (3.0)
- HIST 1740 US Economic History (3.0)
- POLS 1000 American Heritage (3.0)
- POLS 1100 American National Government (3.0)

Complete the following:

- PHIL 2050 Ethics and Values 3.0
- HLTH 1100 Personal Health and Wellness (2.0)
- or PES 1097 Fitness for Life 2.0

Distribution Courses

Humanities:

- COMM 1020 Public Speaking (recommended) 3.0

Social Science:

- COMM 2110 Interpersonal Communication (recommended) 3.0

Physical Science:

- PHYS 2210 Physics for Scientists and Engineers I* 4.0
- PHYS 2215 Physics for Scientists and Engineers I Lab* 1.0

Additional Physical Science:

- PHYS 2220 Physics for Scientists and Engineers II* 4.0
- PHYS 2225 Physics for Scientists and Engineers II Lab* 1.0

Additional Distribution Courses

- Biology 3.0
- Fine Arts Distribution 3.0

Discipline Core Requirements: 25 Credits

- CS 1400 Fundamentals of Programming* 3.0
- CS 1410 Object-Oriented Programming* 3.0
- CS 2300 Discrete Structures I* 3.0
- CS 2420 Introduction to Algorithms and Data Structures* 3.0
- CS 2810 Computer Organization and Architecture* 3.0
- MATH 1210 Calculus I* 5.0
- MATH 1220 Calculus II* 5.0

Graduation Requirements:

- 1 Completion of a minimum of 64 semester credits.
- 2 Overall grade point average of 2.0 (C) or above with no grade lower than a C- in Discipline Core courses.
- 3 Residency hours -- minimum of 20 credit hours through course attendance at UVU.
- 4 Completion of GE and specified departmental requirements.

Footnotes:

- * Minimum grade of C- required.

BS in Computer Science 122 CREDITS

General Education Requirements: 40 Credits

- ENGL 1010 Introduction to Writing 3.0
- ENGL 2020 Intermediate Writing--Science and Technology 3.0
- MATH 1210 Calculus I 5.0

Complete one of the following: 3.0

- HIST 2700 US History to 1877 (3.0)
- and HIST 2710 US History since 1877 (3.0)
- HIST 1700 American Civilization (3.0)
- HIST 1740 US Economic History (3.0)
- POLS 1000 American Heritage (3.0)
- POLS 1100 American National Government (3.0)

Complete the following:

- PHIL 2050 Ethics and Values 3.0
- HLTH 1100 Personal Health and Wellness (2.0)
- or PES 1097 Fitness for Life 2.0

Distribution Courses:

- COMM 1020 Public Speaking* 3.0
- COMM 2110 Interpersonal Communication* 3.0
- Fine Arts Distribution (choose from list) 3.0
- Biology (choose from list) 3.0
- PHYS 2210 Physics for Scientists and Engineers I* 4.0
- PHYS 2215 Physics for Scientists and Engineers I Lab* 1.0

Complete one of the following course/lab combinations*: 4.0

- CHEM 1210 Principles of Chemistry I (4.0)
- and CHEM 1215 Principles of Chemistry I Laboratory (1.0)
- or BIOL 1610 College Biology I (4.0)
- and BIOL 1615 College Biology I Laboratory (1.0)
- or GEO 1010 Introduction to Geology (3.0)
- and GEO 1015 Introduction to Geology Laboratory (1.0)
- or PHYS 2220 Physics for Scientists and Engineers II (4.0)
- and PHYS 2225 Physics for Scientists and Engineers II Lab (1.0)

Discipline Core Requirements: 40 Credits

Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.

- CS 1400 Fundamentals of Programming 3.0
- CS 1410 Object-Oriented Programming 3.0
- CS 2300 Discrete Structures I 3.0
- CS 2420 Introduction to Algorithms and Data Structures 3.0
- CS 2600 Fundamentals of Data Communications 3.0
- CS 2810 Computer Organization and Architecture 3.0
- CS 301R Invited Speaker Series 1.0
- CS 305G Global Social and Ethical Issues in Computing 3.0
- CS 3060 Operating Systems Theory 3.0
- CS 3240 Introduction to Computational Theory 3.0
- CS 3690 Advanced Topics in Data Communications 3.0
- MATH 1220 Calculus II 5.0
- MATH 2040 Principles of Statistics 4.0

