CREATIVE TECHNOLOGY AND DESIGN

Degrees in creative technology and design are conferred by the College of Engineering and Applied Science and administered by the ATLAS Institute (https://www.colorado.edu/atlas/), a center for radical creativity and invention fostering interdisciplinary research, learning and innovation. With strong ties to the technology sector in Colorado and beyond, ATLAS is a vibrant and growing community of researchers, instructors and students interested in the creative application of diverse technologies.

Created to equip students with new and adaptable skill sets for the expanding digital landscape, the undergraduate program offers a bachelor of science, as well as a minor. Through its core curriculum and electives, students choose from a wide range of learning opportunities in subjects such as programming, physical computing, virtual reality, mobile application design/development, web design/development, user-interface/user-experience, history of technology, big data, robotics, wearable technology and game design/development.

Course code for this program is ATLS.

Centers and Labs

ATLAS Institute degrees are offered through the College of Engineering and Applied Science. With a strong emphasis on design, research, project-based learning and creative production, the institute includes a range of research labs, creative studios and learning facilities:

Brain Music Lab (https://www.colorado.edu/atlas/brain-music-lab/)

The Brain Music Lab pursues research and develops creative practices to promote health and wellbeing by combining new music technologies with EEG (brainwave data) and other physiological measurement techniques.

Unstable Design Lab (https://www.colorado.edu/atlas/unstable-design-lab/)

A research lab that studies technology and culture through the design and development of technologies that embrace chance and uncertainty.

Laboratory for Emergent Nanomaterials (https://www.colorado.edu/atlas/laboratory-emergent-nanomaterials/)

A research lab that manipulates matter on the smallest of scales to create materials with emergent properties, characterized by novel and sometimes surprising features arising from the interactions of multiple bodies.

ACME Lab (https://www.colorado.edu/atlas/acme-lab/)

The ACME Creativity Machine Environment (ACME) research lab explores computational tools for design, creativity, cognition, tangible and embedded interaction, and computing for health and wellness.

Programmable Reality Lab (https://www.colorado.edu/atlas/programmable-reality-lab/)

The Programmable Reality Lab is a research lab dedicated to make our whole living environment dynamic, interactive and programmable to transform our living space into a dynamic medium.

Living Matter Lab (https://www.colorado.edu/atlas/living-matter-lab/)

The Living Matter Lab is a research lab that pioneers new technologies empowering individuals by making information about their own biology and biome more accessible.

Utility Research Lab (https://www.colorado.edu/atlas/utility-research-lab/)

The Utility Research Lab invents and investigates digital fabrication technology, tools and techniques that empower us to create things that positively impact people, society and the environment.

TYPO Lab (https://www.colorado.edu/atlas/typo-lab/)

TYPO Lab is an experimental studio for creative work and research related to the technologies of language. It empowers faculty and students to explore and appreciate the media and methods of words.

BTU Lab (https://www.colorado.edu/atlas/blow-things-btu-lab-0/)

A dynamic teaching facility, creative studio and hackerspace that provides a range of physical computing, electronics and fabrication technologies, including a laser cutter, 3D printers and computers.

Whaaat!? Lab (https://www.colorado.edu/atlas/whaaat-lab/)

A game-focused learning lab that provides a range of emerging technologies for the exploration, project development and creative application of games and experimental interactions.

Helio Lab (https://www.colorado.edu/atlas/helio-lab/)

The Helio Lab is a learning lab that supports students' exploration of technologies that capture, edit and display imagery and light-based media which emphasizes storytelling through photography, animation, video, projection, AR/VR, 3D and 360 experiences and more.

B2 Center for Media, Arts and Performance (https://www.colorado.edu/atlas/labscenters/center-media-arts-and-performance-cmap/center-media-arts-and-performance-cmap/)

Centered around the ATLAS Black Box Experimental Studio, where creativity and engineering blend with the performing arts, B2 is an incubator for the novel and experimental use of technology in music, dance, visual art, theater, film and new media.

