

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, 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.

Job demand is very high in the fields of computer science, computer engineering, software engineering, and networking occupations. The employment outlook is excellent.

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, and Computer Science.

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 five possible areas of specialization: Computer Engineering, Computer Networking, Computer Science, Software Engineering, and Database.

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.

In addition to regular programs, the Department also offers a variety of courses to provide skill upgrades, network administration education, 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):

• 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 UVSC.

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 UVSC.

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
• 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
• INFO 1510	Introduction to System Administration--Linux/UNIX	3.0
• MATH 1210	Calculus I (fulfills GE requirement)	5.0

Emphasis Elective Requirements: **20 Credits**

Computer Science

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)* 3.0
- or CS 3260 CsharpNET Software Development (3.0)* 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 3660 Web Server Administration and Programming (3.0)
- CS 3670 Network Programming (3.0)
- CS 4410 Human Factors in Software Engineering (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 UVSC.
- 4 Completion of GE and specified departmental requirements.

Footnotes:

* Minimum grade of C- required.

BS in Computer Science 123 CREDITS

General Education Requirements: 41 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
- PHYS 2220 Physics for Scientists and Engineers II* 4.0
- 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 3050 Computer Ethics 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 123 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 UVSC. 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 CNS Department courses.
- 4 All transfer credit must be approved in writing by UVSC.
- 5 No more than 80 semester hours and no more than 20 hours in CNS 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.

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 require certification examinations.

Emphasis Requirements: 26 Credits

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

- CS 4260 Digital System Simulation 3.0
- CS 4380 Advanced/High-Performance Computer Architecture 3.0
- CS 489R Undergraduate Research Project (2.0) 3.0
- 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

Emphasis Elective Requirements: 16 Credits

Complete 16 credits from the following or any CS 3000 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)
- EENG 4760 Electronic Systems (3.0)
- EENG 4765 Electronics Systems Lab (1.0)
- INFO 1510 Introduction to System Administration--Linux/UNIX (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: 27 Credits

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

- 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 4650 Directory-Based Networks 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: 15 Credits

Complete 15 credits from the following or any CS 3000 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.):

- 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 4660 Computer Forensics (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 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
- CS 4510 Operating Systems Design and Simulation 3.0

Emphasis Elective Requirements: 15 Credits

Complete 15 credits from the following or any CS 3000 or 4000 level course not already required. 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

The Software Engineering area of specialization is designed to prepare students for employment opportunities in the fields of systems analysis, design and implementation, applications programming, and software maintenance. Students are prepared to take industry standard programming certification examinations. The student is responsible to register for and take the required certification examinations.

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)

- INFO 3410 Database Systems 3.0
- CS 3520 Database Theory 3.0
- CS 4410 Human Factors in Software Engineering 3.0

- CS 4100 Database Management System Construction 3.0

- INFO 4410 Database Administration 3.0
- CS 4500 Advanced Topics in Database 3.0
- CS 4600 Enterprise Architecture 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 Administration and 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 69 Credits

General Education Requirements: 41 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:

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

- PHYS 2220 Physics for Scientists and Engineers II 4.0

- PHYS 2225 Physics for Scientists and Engineers II Lab 1.0

- Biology distribution 3.0

- Fine Arts Distribution 3.0

- COMM 1020 Public Speaking 3.0
- COMM 2110 Interpersonal Communication 3.0

Discipline Core Requirements: 64 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 3690 Advanced Topics in Data Communications 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 4230 Software Testing and Quality Engineering 3.0

- CS 4400 Software Engineering II 3.0
- CS 4410 Human Factors in Software Engineering 3.0

- CS 4450 Analysis of Programming Languages 3.0
- CS 4550 Software Engineering III 3.0
- MATH 1220 Calculus II 5.0
- MATH 2040 Principles of Statistics 4.0

Elective Requirements: 18 Credits

Complete 18 credits from the following: 18.0

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

- Any CS course numbered 3000 or higher not already required.

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 UVSC. 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 CNS 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.

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 3330 Windows Programming (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.

Computer Science

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

- CS, Computer Science