

Degree Type – Bachelor of Science in Computer Science (BSCS)
Degree Title – Computer Science

Computer Science is the study of the structure, function and application of computers and is central to the rapidly expanding use of information technology. Computers have traditionally been used in business, engineering and scientific applications, and now applications are found in almost all human activities from art to zoology. Computer science is both an applied and theoretical discipline, supported by the principles of science, engineering, and mathematics that has a direct and profound impact on the quality of life and society at large.

The Department of Computer Science offers three degrees: Bachelor of Science in Computer Science (BSCS), Master of Science in Computer Science (MSCS), and Master of Science in Information Technology (MSIT). The BSCS degree is accredited by the Computing Accreditation Commission of ABET, <http://www.abet.org>. The Department offers a Bachelor of Science in Computer Engineering (BSCE) in cooperation with the Department of Electrical Engineering. The Department also offers service courses to fulfill University core curriculum requirements, and computer science courses required for degree programs in engineering, science, and mathematics. Faculty conduct research in computer science, computer science education, and interdisciplinary fields, and contribute their professional service to student advising, mentoring, professional organizations, University activities, industrial interactions, and to the community through professional expertise.

The undergraduate curricula in computer science are based on the Association for Computing Machinery and the Institute of Electrical and Electronics Engineers Computer Society recommendations for curricula and reflect the goals of a liberal arts education. The graduate curricula provide advanced and specialized study in the areas of computer science and information technology. The curricula in computer science provide the student with marketable expertise to enter the computing and information technology fields, the skills and education required to adapt to the rapidly changing characteristic of the fields, and the foundation to pursue graduate study in computer science and information technology.

STUDENT LEARNING OUTCOMES:

- 1. An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.**
- 2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution**
- 3. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.**
- 4. An ability to function effectively on teams to accomplish a common goal.**
- 5. An understanding of professional, ethical, legal, security and social issues and responsibilities.**
- 6. An ability to communicate effectively with a range of audiences.**
- 7. An ability to analyze the local and global impact of computing on individuals, organizations, and society.**
- 8. Recognition of the need for and an ability to engage in continuing professional development.**
- 9. An ability to use current techniques, skills, and tools necessary for computing practice.**
- 10. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.**
- 11. An ability to apply design and development principles in the construction of software systems of varying complexity.**

A – GENERAL EDUCATION CORE – 42 HOURS

Students must fulfill the General Education Core requirements. The courses listed below satisfy both degree requirements and General Education Core requirements.

Required**Mathematics – 3 hours**

MATH 2413 Calculus I (or MATH 2487 Honors) three-hour lecture

Life and Physical Science – 6 hours

Choose one pair:

BIOL 1406 General Biology I (or BIOL 1487 Honors) three-hour lecture

BIOL 1407 General Biology II (or BIOL 1488 Honors) three-hour lecture

BIOL 2401 Anatomy and Physiology I three-hour lecture

BIOL 2402 Anatomy and Physiology II three-hour lecture

CHEM 1311 General Chemistry I (or CHEM 1307)

CHEM 1312 General Chemistry II

PHYS 1401 General Physics I three-hour lecture

PHYS 1402 General Physics II three-hour lecture

PHYS 2425 Physics for Scientists and Engineers I three-hour lecture

PHYS 2426 Physics for Scientists and Engineers II three-hour lecture

Language, Philosophy, and Culture – 3 hours

PHIL 1310 Ethics, Happiness, and the Good (Must be Computer Science section)

Integrative and Experiential Learning – 6 hours

Choose any course from Humanities, except for Professional Ethics, and complete:

CSCI/CMPE 1370 Engineering Computer Science I (or CSCI/CMPE 1378 Honors)

B – MAJOR REQUIREMENTS – 44 HOURS (33 advanced)**1 – Computer Science Core – 29 hours (18 advanced)**

CSCI 1101 Introduction to Computer Science

CSCI 1170 Engineering Computer Science I Lab (or CSCI 1178 Honors)

CSCI 2333 Computer Organization and Assembly Language

CSCI 2344 Programming in UNIX / Linux Environment

CSCI 2380 Computer Science II (or CSCI 2388 Honors)

CSCI 3333 Algorithms and Data Structures

CSCI 3334 Systems Programming

CSCI 3336 Organization of Programming Languages

CSCI 3340 Software Engineering I

CSCI 4325 Automata, Formal Languages and Computability

CSCI 4390 Senior Project

2 – Computer Science Electives – 15 hours (15 advanced)**a – Programming Language – 3 hours (3 advanced)**