Bachelor's Degree

- Creative Technology and Design - Bachelor of Science (BSTM) (https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/creative-technology-design/creative-technology-design-bachelor-science-bsctd/)

Minor

- Creative Technology and Design - Minor (https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/creative-technology-design/creative-technology-design-minor/)

Certificates

- Design Technologies - Certificate (https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/creative-technology-design/design-technologies-certificate/)
- User Experience - Certificate (https://catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/creative-technology-design/user-experience-certificate/)

Faculty

While many faculty teach both undergraduate and graduate students, some instruct students at the undergraduate level only. For more information, contact the faculty member's home department.

Alistar, Mirela (https://experts.colorado.edu/display/fisid_164177/)
Assistant Professor; PhD, Technical University of Denmark

Bruns, Carson J. (https://experts.colorado.edu/display/fisid_159851/)
Assistant Professor; PhD, Northwestern University

Chopra, Aidan
Lecturer; MArch, Rice University

Cohen, Ruscha (https://experts.colorado.edu/display/fisid_149781/)
Scholar in Residence, Director; MS, University of Colorado Denver

Devendorf, Laura (https://experts.colorado.edu/display/fisid_158564/)
Assistant Professor; PhD, University of California, Berkeley

Do, Ellen Yi-Luen (https://experts.colorado.edu/display/fisid_159925/)
Professor; PhD, Georgia Institute of Technology

Gross, Mark D. (https://experts.colorado.edu/display/fisid_100095/)
Professor, Institute Director; PhD, Massachusetts Institute of Technology

Johnson, Gabriel
Lecturer; PhD, Carnegie Mellon University

Leslie, Grace (https://experts.colorado.edu/display/fisid_172297/)
Assistant Professor; PhD, University of California San Diego

Margaret, Annie (https://experts.colorado.edu/display/fisid_159961/)
Associate Teaching Professor; PhD, Northwestern University

Pinter, Anthony (https://experts.colorado.edu/display/fisid_171867/)
Assistant Teaching Professor; Ph.D., University of Colorado Boulder

Rankin, Daniel (https://experts.colorado.edu/display/fisid_156453/)
Associate Teaching Professor, Associate Director; MS, University of Colorado Boulder

Rezvani, Sheiva
Associate Teaching Professor, Faculty Director; MA, New York University

Rivera, Michael (https://experts.colorado.edu/display/fisid_169859/)
Assistant Professor; PhD, Carnegie Mellon University

Schaal, David A. (https://experts.colorado.edu/display/fisid_114824/)
Associate Teaching Professor; MFA, University of Colorado Boulder

Suzuki, Ryo (https://experts.colorado.edu/display/fisid_167629/)
Assistant Professor; PhD, University of Colorado Boulder

Swanson, Joel E. (https://experts.colorado.edu/display/fisid_134311/)
Associate Professor; MFA, University of California, San Diego

Weaver, Zachary (https://experts.colorado.edu/display/fisid_166757/)
Assistant Teaching Professor; MArch, Carnegie Mellon University

Zamore, Shaz (https://experts.colorado.edu/display/fisid_166083/)
Assistant Teaching Professor; PhD, University of Washington

Courses

ATLS 1100 (3) Design Foundations
Introduces foundational principles, practices and methods of design. Emphasizes design as an expressive and creative problem solving tool. This course engages with design from a broad perspective including visual, computational, physical and auditory design practices. Through lectures, discussions and creative projects, students will gain a familiarity with the diverse applications of creative technology through design.

ATLS 1300 (4) Computational Foundations 1
Explores computation as a powerful tool for creative design and expression in a project-based studio environment. Students learn the fundamentals of creative coding, computational thinking, and object-oriented programming. Hands-on topics include generative art and design, interactivity, animation, and visualization.
Requisites: Restricted to Creative Technology and Design majors (TMEN) and (MTAM) minors and IUT On Track applicants.

