**Technical Electives for CM/CEM Students**

**Note:** *No more than 1 level 1000-2999 course may be used as a technical elective*

**Anthropology (ANTH)**

**ANTH 3000 -  Globalization, Migration and Transnationalism**

Examines the cultural dynamics of globalization, including: the development of special economic zones in the global south, rural to urban migration, transnational migration, the maintenance of transnational ties, and cross-border social formations. Reviews the dynamics of globalization through case studies and film. Term offered: spring. Max hours: 3 Credits.

**ANTH 3200 -  Human Migration: Nomads, Sojourners, and Settlers**

Explores the relationship between human migration, voluntary and forced and social organization and culture in the modern world. Case studies include pastoralists, foragers, refugees, immigrants, sojourners and settlers and their impact on health, culture, identity, ethnicity, tradition and nationality. Cross-listed with [PBHL 3200](https://catalog.ucdenver.edu/search/?P=PBHL%203200). Max hours: 3 Credits.

**ANTH 3316 -  History of Human Environmental Impacts**

Humans exist as active members of an ecosystem. There is increasing awareness that human actions have changed the environment and continue to do so. While ecologists, climatologists, and engineers work to address current and future environmental problems, the discipline of archaeology can provide a time depth and crosscultural breadth of perspective on how such issues have impacted human societies. This course will investigate and critically assess the claim that environmental and ecological factors have played a key role in the dissolution of once thriving civilizations. Examples will be drawn from across time and space, specifically emphasizing the archaeological record and the perspective it provides on a problem that is of critical relevance today. In this course students will: 1) Learn how humans have engaged with their environments over the course of our species' evolutionary history; 2) Critically assess contemporary discussions of collapse and ecocide by contextualizing human environment interactions within the frameworks of resilience, niche construction, and ecosystem engineering; 3) Use 'lessons from the past' to inform contemporary ecological debates; 4) Objectively evaluate the factual basis of various claims made about how humans affect, have affected, and likely will affect their environments; 5) Actively engage with the community to build sustainable gardens. Max hours: 3 Credits.

**ANTH 3320 -  Southwestern Archaeology**

Considers the origins, characteristics, and interrelationships of the major culture areas in the American southwest, including the Anasazi, Hohokam, Mogollon, Sinagua and Northern Mexico. Note: [ANTH 1302](https://catalog.ucdenver.edu/search/?P=ANTH%201302) recommended but not required. Max hours: 3 Credits.

**ANTH 4320 -  Archaeology of Mexico and Central America**

Surveys the major prehistoric and protohistoric cultures and societies of that area of Mexico and Central America identified with the evolution of Meso-American civilization. Major topics include early human colonization of the Americas, the domestication of plants and animals, the emergence of regionally-based cultures and societies, trade and exchange and the evolution of urbanism and the state. Primary emphasis on such ancient cultures and societies as those of the Olmec, Zapotec, Maya, Teotihuacan, Toltec and Aztec. Prereq: Junior standing or higher. Cross-listed with [ANTH 5320](https://catalog.ucdenver.edu/search/?P=ANTH%205320). Max hours: 3 Credits.

**ANTH 4570 -  Landscape Archaeology**

Introduces spatial archaeology through intrasite analysis and regional studies. Methods treated include site location and quantitative spatial organization. Theoretical topics include definitions of community, ancient urbanism and the impact of subsistence and politics on relations to the landscape. Prereq: Junior standing or higher. Cross-listed with [ANTH 5570](https://catalog.ucdenver.edu/search/?P=ANTH%205570). Max hours: 3 Credits.

**Architecture (ARCH)**

**ARCH 1110 - Introduction to Architecture**

Introduces students to the essential ways of looking at and thinking about buildings, sites and cities, exposing students to the various perspectives, positions and practices that they will encounter in both an architecture curriculum and in architectural practice. Max hours: 3 Credits.