Emphasis:

Complete one of the following:

- Computer Engineering 42.0
- Computer Networking 42.0
- Computer Science 42.0
- Database Engineering 42.0

Graduation Requirements:

- 1 Completion of a minimum of 122 semester credits, with a minimum of 40 upper-division credits.
- 2 Overall grade point average of 2.5 or above. Must have a minimum grade of C- in all core courses.
- 3 Residency hours -- minimum of 30 credit hours through course attendance at UVU 10 of these hours must be within the last 45 hours earned. At least 12 of the credit hours earned in residence must be in approved CSE Department courses.
- 4 All transfer credit must be approved in writing by UVU.
- 5 No more than 80 semester hours and no more than 20 hours in CS type courses of transfer credit from a two-year college.
- 6 No more than 30 semester hours may be earned through independent study and/or extension classes.

Computer Science

7 Students completing a bachelor degree following the 2008 or later catalog must complete one course that meets the Global/Intercultural Requirement, indicated by a course number ending in G. For a complete listing, see page 25.

Footnotes:

* Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.

Emphasis in Computer Engineering 42 Credits

This program is designed to prepare students for careers in the many areas of computer science requiring a knowledge of computer systems hardware, software, device drivers, and peripheral devices. Computer Engineers have strong technical skills and an understanding of and ability to work with both computer hardware and software that are scientific and technical in nature. The degree is designed to prepare students for employment opportunities in the computer industry. Areas of employment include: computer hardware design, systems design, device driver programming, software rapid application development, and software/hardware maintenance. Students are prepared to take industry standard programming certification examinations. The student is responsible for registering for and taking the required certification examinations.

Emphasis Requirements: 28 Credits

Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.

• CS 4380	Advanced/High-Performance Computer Architecture	3.0
• EENG 1020	Computer Engineering Problem Solving with Matlab	1.0
• EENG 2270	Circuit Theory	3.0
• EENG 2275	Circuit Theory Lab	1.0
• EENG 2700	Digital Design I	3.0
• EENG 2705	Digital Design I Lab	1.0
• EENG 3740	Digital Design II	3.0
• EENG 3750	Engineering Analysis	3.0
• EENG 3770	Signals and Systems	3.0
• EENG 4800	Computer Engineering Senior Design Project	3.0
• EENG 4760	Electronic Systems (3.0)	3.0
• EENG 4765	Electronics Systems Lab (1.0)	1.0

Emphasis Elective Requirements: 14 Credits

Complete 14 credits from the following or any CS 3000 14.0 or 4000 level course not already required. (Minimum of 6 credits must be EENG; minimum of 3 credits must be CS). (Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.):

• CS 2450	Software Engineering (3.0)
• EENG 4730	Embedded Systems (3.0)
• EENG 4750	Digital Signal Processing (3.0)

Emphasis in Computer Networking 42 Credits

This program is designed to prepare students for employment opportunities in the fields of local area networks, Internet networking, Intranet networking, data communications, groupware, network management, world wide web servers, network customer support, and network maintenance.

Students are prepared to take industry standard networking certification examinations. The student is responsible to register for and take the required certification examinations.

Emphasis Requirements: 24 Credits

Minimum grade of C- required in these courses.

• CS 3250	Java Software Development	3.0
• CS 3520	Database Theory	3.0
• CS 3550	Internet Software Development	3.0
• CS 3670	Network Programming	3.0
• CS 4610	TCP/IP Internet Architecture	3.0
• CS 4670	Undergraduate Research Project--Networking Specialization	3.0
• INFO 1510	Introduction to System Administration--Linux/UNIX	3.0
• INFO 3510	Advanced System Administration--Linux/UNIX	3.0

Emphasis Elective Requirements: 18 Credits

Complete 18 credits from the following or any CS 3000 18.0 or 4000 level course not already required. (minimum of six credits must be 3000 or 4000 level). (Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.):

• CS 3660	Web Server Programming (3.0)
• CS 479R	Advanced Current Topics in Computer Science (1.0)
• EENG 2700	Digital Design I (3.0)
• EENG 2705	Digital Design I Lab (1.0)

• INFO 2640	Router Management (3.0)
• INFO 2650	Voice and Data Cabling Fundamentals (3.0)
• INFO 3630	Advanced System Administration--Windows Server (3.0)
• INFO 2660	Information Security--Fundamentals (3.0)
• INFO 3660	Information Security--Network Defense and Countermeasures (3.0)
• INFO 3880	Computer Forensics and Cybercrime (3.0)

Emphasis in Computer Science 42 Credits

The Computer Science area of specialization is designed to prepare students for employment opportunities in the fields of complex algorithms involved in designing and developing application programs or systems programs, software engineering, rapid application development, and software maintenance. Students are prepared to take industry standard programming certification examinations. The student is responsible for registering for and taking the required certification examinations.

