

Registration Workshop

Nov. 6, 2019

CS/SE Freshman Seminar

Department Website:

<http://cs.mtech.edu>

MontanaTech



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Welcome to the Department of Computer Science



Overview

Create challenging and cutting edge computing career possibilities by earning a Bachelor of Science in Computer Engineering.

Montana Tech professors are experienced in the industry and have broad academic interests. Low student-faculty with these professors on real-world projects. Enjoy easy access to lab computers and state of the art equipment (Sun Fire Server, NAO H25 humanoid robot programming, Android app development, iPad app development, ar

Students graduate with practical experience designing, building, testing and maintaining software systems. Grad

Description of CS Program

Computer Science covers the core concepts and technologies involved with how to get a computer system to perform a desired function. Learning to program a computer is an essential part of such a task. Computer programming is used in almost all of our computer science courses & most of our software engineering courses. As a computer science major you will learn details about how computers & networks work, but with an emphasis on how software & programming languages work. You will also learn about the theory behind how & why computers and software work.

Description of SE Program

Software Engineering focuses on how to design & build software products that reliably deliver valuable services year after year. You will take many of the same courses as you would in computer science, but you will take additional courses that teach you about topics like software requirements, software design, & software testing. You will also learn about working with people (communication, management, working with non-technical customers), methodologies for developing software, & how to measure and analyze a software system.

Description of Data Science Program

Data Science is a new and exciting field that combines the disciplines of computer science and statistics. Data scientists work with scientific and business data to find patterns in the data that can inform decisions and actions. Learning to program a computer is an essential part of data science, as is using that programming skill along with extensive statistics knowledge to discover patterns and trends that in data that is too large for analyze by hand. As a Data Science major you will learn details about how statistical methods can be used to discover patterns and how to manipulate statistical analyses by programming. You will also learn about the theory behind statistical methods and experimental design.

CS Mission

Our program prepares students to **create innovative software solutions**. Our graduates positively influence how **computer software affects** society and carry on our institution's tradition of excellence. Our graduates have excellent skills, a "can do" attitude and meet industry expectations right out of college.

SE Mission

Our program prepares students to develop quality software systems using proven software engineering methodologies. Our graduates positively influence how software products affect society and carry on our institution's tradition of excellence. Our graduates have excellent skills, a "can do" attitude and meet industry expectations right out of college.

Curriculum Differences

	SE	CS	DS
Program	128 credits	120 credits	120 credits
Course differences (only CS courses)	<ul style="list-style-type: none">• User interface Design• Requirements & Specifications• Software Architecture• Software Verification and Validation	<ul style="list-style-type: none">• Theory of Computation• Artificial Intelligence	<ul style="list-style-type: none">• Data Mining• Data Visualization• Machine learning• Artificial Intelligence

Differences – other courses

	SE	CS	DS
Other Courses	<ul style="list-style-type: none">• Engineering Economics	<ul style="list-style-type: none">• Numerical Computing• Linear Algebra	<ul style="list-style-type: none">• Probability theory• Other statistics
Science	14-15 credits, physics sequence (11 credits) & chemistry, biology or geology	11-12 credits, must include a lab sequence. Can be physics, chemistry, biology or geology	7credits, must include one lab. Can be physics, chemistry, biology or geology
Project	Senior Design – 6 credits	Internship – 4 credits	Capstone project – 4 credits

Engineering verses Science

Science	Engineering
Scientists work to understand the natural world	Engineers use scientific and mathematical knowledge to build things that people need

Engineering verses Science

- Science – focused on analyzing and observing basic physical laws.
- Engineering - focused on creating things for people and society

Engineering verses Science - continued

- Engineers - need to know science in order to do their work
- Scientists - often need to know some engineering in order to build their experimental equipment

Methods are different:

Methods:

Science	Engineering
Scientific method	Engineering design algorithm
<ol style="list-style-type: none">1. Observe some2. Hypothesize3. Make predictions4. Test5. Repeat Steps 3 and 4 until there are no discrepancies between theory and experiment and/or observation.	<ol style="list-style-type: none">1. Identify the problem or design objective2. Define goals /identify constraints3. Research and create potential solutions5. Analyze viability of solutions6. Choose most appropriate solution7. Build or implement the design8. Test and evaluative the design9. Repeat ALL steps as necessary

Software Engineering

- (1) The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software, that is, the application of engineering to software.
- (2) The study of approaches as in (1).