**ARCH 1711 -  Architectural Visualization I**

First in the sequence of two visual studies courses, this course introduces students to the fundamental principles of two and three-dimensional visual analysis and communication. Students are taught basic drawing and model-making conventions, both mechanical and digital, and how to use drawings and models as design and communication tools. No co-credit with ARCH 2110. Max hours: 3 Credits.

**ARCH 2230 -  Architectural History I**

Introduces architecture and urbanism from prehistory to the mid-seventeenth century by exploring the social, cultural, technical, philosophical and aesthetic ideas that shaped buildings and other architectural and urban settings in different parts of the world. Max hours: 3 Credits.

**ARCH 3130 -  Construction Practices: Material and Structural Systems**

Provides an overview of the materials, systems, assemblies and processes that inform the design and construction of buildings, reviewing the building technologies and developing student understandings of the interrelationship between the interconnected elements and systems that define buildings and spaces. Max hours: 3 Credits.

**ARCH 3230 -  Architectural History II**

Introduces architecture and urbanism from the mid-seventeenth century to the present, exploring the forces that shaped buildings and other architectural and urban settings in different parts of the world. Prereq: [ARCH 2230](https://catalog.ucdenver.edu/search/?P=ARCH%202230) with a C- or higher. Restriction: Open to all undergraduate majors. Max hours: 3 Credits.

**ARCH 3340 -  Theory of Structures I  \*CEM ONLY\***

Introduction to the analysis and design of structural elements and focuses on the principles of statics and the strength of materials. Topics include stress determination, deflection and the behaviors of tension, compression and shear in various structural elements. Prereq: [MATH 1130](https://catalog.ucdenver.edu/search/?P=MATH%201130) OR [MATH 1110](https://catalog.ucdenver.edu/search/?P=MATH%201110) & 1120; [PHYS 2010](https://catalog.ucdenver.edu/search/?P=PHYS%202010)/2030 OR [PHYS 2311](https://catalog.ucdenver.edu/search/?P=PHYS%202311)/2321. Restriction: Restricted to undergrad students in B.S. Architecture, B.S. Construction Management, and B.S. Construction Engineering Management. Max hours: 3 Credits.

**ARCH 3430 -  Construction Practices: Building Envelope  \*CEM ONLY\***

Discusses the principles and processes of building construction and introduces the major systems and assemblies that inform construction practices. Stresses the relationship between architectural concepts and emerging building technologies, teaching students how to select appropriate materials, systems and assemblies. Max hours: 3 Credits.

**ARCH 3692 -  International: Project Delivery**

This course is the delivery of the design solution developed in [ARCH 3703](https://catalog.ucdenver.edu/search/?P=ARCH%203703). Critical thinking skills will be honed as students respond to construction material and technology limitations during the 10 day build in a South American cultural setting. Prereq [ARCH 3703](https://catalog.ucdenver.edu/search/?P=ARCH%203703). Restriction: Restricted to undergraduates with a Junior standing or higher. Max hours: 3 Credits.

Prereq [ARCH 3703](https://catalog.ucdenver.edu/search/?P=ARCH%203703). Restricted to undergraduates with a Junior standing or higher.

**ARCH 4220 -  A History of Theoretical Discourse on Architecture**

This course traces the history of theoretical discourse on architecture from the Renaissance to the present. It explore the genealogy of current theoretical stances and critical methodologies in the discipline of Architecture through the close reading of a select group of historic and contemporary texts. Prereq: [ARCH 3230](https://catalog.ucdenver.edu/search/?P=ARCH%203230). Cross-listed with [ARCH 6220](https://catalog.ucdenver.edu/search/?P=ARCH%206220). Max hours: 3 Credits.

Prereq: [ARCH 3230](https://catalog.ucdenver.edu/search/?P=ARCH%203230).