Emphasis Requirements: 27 Credits

Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.

• CS 2450	Software Engineering	3.0
• CS 3220	Visual Basic Software Development	3.0
or CS 3250	Java Software Development (3.0)	
or CS 3260	CsharpNET Software Development (3.0)	
• CS 3310	Introduction to Algorithms	3.0
or CS 3320	Numerical Software Engineering (3.0)	
• CS 3450	Principles and Patterns of Software Design	3.0
• CS 3520	Database Theory	3.0
• CS 4380	Advanced/High-Performance Computer Architecture	3.0
• CS 4450	Analysis of Programming Languages	3.0
• CS 4470	Artificial Intelligence	3.0
• CS 4490	Compiler Construction	3.0

Emphasis Elective Requirements: 15 Credits

Complete 15 credits from the following or any CS 3000 15.0 or 4000 level course not already required. Minimum of 6 credits must be upper division. (Minimum grade of C- required in these courses with a combined GPA of 2.5 or higher.):

• EENG 3750	Engineering Analysis (3.0)
• INFO 1510	Introduction to System Administration--Linux/UNIX (3.0)

Emphasis in Database Engineering 42 Credits

This program is designed to prepare students for careers that require in-depth knowledge of Database Systems. Theoretical and practical aspects associated with the design and construction of Database Systems is emphasized.

The program covers the fundamentals of Data Modeling, Information Retrieval, Relational/Object-Relational/Object-Oriented Databases, Distributed Databases, Data Warehousing, Data Mining, Database Recovery, Database Security and Database Integrity, as well as other topics..

Emphasis Requirements: 27 Credits

• CS 2450	Software Engineering	3.0
• CS 3220	Visual Basic Software Development	3.0
or CS 3250	Java Software Development (3.0)	
or CS 3260	CsharpNET Software Development (3.0)	
or CS 3370	C-plus-plus Software Development (3.0)	
• CS 3410	Human Factors in Software Engineering	3.0
• CS 3520	Database Theory	3.0
• CS 4100	Database Management System Construction	3.0
• CS 4500	Advanced Topics in Database	3.0
• CS 4600	Enterprise Architecture	3.0
• INFO 3410	Database Systems	3.0
• INFO 4410	Database Administration	3.0

Emphasis Elective Requirements: 15 Credits

Complete 15 credits from the following: 15.0

• CS 3220	Visual Basic Software Development (3.0)
• CS 3250	Java Software Development (3.0)
• CS 3260	CsharpNET Software Development (3.0)

• CS 3370	C-plus-plus Software Development (3.0)
• CS 3540	Game Programming (3.0)
• CS 3550	Internet Software Development (3.0)
• CS 3660	Web Server Programming (3.0)
• CS 3670	Network Programming (3.0)
• CS 4230	Software Testing and Quality Engineering (3.0)
• CS 4400	Software Engineering II (3.0)
• CS 4470	Artificial Intelligence (3.0)
• CS 4510	Operating Systems Design and Simulation (3.0)
• CS 481R	Internship (1.0)

BS in Software Engineering 123 CREDITS

General Education Requirements: 37 Credits

• ENGL 1010	Introduction to Writing	3.0
• ENGL 2020	Intermediate Writing--Science and Technology	3.0
• MATH 1210	Calculus I	5.0
American Institutions, complete one of the following:		3.0
• HIST 1740	US Economic History (3.0)	
• HIST 1700	American Civilization (3.0)	
• POLS 1000	American Heritage (3.0)	
• POLS 1100	American National Government (3.0)	
• HIST 2700	US History to 1877 (3.0)	
and HIST 2710	US History since 1877 (3.0)	

Complete the following:

• PHIL 2050	Ethics and Values	3.0
• HLTH 1100	Personal Health and Wellness	2.0
or PES 1097	Fitness for Life (2.0)	

Distribution Requirements:

