

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 (<http://atlas.colorado.edu/>), 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 and the Graduate School. 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.

A (<https://www.colorado.edu/atlas/laboratory-emergent-nanomaterials/>)CME 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.

THING Lab (<https://www.colorado.edu/atlas/thing-lab/>)

The Transformative Human Interfaces for the Next Generation (THING) research lab employs shape-changing materials, novel sensors and

unique design methods to make digital information tangible, paving the way for a new generation of interactivity that goes beyond sight and sound.

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

The Living Matter Lab pioneers new technologies that empower individuals by making information about their own biology and biome more accessible.

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.

Heliolab (<https://www.colorado.edu/atlas/heliolab/>)

A facility that provides a range of technologies and materials for investigating digital imaging and photography through the production of creative works and projects.

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/>)

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.

Bethancourt, Matthew R. (https://experts.colorado.edu/display/fsid_156489/)

Senior Instructor; MFA, Parsons School of Design

Bruns, Carson J. (https://experts.colorado.edu/display/fsid_159851/)
Assistant Professor; PhD, Northwestern University

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

Dispenza, Arielle (https://experts.colorado.edu/display/fisid_157379/)
Instructor; MPS, New York University

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

Dupré, Jill Van Matre (https://experts.colorado.edu/display/fisid_144395/)
Professor; JD, University of Colorado Boulder

Leithinger, Daniel (https://experts.colorado.edu/display/fisid_163356/)
Assistant Professor; PhD, Massachusetts Institute of Technology

Margaret, Annie (https://experts.colorado.edu/display/fisid_159961/)
Assistant Professor

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

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

Szafir, Daniel J. (https://experts.colorado.edu/display/fisid_156420/)
Assistant Professor; PhD, University of Wisconsin–Madison

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.
Requisites: Restricted to Technology, Arts and Media (TMEN) majors and (MTAM) minors only.

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 (TMEN) majors and (MTAM) minors.

ATLS 1710 (3) Tools and Methods for Engineering Computing

Designed for students with little or no programming background. Students learn procedural and object-oriented programming through development of games, simulations, and animations using Flash/Actionscript, VB/Excel, Java, MATLAB, and real-world applications. Activities are oriented toward smaller projects that address topics in beginning science, engineering, and mathematics courses. Students gain practical, applicable skills.

ATLS 2000 (3) The Meaning of Information Technology

Surveys the history of information technologies and modern techniques of information production, storage, transmission, and retrieval. Emphasizes understanding not only the technological transformations in interpersonal, organizational, and mass communication, but also the technological, social and political changes that underlie the movement toward a digital society.

Equivalent - Duplicate Degree Credit Not Granted: ENES 2020

Requisites: Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors, IDEN majors and EMEN majors.

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 and ATLS 2001. 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

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Restricted to Technology, Arts and Media (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 and ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 (all min grade C-). Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN majors and MTAM minors or IDEN majors.

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 of ATLS 1100 and ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 (all min grade C-). Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN majors and MTAM minors or IDEN majors.

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 CSCI 1200 or INFO 1701 or ASEN 1320 (all minimum grade C-). Requires prerequisite or corequisite course ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN) majors and MTAM minors only.

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 courses of ATLS 1100 and ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 (all min grade C-). Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN majors and MTAM minors or IDEN majors.

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 Technology, Arts and Media (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 courses of ATLS 1100 and ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 (all min grade C-). Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN, IDEN, AMEN, EPEN majors

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). Restricted to Technology, Arts and Media (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.

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).

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: ENV5 3173 and THTR 4173

Recommended: Prerequisite ENV5 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 courses of ATLS 1100 and ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 (all min grade C-). Requires prereq or coreq course of ATLS 2000 or HUEN 2020 or ENES 2020. Restricted to TMEN, IDEN, AMEN, EPEN majors

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 prerequisite courses of ATLS 1100 and (ATLS 1300 or INFO 1701 or CSCI 1200 or CSCI 1300 or CSCI 1320 or ASEN 1320); and Pre-req or Co-req ATLS 2000 or HUEN 2020 or ENES 2020 (all minimum 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, troubleshooting and presentation.

Repeatable: Repeatable for up to 6.00 total credit hours.

Requisites: Requires prerequisite course of ATLS 2000 (minimum grade C).

ATLS 3519 (1-3) Special Topics in Creative Technology and Design

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.

Requisites: Requires prerequisite course of ATLS 2000 or HUEN 2020 or ENES 2020 (minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.

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: APRD 3523 and EBIO 3523

Grading Basis: Letter Grade

ATLS 3529 (1-3) Special Topics in Critical Perspectives in Technology

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.

Requisites: Requires prerequisite course of ATLS 2000 (minimum grade C-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

ATLS 3539 (1-3) Special Topics in Creative Technology and Design

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 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 (minimum grade C). Restricted to Technology, Arts and Media (TMEN) majors only.

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-). Restricted to Creative Technology and Design (TMEN) majors and (MTAM) minors.

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 prerequisite ATLS 2000 (minimum grade C). Restricted to TMEN or MTAM students.

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 3000 or ATLS 1300 or CSCI 1300 or CSCI 1320 (minimum grade C-). Restricted to Technology, Arts and Media (TMEN) majors, MTAM minors or the ATLAS (PATL) student group only.

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 (both minimum grade C). Restricted to TMEN 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). Restricted to MTAM or TMEN students.

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 ATLS 2000 (minimum 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 Technology, Arts and Media (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.

Additional Information: Arts Sci Gen Ed: Distribution-Arts Humanities

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

Requisites: Requires prerequisite course of ATLS 2270 or CSCI 2270 or CSCI 2275 (minimum grade C-). Restricted to TMEN, MTAM, CSEN, CSCI, and ATLAS (PATL) student group only.

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

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

Recommended: Prerequisite ATLS 2000.

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 4519 (1-4) Advanced Special Topics in Creative Technology & Design

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.

Requisites: Requires prerequisite course of ATLS 2000 (minimum grade C-). Restricted to Technology, Arts and Media (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.

ATLS 4529 (1-3) Advanced Special Topics: Critical Perspectives in Technology

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.

Requisites: Requires prerequisite course of ATLS 2000 (minimum grade C-). Restricted to Technology, Arts and Media (TMEN) majors and (MTAM) minors, or the ATLAS (PATL) student group only.

Grading Basis: Letter Grade

ATLS 4539 (1-4) Advanced Special Topics in Creative Technology and Design

Analyzes special interest areas of multidisciplinary creative technology and design research and practice.

Repeatable: Repeatable for up to 18.00 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

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 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

Requisites: Restricted to Technology, Arts and Media (TMEN) majors, MTAM minors, or the ATLAS (PATL) student group only.

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-).