ATLS 1350 (3) Computational Foundations for Non-Majors
Explores computation as a powerful tool for creative design and expression in a project-based studio environment. Students learn the fundamentals of creative coding, computational thinking, and object-oriented programming. Hands-on topics include generative art and design, interactivity, animation, and visualization.

ATLS 2000 (3) The Meaning of Information Technology
A survey of the mutual influence of technology, media, and society. Equips students with an understanding of technological transformations in interpersonal, organizational, and mass communication. Emphasis is on the technological, social and political changes that underlie the movement toward a digital society. As such, the class acts as a survey of various technologies and their relationship to socio-political issues. We not only address ¿how does it work¿ and ¿where does this come from¿ but ¿why is it here¿ and ¿how does it impact us as individuals and as a society¿.

ATLS 2001 (3) Design Technologies: Toolkit
Introduces students to the fundamentals of creative design through digital media production. Throughout the semester, students explore a number of disciplines related to digital media including imaging, web development, animation, video production, and more. Class sessions are in lecture format and are aimed at helping students attain a strong conceptual and technical understanding of creative design.
Requisites: Requires prerequisite or corequisite course of ATLS 2000 (minimum grade C-). Restricted to PATL students.
Grading Basis: Letter Grade

ATLS 2002 (3) Design Technologies: Process
Introduces foundational principles, practices and methods relating to the process of creative design. Emphasis on the pre-production process as a creative problem-solving tool in order to produce innovative and interesting creative work. Through lectures, discussion and creative projects, students will gain a familiarity with diverse applications and practices related to creative technology and design
Requisites: Requires prerequisite or corequisite courses of ATLS 2000. Restricted to PATL students.

ATLS 2036 (3) Introduction to Media Studies in the Humanities
Serves as an introduction to media studies specifically from a humanities perspective. Studies both histories and theories of media from the 20th and 21st centuries. Touches on methodologies for undertaking media studies (including distant ready and media archaeology). Objects of study may include such topics as film, radio, social media platforms and games, as well as digital art and literature.
Equivalent - Duplicate Degree Credit Not Granted: ENGL 2036 and AHUM 2036
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Restricted to Creative Technology Design (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.
Additional Information: Arts Sci Gen Ed: Distribution-Arts Humanities

ATLS 2100 (3) Image
Introduces techniques, technologies and concepts of digital image making and manipulation through lectures, projects and critiques. Focuses on digital photography, digital animation and digital video as a means to formal and expressive ends. This course also contextualizes practices and methodologies of digital imaging with historical and critical perspectives.
Requisites: Requires prereq courses of ATLS 1100. Requires prereq or coreq of ATLS 1300 or ATLS 1350 or INFO 1701 or CSCI 1300, and ATLS 2000 or ENES 2020 (all min grade C-).
Grading Basis: Letter Grade

ATLS 2200 (3) Web
Introduces techniques, technologies and concepts of web design and development through lectures, projects and critiques. Focuses technically on HTML, CSS and JavaScript as the primary web technologies. Contextualizes the technical and societal implications of the Internet through historical and critical perspectives.
Requisites: Requires prereq courses ATLS 1100 ATLS 1300 or ATLS 1350 or INFO 1701 or CSCI 1300 (all min grade C-). Requires prereq or coreq course ATLS 2000 or ENES 2020.

ATLS 2270 (4) Computational Foundations 2
Builds on the fundamental programming concepts introduced in ATLS 1300. Students will learn to write sophisticated programs that employ efficient means of representing and manipulating information. They will learn to analyze algorithms in terms of complexity, gain an understanding of fundamental data structures (lists, stacks, queues, trees), and acquire practical experience implementing algorithms to solve common problems (sorting, graph traversal).
Requisites: Requires prerequisite courses of ATLS 1300 or CSCI 1300 or INFO 1701 or ASEN 1320 (all minimum grade C-). Requires prerequisite or corequisite course ATLS 2000 or ENES 2020.