**ARCH 4610 -  A History of American Architecture**

This course investigates the history of architecture in the United States as a chronological survey of buildings, architects, landscapes, and urban forms and as an exploration of the social, political, economic, technological, and similar issues that inform this built environment. Prereq: [ARCH 2230](https://catalog.ucdenver.edu/search/?P=ARCH%202230) and [3230](https://catalog.ucdenver.edu/search/?P=ARCH%203230). Cross-listed with [ARCH 6210](https://catalog.ucdenver.edu/search/?P=ARCH%206210). Max hours: 3 Credits.

**ARCH 4612 -  A History of Modern Architecture**

This course traces the various theoretical and formal developments in European and American Architecture from the end of the 19th century through the 20th century. The works of a select group of architects will be examined and discussed in relation to the diverse body of goals and objectives, ideas and ideals that constituted the Modern movements in architecture. Prereq: [ARCH 2230](https://catalog.ucdenver.edu/search/?P=ARCH%202230). Restriction: Restricted to Sophomore standing or higher. Cross-listed with [ARCH 6212](https://catalog.ucdenver.edu/search/?P=ARCH%206212). Max hours: 3 Credits.

**Communication (COMM)**

**COMM 2045 -  Workplace Communication**

Focuses on theories and practices of leadership, teambuilding, relationship development and other workplace communication skills. The goal of the course is to help students develop advanced communication strategies for managing workplace challenges. Term offered: fall, spring, summer. Max hours: 3 Credits.

**COMM 2050 -  Business and Professional Speaking**

Development of communication skills often used in business and professional settings, with an emphasis on various kinds of presentations. Term offered: fall, spring, summer. Max hours: 3 Credits.

**COMM 2082 -  Introduction to Environmental Communication**

Intro to Environmental Communication provides students with the foundations for analyzing public debates about environmental sustainability, global warming, economic development, corporate responsibility, and activist movements. Emphasis is placed on representations of these issues in TV, films, music, blogs, and public deliberation. Term offered: fall, spring. Max hours: 3 Credits.

**COMM 4082 -  Wilderness Communication**

The primary goal of this course is to engage issues of wilderness, communication, and environmental sustainability. Students will read philosophical, theoretical, and academic literature on human symbolic constructions of wilderness. Cross-listed with COMM 5082. Term offered: summer, fall. Max hours: 3 Credits.

**COMM 4111 -  Theories of Leadership**

Examines research and applications related to the major theories of leadership. Emphasizes a critical reading of research confirming or denying various theories, and stresses the historical development of theories of leadership behavior and characteristics. Cross-listed with COMM 5111. Max hours: 3 Credits.

**COMM 4240 -  Organizational Communication**

Addresses the relationships among such communication factors as flow, media, channel, diversity, information delivery and organization functioning, morale, and productivity. Stresses functional workplace skills and practices. Cross-listed with [COMM 5240](https://catalog.ucdenver.edu/search/?P=COMM%205240). Term offered: fall, spring. Restriction: Restricted to students with junior standing or higher or permission from the instructor. Max Hours: 3 Credits.

**COMM 4245 -  Advanced Organizational Communication**

Explores critical theoretical perspectives on communication in complex organizations, including issues and standpoints that have not been included in mainstream theory and research. Analyzes assumptions and pragmatic solutions associated with these theories. Cross-listed with COMM 5245. Max hours: 3 Credits.

**COMM 4255 -  Negotiations and Bargaining**

Designed to allow students to study theories and apply concepts that explain the influences of various forms of mediating, reducing, and/or resolving conflict among individuals, groups, organizations, nations and cultures. Cross-listed with [COMM 5255](https://catalog.ucdenver.edu/search/?P=COMM%205255). Term offered: summer. Restriction: Restricted to students with junior standing or higher or permission from the instructor. Max Hours: 3 Credits.

**COMM 4260 -  Communication and Conflict**

Studies the influence of communication on intrapersonal, interpersonal, intragroup and intergroup conflict situations. Cross-listed with [COMM 5260](https://catalog.ucdenver.edu/search/?P=COMM%205260). Term offered: fall, spring, summer. Restriction: Restricted to students with junior standing or higher or permission from the instructor. Max Hours: 3 Credits.