Choose from:

CSCI 3326 Object Oriented Programming in JAVA

CSCI 3327 Object Oriented Programming in Visual Basic

CSCI 3328 Object Oriented Programming in C#

b – Databases, Networking, and Operating Systems – 6 hours (6 advanced)

Choose from:

CSCI 4333 Database Design and Implementation
 CSCI 4334 Operating Systems
 CSCI 4335 Computer Architecture
 CSCI 4345 Computer Networks

c – Technical Electives – 6 hours (6 advanced)

Choose from:

CSCI 3300 Internship in Computer Science
 CSCI 3341 Software Engineering II
 CSCI 3342 Internet Programming
 CSCI 3350 Numerical Methods
 CSCI 3370 Introduction to Game Development
 CSCI 4185 Research Seminar
 CSCI 4301 Digital Image Processing
 CSCI 4302 Multimedia Systems
 CSCI 4303 Computer Vision
 CSCI 4310 Design and Analysis of Algorithms
 CSCI 4318 Cyber Security
 CSCI 4319 Digital Forensics
 CSCI 4321 E-Commerce
 CSCI 4327 Compiler Construction
 CSCI 4336 Parallel and Distributed Computing
 CSCI 4341 Topics in Computer Science
 CSCI 4343 Data Mining
 CSCI 4344 Bioinformatics
 CSCI 4350 Artificial Intelligence
 CSCI 4352 Machine Learning
 CSCI 4355 Expert Systems
 CSCI 4360 Computer Graphics and Interactive Systems
 CSCI 4363 Advanced Databases
 CSCI 4365 Computer and Network Security
 CSCI 4370 Advanced Game Development
 CSCI 4381 Interactive Systems and User Interface Design
 CSCI 4382 Computer Visualization
 CSCI 4383 Bioinformatics Imaging

C – SUPPORT COURSES – 41 HOURS (15 advanced)

1 – Oral and Written Communication – 6 hours (3 advanced)

COMM 1315 Public Speaking
 ENGL 3342 Technical Communication

2 – Mathematics and Engineering – 18 hours (6 advanced)

CSCI 3310 Discrete Structures
 ELEE 2130 Digital Systems Engineering I Lab
 ELEE 2330 Digital Systems Engineering I
 MATH 2318 Linear Algebra
 MATH 2413 Calculus I (or MATH 2487 Honors) one-hour lecture
 MATH 2414 Calculus II (or MATH 2488 Honors)

Choose one:

MATH 4337 Probability and Statistics I
 ELEE 3340 Probability and Statistics for Electrical Engineers

MATH 3331 Applied Statistics I

3 – Laboratory – 2 hours

Choose corresponding pair from Life and Physical Science:

BIOL 1406 General Biology I (or BIOL 1487 Honors) one-hour lab
BIOL 1407 General Biology II (or BIOL 1488 Honors) one-hour lab

BIOL 2401 Anatomy and Physiology I one-hour lab
BIOL 2402 Anatomy and Physiology II one-hour lab

CHEM 1111 General Chemistry I Lab (or CHEM 1107)
CHEM 1112 General Chemistry II Lab

PHYS 1401 General Physics I one-hour lab
PHYS 1402 General Physics II one-hour lab

PHYS 2425 Physics for Scientists and Engineers I one-hour lab
PHYS 2426 Physics for Scientists and Engineers II one-hour lab

4 – Basic Science – 4 hours

Choose one:

BIOL 1407 General Biology I (or BIOL 1487 Honors)
BIOL 2401 Anatomy and Physiology I
CHEM 1311 and CHEM 1111 or CHEM 1307 and CHEM 1107
PHYS 1401 General Physics I
PHYS 2425 Physics for Scientists and Engineers I

5 – Free Electives – 11 hours (6 advanced)

TOTAL CREDIT HOURS FOR GRADUATION – 127 HOURS

TOTAL ADVANCED HOURS – 48 HOURS

ADMISSION, PROGRESSION, AND GRADUATION REQUIREMENTS, if applicable:

Graduation requirements

1. All courses in the Computer Science Core must be completed with a grade 'C' or better.
2. In addition to the graduation requirements listed in the UTRGV 2015-2017 Undergraduate Catalog, demonstration of proficiency in a language other than English is required at the undergraduate level equivalent to a minimum of six credit hours. Proficiency can be demonstrated by a college credit exam, a placement test approved through the UTRGV Department of Writing and Language Studies, and/or up to six credit hours of college-level language coursework.