ATLS 2300 (3) Text
Introduces technologies, terminology and histories related to the design of text within digital and analogue media. Students will learn the fundamentals of design, typography and layout through lectures, projects and critiques. The curriculum surveys significant theoretical perspectives, historical periods and significant practitioners that influence the practice of typographic design.
Requisites: Requires prereq of ATLS 1100. Requires prereq or coreq ATLS 1300, ATLS 1350, INFO 1701 or CSCI 1300. Requires prereq or coreq ATLS 2000 or ENES 2020 (all min grade C-).

ATLS 2519 (1-4) Special Topics in Creative Technology and Design
Analyzes special interest areas of creative technology and design research and practice.
Repeatable: Repeatable for up to 12.00 total credit hours. Allows multiple enrollment in term.
Requisites: Restricted to Creative Technology Design (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.
Grading Basis: Letter Grade

ATLS 3040 (3) Introduction to Games and Play
Introduces students to foundational concepts, culture, history, and creation of games and playful experiences. Through readings, playing games, and completing design exercises, students will learn to analyze how various formal elements of play function to make successful games.
Requisites: Requires prerequisite or corequisite course of ATLS 1100 (minimum grade C-).

ATLS 3100 (3) Form
Teaches the fundamentals of 3D modeling, 3D animation and 3D printing / rapid prototyping from a conceptual and sculptural perspective. Through topical lectures, technical demonstrations and creative projects the course will introduce students to the potentials of thinking and working within 3-dimensional spaces.
Requisites: Requires prereq course of ATLS 1100. Requires prereq or coreq of courses ATLS 1300 or ATLS 1350 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320, and ATLS 2000 or ENES 2020 (all min grade C-).

ATLS 3110 (3) Motion Design
An animation-based projects course that advances student understanding of motion design in today's culture. Through active production and critical analysis, students will create new media projects and critically examine the history, social implications, and impacts of these forms of mass media.
Requisites: Requires prerequisite course of ATLS 2100 (minimum grade C-).

ATLS 3120 (3) Creative Web Development
An Internet-based projects course that advances student understanding of Internet culture. Through active production and critical analysis, students will explore their individual roles in the digital landscape and critically examine the social implications and impacts of digital communities.
Requisites: Requires prerequisite courses of ATLS 2000 and ATLS 2200 (all minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

ATLS 3150 (3) Universal Design for Digital Media
Focusing on the concepts of universal design and Web Standards, this course will address issues that occur at the nexus of web standards, Universal Design and the needs of persons with disabilities. Students will gain the expertise and skills to create media and web sites which are accessible, usable and effective for all users and device platforms.
Equivalent - Duplicate Degree Credit Not Granted: CSCI 3150
Requisites: Requires prerequisite course of ATLS 1300 or CSCI 1300 (minimum grade C-).
Recommended: Prerequisite some knowledge of creating web pages with either direct HTML coding or with web design software.

ATLS 3173 (3) Creative Climate Communication
We generate multimodal compositions on the subject of climate change and engage with various dimensions of issues associated with sustainability. We work to deepen our understanding of how issues associated with climate change are or can be communicated, by analyzing previously created expressions from a variety of media (interactive theatre, film, fine art, television programming, blogs, performance art, for example) and then be creating our own work.
Equivalent - Duplicate Degree Credit Not Granted: ENVS 3173 and THTR 4173
Recommended: Prerequisite ENVS 1000.
Additional Information: Arts Sci Gen Ed: Distribution-Arts Humanities Arts Sci Gen Ed: Distribution-Social Sciences

ATLS 3200 (3) Sound
Introduces techniques, technologies and concepts of digital sound through lectures, projects and critiques. Focuses technically on digital sound creation, production, synthesis and interactivity. Explores various approaches to digital sound production through historical and conceptual perspectives.
Requisites: Requires prereq course of ATLS 1100. Requires prereq or coreq course of (ATLS 2000 or ENES 2020) and (ATLS 1300 or ATLS 1350 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320) (all min grade C-).