**COMM 4262 -  Mediation**

Explores theoretical and practical aspects of mediation in a variety of contexts ranging from divorce mediation to labor-management disputes. Cross-listed with COMM 5262. Term offered: fall, spring, summer. Restriction: Restricted to students with junior standing or higher or permission from the instructor. Max Hours: 3 Credits.

**COMM 4282 -  Environmental Communication**

Studies the communication processes involved in policies and practices affecting natural and human environments. Cross-listed with [COMM 5282](https://catalog.ucdenver.edu/search/?P=COMM%205282). Term offered: spring. Prereq: [COMM 2082](https://catalog.ucdenver.edu/search/?P=COMM%202082) with a C- or higher permission from the instructor. Max hours: 3 Credits.

**Engineering (ENGR)**

**ENGR 1111 -  Psychological and Social Implications of Technology**

This course will explore the impact of technology and its advances on human beings from an emotional, psychological, and social perspective. Discussions will include ethical, moral, and multicultural implications of technological advances from a global perspective and will require students to critically analyze issues that arise from such advances. Max Hours: 3 Credits.

**ENGR 1130 -  Chemistry for Engineers  (5 Credits)  \*CM STUDENTS ONLY\***

An introductory lecture and recitation course designed to meet the general chemistry requirement for engineering students. Topics include atoms, molecules, moles, stoichiometry, chemical bonding, atomic & molecular structures, thermodynamics and kinetics. The course will highlight the application of chemistry to engineering disciplines. Note: Suggested background of one year of high school chemistry or [CHEM 1000](https://catalog.ucdenver.edu/search/?P=CHEM%201000) and [MATH 1110](https://catalog.ucdenver.edu/search/?P=MATH%201110) (or high school equivalent) strongly recommended. Max Hours: 5 Credits.

**ENGR 3400 -  Technology and Culture**

Explores the cultural and political foundations of technology and the impact of technology upon the individual and society. Contributions to technological advances and the impact of technology on women and diverse ethnic groups are examined in the context of specific engineering designs and case studies. Prereq: One course in social sciences, one course in humanities, one course in science. (Satisfies the multicultural diversity requirement of the UCDHSC core curriculum). Max Hours: 3 Credits.

**ENGR 3600 -  International Dimensions of Technology and Culture**

This course provides students with an understanding of how science, technology and international issues interrelate in a world that has become more interconnected and interdependent. The course will focus on the technical, organizational and cultural aspects of information and other technologies with an emphasis on their impact on third world countries. Prereq: One course in social sciences, one course in humanities, one course in science. (Satisfies the international perspectives requirement of the UCDHSC core curriculum). Max Hours: 3 Credits.

**ENGR 3995 -  Global Technology, Business & Culture**

Repeatable. Max Hours: 9 Credits.

**ENGR 4800 -  Science Engineering and Culture for Undergraduates**

Course for undergraduate international and limited English proficient (LEP) students to improve success in science and engineering degree programs through senior research paper writing , advanced STEM English skills and cross cultural training. Repeatable. Max Hours: 6 Credits.

**Environmental Sciences (ENVS)**

**ENVS 1044 -  Introduction to Environmental Sciences**

This survey course develops a basic understanding of ecological relationships and environmental systems. Issues such as the effects of human activities on earth's environment, extinction or diversity, greenhouse effect, hazardous or toxic wastes and human population growth are discussed. Students must also take the accompanying laboratory [ENVS 1045](https://catalog.ucdenver.edu/search/?P=ENVS%201045). No co-credit with ENVS 1042. Prereq or Coreq: [ENVS 1045](https://catalog.ucdenver.edu/search/?P=ENVS%201045). Term offered: fall, spring, summer. Max hours: 3 Credits.

**ENVS 1045 -  Introduction to Environmental Sciences Laboratory**

Introduces the basic scientific approach through investigations, observations, and experiments in environmental science. Students must also take the accompanying lecture [ENVS 1044](https://catalog.ucdenver.edu/search/?P=ENVS%201044). No co-credit with ENVS 1042. Prereq or Coreq: [ENVS 1044](https://catalog.ucdenver.edu/search/?P=ENVS%201044). Max hours: 1 Credit.