• Biology	3.0	
• Physical Science	3.0	
• Additional Physical Science or Biology	3.0	
• Fine Arts	3.0	
• COMM 1020	Public Speaking	3.0
• COMM 2110	Interpersonal Communication	3.0

Discipline Core Requirements: 59 Credits

• CS 1400	Fundamentals of Programming	3.0
• CS 1410	Object-Oriented Programming	3.0
• CS 2810	Computer Organization and Architecture	3.0
• CS 2300	Discrete Structures I	3.0
• CS 2420	Introduction to Algorithms and Data Structures	3.0
• CS 2450	Software Engineering	3.0
• CS 2600	Fundamentals of Data Communications	3.0
• CS 301R	Invited Speaker Series	1.0
• CS 3050	Computer Ethics	3.0
• CS 3060	Operating Systems Theory	3.0
• CS 3240	Introduction to Computational Theory	3.0
• CS 3220	Visual Basic Software Development	3.0
or CS 3250	Java Software Development (3.0)	
or CS 3260	CsharpNET Software Development (3.0)	
• CS 3410	Human Factors in Software Engineering	3.0
• CS 3450	Principles and Patterns of Software Design	3.0
• CS 3520	Database Theory	3.0
• CS 4230	Software Testing and Quality Engineering	3.0
• CS 4400	Software Engineering II	3.0
• CS 4450	Analysis of Programming Languages	3.0
• CS 4550	Software Engineering III	3.0
• MATH 2040	Principles of Statistics	4.0

Elective Requirements: 27 Credits

Complete 12 credits from the following: 12.0

• Any CS course numbered 3000 or higher not already required.	15.0
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Complete at least 15 credits (at least 5 must be upper division) in a discipline other than Computer Science.

See Advisor for details. Note that these credits may not also be used to fulfill general education requirements:

Graduation Requirements:

- 1 Completion of a minimum of 123 semester credits, with a minimum of 40 upper-division credits.
- 2 Overall grade point average of 2.5 or above, with a minimum grade of C- in all discipline core and elective requirements.

- 3 Residency hours -- minimum of 30 credit hours through course attendance at UVU. Ten of these hours must be within the last 45 hours earned. At least 12 of the credit hours earned in residence must be in approved CSE Department courses.
- 4 No more than 80 semester hours and no more than 20 hours of transfer credit from a two-year college may be applied to the core or elective courses.
- 5 No more than 6 semester hours may be earned through independent study.
- 6 Students completing a bachelor degree following the 2008 or later catalog must complete one course that meets the Global/Intercultural Requirement, indicated by a course number ending in G. For a complete listing, see page 25.

Minor in Computer Science 18 CREDITS

Discipline Core Requirements: 9 Credits

- CS 1400 Fundamentals of Programming (CS 1030 recommended) 3.0
- CS 1410 Object-Oriented Programming 3.0
- CS 2420 Introduction to Algorithms and Data Structures 3.0

Elective Requirements: 9 Credits

- Complete at least three CS courses numbered 3060 or above 9.0

Graduation Requirements:

- To fill the requirements for a computer science minor students must have no course grade lower than C- in any of the CS courses required for the computer science minor.

BA/BS in Integrated Studies 123 CREDITS

The following Integrated Studies Emphasis is available (see the Integrated Studies section of this catalog for complete degree requirement listings.)

Emphasis in Computer Science 18 Credits

Emphasis Requirements: 18 Credits

Computer Science Emphasis

Complete one of the following: 3.0

- CS 3250 Java Software Development (3.0)
- CS 3370 C-plus-plus Software Development (3.0)

Choose 15 credits from the following: 15.0

- CS 3240 Introduction to Computational Theory (3.0)
- CS 3250 Java Software Development (3.0)
- CS 3370 C-plus-plus Software Development (3.0)
- CS 2450 Software Engineering (3.0)
- CS 4380 Advanced/High-Performance Computer Architecture (3.0)
- CS 4450 Analysis of Programming Languages (3.0)
- CS 4490 Compiler Construction (3.0)

NOTE: A minimum GPA of 2.5 in all Specialty Core courses with no grade lower than a C- required for graduation.

See Course Descriptions section of the catalog for detailed course information. This department manages the following course prefixes:

- CS, Computer Science
- EENG, Electrical Engineering
- ENGR, Engineering Science