ATLS 3300 (3) Object
Introduces the fundamentals of physical computing. This class is an exploration of computing that starts from the perspective that humans are fundamentally physical beings. Students will design projects that interact with humans and the physical world and will learn to integrate sensors, motors, and simple electronics into creative projects. Projects will include interactive installations, art projects, games, and audio controllers.
Requisites: Requires prereq courses of ATLS 1100 ATLS 1300 or (ATLS 1350 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 or ASEN 1320) (all min grade C-). Requires prereq or coreq course of ATLS 2000 or ENES 2020 (all min grade C-).
Grading Basis: Letter Grade

ATLS 3500 (1-3) Client Projects in Creative Technology and Design
Allows undergraduate students to work on collaborative projects with faculty and with external organizations under faculty supervision. Focuses on teamwork, conceptual planning, technical design and development and working within real-world client environments. Critical skills include project research, planning, design, development, trouble-shooting and presentation.
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Requires prerequisite course of ATLS 2000 or HUEN 2020 or ENES 2020 (all min grade C-).

ATLS 3519 (1-3) Special Topics
Analyzes special interest areas of multidisciplinary creative technology and design research and practice.
Repeatable: Repeatable for up to 21.00 total credit hours. Allows multiple enrollment in term.

ATLS 3523 (3) The Art and Strategy of Science Communication: Branding Climate Change
Integrating the science of climate change and science communication with the research, strategy and execution practices of strategic communication (e.g., advertising and public relations).
Equivalent - Duplicate Degree Credit Not Granted: EBIO 3523
Grading Basis: Letter Grade

ATLS 3529 (1-3) Critical Topics
Analyzes critical perspectives in creative technology and design. Within these courses, students will develop vocabularies, theoretical perspectives and critical approaches relevant to technology and its effects on culture and society.
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.

ATLS 3539 (1-3) Topics: How-to
Analyzes special interest areas of multidisciplinary creative technology and design research and practice.
Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

ATLS 3710 (3) Material Studies and Practice
Surveys the broad array of physical materials used in design and practically applies this knowledge via hands-on projects that introduce basic tools and techniques for fabrication in the domains of woods, plastics, ceramics, concrete, fibers and metals. Practical work is complemented with inquiry into the social, aesthetic, and ecological significance of materials used in design.
Requisites: Requires prerequisite course of ATLS 1100 (minimum grade C-).

ATLS 4000 (3) Research Methods and Professional Practice
Research Methods and Professional Practice lays the foundation for students to produce culminating work in their major. In this course, students will engage in domain exploration, learn to define a research problem, utilize tools and methods for professional design research, refine presentation skills, and engage in iterative and collaborative work. This course is focused on domain research, idea validation, and prototyping in order to prepare students for a culminating semester-long Capstone project based on this research. Formerly offered as a special topics course.
Requisites: Requires prerequisite courses of ATLS 3100 and ATLS 3300 (all min grade C-). Restricted to Creative Technology and Design (TMEN) majors.

ATLS 4010 (4) Capstone Projects
Focuses on the development of an individual thesis project. Specific class sessions will feature a combination of lectures, demonstrations, guest speakers, lab sessions, and critiques. This course also entails group work, portfolio development, critical theoretical readings, and a significant written component.
Repeatable: Repeatable for up to 8.00 total credit hours.
Requisites: Requires prerequisite course of ATLS 4000 (minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors only.

ATLS 4040 (3) Game Design
Introduces students to game design, development, history, theory and culture through readings, discussion, game analysis and the iterative design process of non-digital games.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5040
Requisites: Requires prerequisite course of ATLS 1100 (minimum grade C-).

ATLS 4050 (3) Alt Arcade Interfaces
In this project-based studio course, students will move beyond conventional button and joystick interfaces into the design of bespoke interfaces for game control, with an emphasis on games designed for public exhibition. Students will, both individually and in groups, design and develop multiple games, and build custom control interfaces for them.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5050
Requisites: Requires prerequisite ATLS 1300 or ATLS 1350 or CSCI 1300 (all minimum grade C-).
Recommended: Prerequisite ATLS 3300 (Object), and ATLS 4050 (Game Development).