**ENVS 1342 -  Environment, Society and Sustainability**

Overview of perspectives on environmental issues within the context of sustainable development and taking a systems approach. The focus is on social science approaches to explore the human footprint on the earth, environmentalism, scientific uncertainty, policy creation and social change. Note: This course is a prerequisite for [GEOG 4680](https://catalog.ucdenver.edu/search/?P=GEOG%204680) Urban Sustainability: Perspectives and Practice. Term offered: fall, spring. Max hours: 3 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-SS2.

**ENVS 3082 -  Energy and the Environment**

For students of various backgrounds who wish to increase their understanding of the environmental and technical issues of supplying the energy demands of our society. Alternative energy sources and conservation are explored as solutions to promote a sustainable society. Note: One college-level science course and [MATH 1110](https://catalog.ucdenver.edu/search/?P=MATH%201110) or equivalent are strongly recommended as preparation for optimal student success. Cross-listed with [PHYS 3082](https://catalog.ucdenver.edu/search/?P=PHYS%203082). Term offered: fall. Max hours: 3 Credits.

**ENVS 3232 -  Weather and Climate**

Introduces the processes and systems that govern both day-to-day weather and longer-term climate variations. Covers instrumentation and weather forecasting techniques. Prereq: [GEOG 1202](https://catalog.ucdenver.edu/search/?P=GEOG%201202) or [ENVS 1044](https://catalog.ucdenver.edu/search/?P=ENVS%201044) and [ENVS 1045](https://catalog.ucdenver.edu/search/?P=ENVS%201045). Note: The deactivated ENVS 1042 can also apply as a prereq to this course. Cross-listed with [GEOG 3232](https://catalog.ucdenver.edu/search/?P=GEOG%203232). Term offered: fall, spring, summer. Max hours: 3 Credits.

**ENVS 4380 -  Anthropocene Futures**

We are living in the “Anthropocene”—an era of rapid environmental and societal changes, and of decline and loss resulting from accelerating human interactions with Earth systems. Warming climates, wildfires, floods, water and food insecurity, novel ecosystems, and even pandemics such as COVID-19, are phenomena of the Anthropocene. With a still growing human population and a finite planet, understanding and overcoming such challenges is more pressing than ever, if people are to co-evolve with Earth toward a sustainable future. This interdisciplinary seminar course tells the scientific story of humanityʼs intensifying interactions with the planet and explores possible future paths. Through presentations, readings and discussion, students will examine topics that include the origin and significance of Anthropocene in Earthʼs evolutionary history, the debates and evidences for a new geologic epoch, large-scale trajectories of environmental change, a safe operating space, and planting seeds for a “good” Anthropocene. In doing so, students will acquire skills and experiences in critical thinking and analytical reasoning to grapple with many uncertainties and tensions of the Anthropocene. Cross-listed with [GEOG 4380](https://catalog.ucdenver.edu/search/?P=GEOG%204380), [GEOG 5380](https://catalog.ucdenver.edu/search/?P=GEOG%205380), and [ENVS 5380](https://catalog.ucdenver.edu/search/?P=ENVS%205380). Max hours: 3 Credits.

**ENVS 4720 -  Climate Change: Causes, Impacts and Solutions**

Examines science behind past, present & future climate change & environmental, social & political implications & solutions. Explores recent scientific research, syntheses & mainstream literature advancing knowledge about causes & consequences of natural & anthropogenic climate change. Prereq: [GEOG 3232](https://catalog.ucdenver.edu/search/?P=GEOG%203232). Cross-listed with [GEOG 4720](https://catalog.ucdenver.edu/search/?P=GEOG%204720)/ [GEOG 5720](https://catalog.ucdenver.edu/search/?P=GEOG%205720)/ [ENVS 5720](https://catalog.ucdenver.edu/search/?P=ENVS%205720). Max hours: 3 Credits.

