CREATIVE TECHNOLOGY AND DESIGN - BACHELOR OF SCIENCE (BSCTD)

The Bachelor of Science in Creative Technology and Design (http://tam.colorado.edu) is an engineering degree like no other. Encompassing a broad, transdisciplinary course of study, the degree blends creativity and design with a rigorous engineering curriculum that emphasizes critical thinking, problem-solving and creative production. Attracting designers, technologists, makers and inventors who seek diverse and adaptable skills, the degree opens doors to a wide range of 21st-century challenges and opportunities.

Industry and Career Paths

Students graduating with a major in Creative Technology and Design and prepared to enter professional positions in the following disciplines:

- Human-computer interaction.
- Information design and data visualization.
- Web design and development.
- Video and narrative media.
- Robotics and physical computing.
- Internet of Things design.
- Graphic design and visual communication.
- Game design and development.
- User-interface and user-experience design (UI/UX)
- Experience design.
- Digital sound, audio production and electronic music.
- Mobile application design and development.

Students who complete the BS degree program are also poised to pursue graduate or advanced degrees in engineering, other technological fields and design.

Hallmarks of the Program

- Most classes are small, studio-based courses that encourage group work and collaboration.
- Most classes are greater than 50 percent female-identifying or non-binary students, a percentage well above most engineering and computing programs.
- The interdisciplinary coursework stresses knowledge, skills and expertise in technology development through both design and engineering.
- Projects use an iterative creative process from problem finding and ideation through user-testing, implementation and deployment.
- Students learn to think critically about the ethical and cultural impacts of emerging technology.
- Faculty are engineers, designers and artists from diverse fields who are experts in working with students of varied backgrounds, abilities and interests.

Unique

With a solid engineering foundation, the BS in Creative Technology and Design program caters to an emerging generation of hybrid students. Students develop skills that extend beyond traditional engineering disciplines, eagerly producing technical and creative projects that integrate both engineering and design.

Transdisciplinary

The degree program is discipline agnostic, encouraging students to pursue their interests and passions in ways that conform to, as well as transcend, traditional disciplinary fields. By helping students discover, explore and expand these interests, faculty members prepare students for rapid shifts and innovations in tomorrow's technology landscape.

Creative Production and Critical Perspectives

Students are prolific creators who learn to critically and conceptually assess the works they create. Courses are designed on the studio model that integrates faculty and peer critique at every level. Graduates of the program are savvy and resourceful engineers, equal parts creator and critic, artist and theorist.

Requirements

Course Requirements

Students must complete a total of 128 credits in order to graduate with a BS in creative technology and design. The last 45 credit hours of the 128 for the BS degree must be earned via CU Boulder coursework only and while rostered in the College of Engineering & Applied Science.

The minimum passing grade for a course that is considered a prerequisite for another course is C-. A grade of C or better is required in all terminal Foundation, Core and Capstone courses. A grade of C- or higher is required in all terminal Focus and CPT Electives.

Code	Title	Credit Hours
General Coursework (73-75 credit hours)		
Writing, Humanities and Social Sciences (H&SS)		
College-Approved Writing Course [1]		3
H&SS Electives [2]		18
Mathematics Courses and Natural Science Electives		
APPM 1350	Calculus 1 for Engineers	4
or MATH 1300	Calculus 1	
or APPM 1345	Calculus 1 with Algebra, Part B	
APPM 1360	Calculus 2 for Engineers	4
or MATH 2300	Calculus 2	
Mathematics Electives [3]		6
Natural Science Electives [4]		12
Engineering and Computation Coursework		
ATLS 1300	Computational Foundations 1	4
or APPM 1650	Python for Math and Data Science Applications	
or ASEN 1320	Aerospace Computing and Engineering Applications	
or CSCI 1300	Computer Science 1: Starting Computing	
or ECEN 1310	C Programming for ECE	
or INFO 1701	Programming for Information Science 1	
ATLS 2270	Computational Foundations 2	4
or APPM 3650	Algorithms and Data Structures in Python	
or CSCI 2270	Computer Science 2: Data Structures	
or INFO 2201	Programming for Information Science 2	
GEEN 1400	Engineering Projects [7]	3

or ASEN 1400	Gateway to Space	
or ASEN 1403	Introduction to Rocket Engineering	
or ECEN 1400	Introduction to Digital and Analog Electronics	
Free Electives		
Free Electives		15
BS Program Coursework (55 hours)		
ATLS Foundation and Core Coursework		
ATLS 1100	Design Foundations	3
ATLS 2000	The Meaning of Information Technology	3
or ENES 2020	The Meaning of Information Technology	
ATLS 2100	Image	3
ATLS 2200	Web	3
ATLS 2300	Text	3
ATLS 3100	Form	3
ATLS 3200	Sound	3
ATLS 3300	Object	3
Capstone Coursework		
ATLS 4000	Research Methods and Professional Practice	3
ATLS 4010	Capstone Projects	4
Critical Perspectives in Technology (CPT) Electives		
CPT Electives [5]		6
Focus Electives (project-based courses)		
Focus Electives [6]		18
Total Credit Hours		**128**