ATLS 4060 (3) Tiny Games
Guides students into fluency across a suite of technical tools (Bitsy, PuzzleScript, Pico-8, and others) to construct tiny games: short games with tight technical constraints, created in relatively brief amounts of time, and built around singular ideas.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5060
Recommended: Prerequisite ATLS 1100 (Design Foundations) and ATLS 1300 (Computational Foundations), or ATLS 1350, or CSCI 1300.

ATLS 4112 (3) Neurohacking
Explores psychotechnologies for developing high level metacognition and individual sovereignty. We investigate the optimization of conscious human experience, mindfulness, and creativity through the lenses of neuroscience, cognitive science, evolutionary psychology, and philosophy. Students will learn to critique primary literature, experimental design, and be guided in developing a set of practices to enhance cognition and achieve various desired mental states.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5112
Requisites: Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020 (minimum grade C-).

ATLS 4120 (3) Mobile Application Development
Provides a comprehensive overview of developing mobile applications using a range of technologies including software developers' kits, object-oriented programming and human interface design principles. Students incorporate leading edge technologies with their own academic pursuits and personal interests to develop mobile applications. Explores the social and cultural effects of app and mobile-based computing.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5120
Requisites: Requires prerequisite course of ATLS 1300 or CSCI 1300 or CSCI 1320 (minimum grade C-).

ATLS 4130 (3) Experimental Typography
This course is an advanced investigation of typography for visual communication and expression. Emphasis is placed on the analysis of meaning as conveyed through materials, technology, and design. Projects are experimental and are designed to challenge you to expand your understanding of the function of typography in communication, design, art, and culture.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5130
Requisites: Requires prerequisites ATLS 2200 and ATLS 2300 (all minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) students.

ATLS 4140 (3) Game Development
Builds on concepts and processes learned in ATLS 4040/5040. Reinforces game design principles through analysis and discussion of digital games, and introduces students to key practices in the development of digital game experiences, including game flow, mechanics, 2D and 3D graphics, and artificial intelligence.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5140
Requisites: Requires prerequisite ATLS 4040 (minimum grade C-).

ATLS 4141 (3) Color
Examines the generation and perception of colors in the context of physics, chemistry, biology, and psychology as a foundation for making. Explores the synthesis and applications of color dyes and pigments in art and design through lectures, readings, experiments, and projects.
Requisites: Requires prerequisite course of ATLS 2000 or HUEN 2020 or ENES 2020 (all min grade C-).

ATLS 4151 (3) Flow Visualization
Explores techniques for the visualization of the physics of fluid flows including seeding with dyes, particles and bubbles, and shadowgraphy and schlieren. Reviews optics and fluid physics, especially atmospheric clouds. Assignments are student-driven, to individuals and mixed teams of graduates, undergraduates, engineering majors and photography/video majors.
Equivalent - Duplicate Degree Credit Not Granted: ARTF 5200, MCEN 5151, MCEN 4151 and ATLS 5151
Requisites: Restricted to students with 57+ credits (juniors and above) only.
Additional Information: Arts Sci Gen Ed: Distribution-Arts Humanities

ATLS 4201 (3) Biodesign
This class covers basic design techniques, together with essential wetlab skills. Students will learn how to culture and work with various types of organisms, such as bacteria, algae (dynoflagellates, cyanobacteria) and fungus. These organisms will become the living media or processed biomaterials that the students will design with. This is a lab-based class.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5201

ATLS 4202 (3) Computational Fabrication
This course will explore techniques, representations, and workflows for computational fabrication. Digital fabrication machines like 3D printers and laser-cutters bring complicated designs into physical form, and computer programming helps overcome design challenges that are difficult or nearly impossible. Blending these two tools, students will use computational fabrication techniques to design and build functional, creative objects leveraging existing computer-aided design (CAD) tools, programming languages and digital fabrication machinery.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5202
Requisites: Required prerequisites: ATLS 1300 or CSCI 1300.
Recommended: Prerequisites Prior programming experience in Python/C ++ and ATLS 1300 (Form) or prior CAD/3D Modeling experience.