**ENVS 4740 -  Soil Science and Geography**

Reviews chemical and physical properties of soils, soil development, and geographic distributions of soil types in the context of the role that soils play in natural and human-altered ecosystems. Cross-listed with [GEOG 4740](https://catalog.ucdenver.edu/search/?P=GEOG%204740), [GEOG 5740](https://catalog.ucdenver.edu/search/?P=GEOG%205740), [ENVS 5740](https://catalog.ucdenver.edu/search/?P=ENVS%205740). Max hours: 3 Credits.

**ENVS 4780 -  Aquatic Ecology**

This course explores the physical, chemical, and biological (including human) properties of aquatic ecosystems, and how the interrelationships between these properties define and influence advanced ecological processes. Special focus is given to lakes, reservoirs, wetlands, streams, rivers, and groundwater. Learning is facilitated through lectures, discussions, student presentations, laboratory and data exercises, and periodic (often virtual) field excursions. Prereq: [BIOL 2010](https://catalog.ucdenver.edu/search/?P=BIOL%202010) (2061) or [BIOL 2030](https://catalog.ucdenver.edu/search/?P=BIOL%202030) (2097) with a C- or higher. Cross-listed with [ENVS 5780](https://catalog.ucdenver.edu/search/?P=ENVS%205780), [BIOL 4780](https://catalog.ucdenver.edu/search/?P=BIOL%204780), and [BIOL 5780](https://catalog.ucdenver.edu/search/?P=BIOL%205780). Max hours: 3 Credits.

**inWorks Innovation Initiative (IWKS)**

**IWKS 2100 -  Human-Centered Design, Innovation and Prototyping**

Introduces collaborative interdisciplinary design and innovation from a human perspective. Using the wide array of Inworks prototyping facilities, teams of students will design and implement human-oriented projects of increasing scale and complexity, in the process acquiring essential innovation and problem-solving skills. Cross-listed with [ARCH 3705](https://catalog.ucdenver.edu/search/?P=ARCH%203705). Prereq: none. Participants of all backgrounds are encouraged to register; no previous design or prototyping experience is required. Max hours: 3 Credits.

**IWKS 3100 -  3D Design, Computation and Prototyping**

Introduces the design and computer-controlled fabrication of three-dimensional objects using both additive (3D printing) and subtractive (laser cutter, CNC router/mill) processes. Increasingly complex projects throughout the semester using various CAD/CAM software tools will explore design strategies for digital fabrication. Prerequisites: None; no previous design or prototyping experience is expected or required. Cross-listed with [IWKS 5170](https://catalog.ucdenver.edu/search/?P=IWKS%205170) and [ARCH 3706](https://catalog.ucdenver.edu/search/?P=ARCH%203706). Max hours: 3 Credits.

**IWKS 3180 -  Inworks: Choose Your Own Adventure: Experiences in Design, Innovation and** Prototyping

Provides weekly speakers, workshops and other experiences that educate and enrich across the design, innovation and prototyping landscape. Students may choose to participate in any five (for one credit), ten (for two credits) or fifteen (for three credits) activities. Each week, participating students will attend the scheduled activity, and then create a meaningful response that reflects the impact of that activity on their thinking or practice. Prerequisites: None. Repeatable. Max hours: 12 Credits.

**IWKS 3300 -  NAND to Tetris: Foundations of Computer Systems**

Introduces the principles of computer systems that underlie the global information age. Starting from first principles, students gradually construct a simple hardware platform and a modern software hierarchy, yielding a working basic yet powerful computer system. Only introductory programming experience is required. Suggested Background: [IWKS 2300](https://catalog.ucdenver.edu/search/?P=IWKS%202300) or similar computing experience. Cross-listed with [CSCI 2940](https://catalog.ucdenver.edu/search/?P=CSCI%202940). Max hours: 3 Credits.