1. Students may choose a course from the list of college-approved writing courses (http://www.colorado.edu/engineering/academics/policies/hss/).
2. Students may choose courses from the list of college-approved humanities and social sciences (HSS) electives (http://www.colorado.edu/engineering/academics/policies/hss/).
3. Students may choose two courses from the list of mathematics electives (found in degree audit).
4. Natural Science Courses (use Class Search (https://classes.colorado.edu/) and under *Advanced Search*, choose "A&S GenEd: Distribution-Natural Sciences").
5. Students may choose two courses from the list of CPT Electives (found in degree audit).
6. Students may choose six courses from the list of Focus Electives (found in degree audit); at least 12 credits of which must be upper-division coursework; at least 12 credits must be ATLS courses.
7. If a first-year projects course is not taken, a student can take a higher-level projects course to fulfill this requirement. Any approved focus elective (within the engineering college) will count.

Sample Four-Year Plan of Study

First Year

Fall Semester		**Credit Hours**
ATLS 1100	Design Foundations	3
CSCI 1300 or ATLS 1300	Computer Science 1: Starting Computing or Computational Foundations 1	4
APPM 1350 or MATH 1300	Calculus 1 for Engineers or Calculus 1	4-5
First-Year Projects Course		3
COEN 1830	Special Topics (Engineering First-Year Seminar)	1
	Credit Hours	**15-16**
Spring Semester		
ATLS 2000	The Meaning of Information Technology	3
ATLS 2270 or CSCI 2270	Computational Foundations 2 or Computer Science 2: Data Structures	4
APPM 1360 or MATH 2300	Calculus 2 for Engineers or Calculus 2	4-5
Natural Science Course [3]		3-4
	Credit Hours	**14-16**

Second Year

Fall Semester		
ATLS 2100	Image	3
ATLS 2200	Web	3
ATLS 2300	Text	3
Mathematics Course [4]		3
Humanities or Social Science Elective [1]		3
Natural Science Course [3]		3-4
	Credit Hours	**18-19**
Spring Semester		
ATLS 3100	Form	3
ATLS 3200	Sound	3
ATLS 3300	Object	3
Mathematics Course [4]		3-4
Humanities or Social Sciences Elective [1]		3
	Credit Hours	**15-16**

Third Year

Fall Semester		
Critical Perspectives in Technology Elective [5]		3
Focus Electives [6]		6
Natural Science Course [3]		3-4
Humanities or Social Sciences Elective [1]		3
College-Approved Writing Course [2]		3
	Credit Hours	**18-19**
Spring Semester		
Focus Electives [6]		6
Humanities or Social Sciences Electives [1]		5
Natural Science Course (if needed to fulfill 12 credits hours total of science) [3]		3
Free Elective		3
	Credit Hours	**17**

Fourth Year

Fall Semester		
ATLS 4000	Research Methods and Professional Practice	3
Critical Perspectives in Technology Elective [5]		3
Focus Elective [6]		3
Humanities or Social Science Elective [1]		3
Free Electives		6
	Credit Hours	**18**

Spring Semester		
ATLS 4010	Capstone Projects	4
Focus Elective [6]		3
Free Electives		6
	Credit Hours	**13**
	Total Credit Hours	**128-134**

1. Students may choose courses from the list of college-approved humanities and social sciences (HSS) electives (http://www.colorado.edu/engineering/academics/policies/hss/).
2. Students may choose a course from the list of college-approved writing courses (http://www.colorado.edu/engineering/academics/policies/hss/).
3. Natural Science Courses (use Class Search (https://classes.colorado.edu/) and under *Advanced Search*, choose "A&S GenEd: Distribution-Natural Sciences").
4. Students may choose two courses from the list of Mathematics Electives (https://www.colorado.edu/atlas/academics/undergraduate/bs-ctd-curriculum/bs-ctd-mathematics-electives/).
5. Students may choose two courses from the list of CPT Electives (https://www.colorado.edu/atlas/academics/undergraduate/cpt/).
6. Students may choose six courses from the list of Focus Electives (https://www.colorado.edu/atlas/bs-ctd-focus-electives/); at least 12 credits of which must be upper-division coursework; and at least 12 credits must be ATLS courses.
7. If a first-year projects course is not taken, a higher-level projects course will satisfy this requirement. All focus electives (within the engineering college) are approved to fulfill this requirement.

Learning Outcomes

Upon graduation, CTD students are expected to be able to:

- Develop work that addresses complex interdisciplinary problems, applying principles of engineering, computational thinking, and design using industry standard and emerging technologies.
- Understand the historical, cultural and psychological factors that impact the human experience of design.
- Engage in research, critical assessment and critique.
- Engage in iterative design and production to contribute novel functionalities, aesthetics or interactions.
- Collaborate on a team that effectively demonstrates task management, accountability and makes progress towards common goals.
- Recognize ethical and professional responsibilities and make informed discernments in applying creative technology solutions.
- Effectively communicate the functionality, purpose and impact of creative technology solutions in a wide range of professional contexts in a way that is thoughtful and respectful to others.