ATLS 4203 (3) Light and Perception
Traces human and camera vision in close detail. Students explore visual perception between two and three dimensions by exploring advanced experiments in designing light. Starting with different analog illustration exercises, students explore how light informs the perception of three dimensional space and objects. Students then explore techniques to play with visual perception, using advanced technologies like Augmented and Virtual Reality, Interactive Sculpture, Digital Games, and Immersive Media.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5203
Recommended: Prerequisite ATLS 2100.

ATLS 4214 (3) Big Data Architecture
Provides students with a comprehensive survey of technologies used today in the collection, storage, processing, analytics and display of big data. Focuses on cultivating real world skills with students working on semester long projects to execute on a group project.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5214, CSCI 5214, and CSCI 4214
Requisites: Requires prerequisite course of ATLS 2270 or CSCI 2270 or CSCI 2275 (all minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors or (MTAM) minors and CSEN majors and CSCI majors.

ATLS 4221 (3) Interactive Sound
Interactive Sound explores generative coding to produce unique audio design systems that can be employed in a wide array of interactive projects. Students will learn to use Max (a visual programing tool) to combine and control sound, video, OpenGL 3D objects, and microcontrollers. Example inputs: real time video, data scraping for the sonification of natural phenomena, or environmental sensor data collected via Arduino. Example outputs: reactive audio-visual installations, immersive projection, or multichannel spatial sound systems.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5221
Recommended: Prerequisite ATLAS 3200 Sound, or have equivalent music technology experience.

ATLS 4230 (3) Case Studies in Social Impact
Students will evaluate case studies across a range of technologies and applications. Students will learn how to match available technologies to human and environmental needs and resources, be introduced to the seminal work and leaders in the field, and discuss the future of Creative Technology Design as an emerging area of academic focus.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5230
Requisites: Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

ATLS 4244 (3) Empathy and Technology
Explores how the creative integration of empathy and compassion with design and technology can benefit society. Reviews foundational neuroscience and evolution of empathy. Through readings, discussion, and reflection students will develop personal practices for fostering empathy and critically investigate: empathy as a finite resource, tribalism/polarization, the weaponization of empathy, and principles for designing social systems that promote well-being. Previously offered as a special topics course.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5244
Requisites: Requires prerequisite course of ATLS 2000 or HUEN 2020 or ENES 2020 (all min grade C-).
Grading Basis: Letter Grade

ATLS 4279 (3) Aesthetics in Design
Focuses on aesthetic aspects of design via hands-on design-build experiences. Students individually create dynamic artifacts of their own choice with the assistance of teammates. Content includes major design movements since 1900, constructive critique practice, hand sketching techniques and other selected industrial design topics. Students publish their design work on an archival public blog which provides a professional portfolio element.
Equivalent - Duplicate Degree Credit Not Granted: MCEN 4279 and MCEN 5279 and ATLS 5279

ATLS 4320 (3) Mobile Application Development: Advanced Topics
Explores advanced topics in mobile application design and development, including examining different approaches to information design and the various user interaction models associated with them. Understanding how data is structured, accessed, stored and flows through apps is a core theme of the course. Explores the interaction with external data sources and storage models.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5320
Requisites: Requires a prerequisite course of ATLS 4120 (minimum grade C-). Restricted to College of Engineering (ENGRU) undergraduates only.

ATLS 4330 (3) Wearable Technologies
Introduces elements of embedding electronic and computational behaviors into clothing and accoutrements such as watches, handbags, and other wearable accessories. In weekly exercises students build, test, and demonstrate canonical wearable projects. Readings and video viewings survey past and current trends in wearable technologies, including materials, components, fashion and social acceptability. Participants design, develop, debug and document a wearable technology term project.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5330
Requisites: Requires prerequisite course of ATLS 3300 (minimum grade C-).

ATLS 4340 (3) Experimental Textiles
Introduces students to the design and creation of soft interactive objects using textile techniques with a focus on weaving. Specifically, students are guided through exercises intended to cultivate and embodied a sense of textile structures and the mechanical and aesthetic effects they afford. Then, students learn the state of the art of integrating electronics into these soft/deformable textiles structures. With applications from sports, medicine, fashion, architecture, and soft robotics, smart/interactive textiles require a unique set of understandings and design considerations. Students learn about textile structure development, surface design, material sourcing, and electronics integration through project-based assignments.

ATLS 4519 (1-4) Advanced Special Topics
Analyzes special interest areas of multidisciplinary creative technology and design research and practice.
Repeatable: Repeatable for up to 32.00 total credit hours. Allows multiple enrollment in term.

ATLS 4529 (1-3) Adv Critical Topics
Analyzes critical perspectives in technology, art and media. Within these courses, students will develop vocabularies, theoretical perspectives and critical approaches relevant to technology and its effects on culture and society.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5529
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Grading Basis: Letter Grade

ATLS 4539 (1-4) AdvTopics: How-to
Analyzes special interest areas of multidisciplinary creative technology and design research and practice.
Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

ATLS 4606 (3) Critical Technical Practice
Surveys design theory and methods that can be used to question relationships between technology, culture, and the environment. Students will discuss readings and synthesize those readings through design exercises. The course will equip students with resources for thinking more critically and creatively about design and possible future human-technology relationships.
Equivalent - Duplicate Degree Credit Not Granted: INFO 5606, INFO 4606, and ATLS 5606
Grading Basis: Letter Grade

ATLS 4616 (3) Introduction to Virtual Reality
Introduces students to the field of virtual reality (VR). Covers the historical development of virtual reality technologies and virtual reality as a research field, the mathematics of 3D coordinate systems, fundamental principles, algorithms, and design patterns in developing interactive virtual environments, the perceptual science behind mixed reality technologies, and libraries and tools for creating VR experiences.
Equivalent - Duplicate Degree Credit Not Granted: CSCI 4616
Requisites: Requires prerequisite course of ATLS 2270 or CSCI 2270 (minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

ATLS 4620 (3) User-Experience Design 1
Teaches the end-to-end UX Design process. Through lectures, industry illustrations and hands-on projects students will develop a professional design portfolio piece, understand contemporary UX design methodologies, and learn how to innovate when designing at scale.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5620
Requisites: Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

ATLS 4630 (3) Web Front-End Development
Explores interactivity on the web using front-end web development concepts and technologies. Students will work with a range of technologies including JavaScript, jQuery, HTML5, APIs and user interface design methods to create interactive web applications. Individual and group projects will include animations, games, interactive narratives and web applications.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5630
Requisites: Requires prerequisite courses of ATLS 2200 and ATLS 1300 or ATLS 3000 or CSCI 1300 or CSCI 1320 (all minimum grade C-).

ATLS 4720 (3) User-Experience Design 2
Expands on techniques and opportunities presented in User-Experience Design 1 with a deeper dive into research and prototyping practices as means to insight into user desires and preference, adoption, and execution of product and branded experiences in a variety of contexts and locations within the global experience economy.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5720
Requisites: Requires prerequisite course of ATLS 4620 (minimum grade C).

ATLS 4809 (3) Computer Animation
Develops a firm understanding of the general principles of computer animation. Lectures cover the creation of models, materials, textures, surfaces, and lighting. Path and key frame animation, particle dynamics, and rendering are introduced. Students are assigned a number of animation tutorials to carry out.
Equivalent - Duplicate Degree Credit Not Granted: ATLS 5809 and CSCI 4809 and CSCI 5809

ATLS 4900 (1-3) Undergraduate Independent Study
Provides opportunities for independent study at the upper-division undergraduate level. Students work on research or a creative project guided by faculty. Department consent required.
Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.
Requisites: Requires prerequisite courses of ATLS 1100 and ATLS 1300 (minimum grade C-).