**IWKS 3400 -  Game Design and Development I**

Introduces principles of computer game development, building on the rich interplay of computer science, graphics design, physics, music, and narrative. Students develop interactive 2D and 3D games and a final project. Substantial software development involved, but requires only introductory programming experience. Suggested Background: [IWKS 2300](https://catalog.ucdenver.edu/search/?P=IWKS%202300) or similar computing experience. Cross-listed with [CSCI 2941](https://catalog.ucdenver.edu/search/?P=CSCI%202941). Max hours: 3 Credits.

**IWKS 3600 -  Innovating for the Developing World**

Explores the design and development of products and services that can be sustainably and gainfully used by the world’s poorest citizens. Students in interdisciplinary teams will design, implement and evaluate viable solutions to a real problem faced by people in the developing world. The goal is to develop an understanding of the extraordinary challenges faced by individuals for whom basic survival is not a given, and the knowledge and skills necessary to create designs that respond appropriately to those unique circumstances. Provides a foundation for further study and practice in the area of technology and development. Suggested Background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100). Max hours: 3 Credits.

**IWKS 4100 -  Advanced Human-Centered Design and Prototyping**

Explores user-centered design paradigm from a broad perspective, emphasizing how user research and prototype assessment can be integrated into different phases of the design process. Teams of students develop expertise in the design, development, and critique of solutions to important human problems. Suggested background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100) & 3100. Max hours: 3 Credits.

**IWKS 4120 -  IoT: The Internet of Things**

In a world where everything is connected to everything else, how does that work? This course introduces techniques for (1) designing systems that can sense the environment and respond to humans in meaningful ways and (2) creating networks of physical objects that collect and exchange data. Such systems might include wearable sensors, interactive art, and Internet-connected home devices. Working individually and in teams, students will develop projects using Inworks’ materials, devices, and fabrication tools. The course involves considerable prototyping and software development but requires only introductory programming and prototyping experience. Suggested Background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100) & 2300. Cross-listed with [CSCI 2942](https://catalog.ucdenver.edu/search/?P=CSCI%202942). Max hours: 3 Credits.

**IWKS 4450 -  Game Design and Development II**

Continuation of [IWKS 3400](https://catalog.ucdenver.edu/search/?P=IWKS%203400), with increased emphasis on more advanced techniques including 3D rendering; lighting simulation; vertex, pixel and geometry shaders; shadows; terrain building; bump, parallax, and parallax occlusion mapping; shading; ray tracing; bloom; and high dynamic range lighting. Suggested Background: [IWKS 3400](https://catalog.ucdenver.edu/search/?P=IWKS%203400). Max hours: 3 Credits.

**IWKS 4500 -  Bio-Design and Innovation**

Introduces the biodesign innovation process, which involves identifying important human needs and inventing meaningful solutions to address them. The course examines how biotechnology and bio-inspired innovation improve the form and function of our design world through innovative materials and novel approaches to developing buildings, food, medicine, infrastructure and more. Readings and in-class debates will raise critical issues in contemporary bioethics. For their final projects, students will choose to create and prototype a speculative biodesign concept, or work in the bio lab on the development of a real-world biodesign solution of their choosing. Suggested Background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100) & 3100. Max hours: 3 Credits.

**IWKS 4520 -  Design for Healthful Human Longevity**

Introduces contemporary studies, therapies, theories, and research on aging, age related disease, and innovations for longer healthier human lives. Guest lecturers, seminar discussions, readings and discussions will inform student projects that address challenges to prolonged, healthy, disease-free lives. Suggested Background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100) and [3700](https://catalog.ucdenver.edu/search/?P=IWKS%203700). Max hours: 3 Credits.

**IWKS 4650 -  Innovating for the Developing World**

Explores the design of products and services that can be sustainably used by the world’s poorest citizens. Students design, implement and evaluate solutions to real problems in the developing world. Provides a foundation for further study and practice. Suggested Background: IWKS 3500 & 3600. Max hours: 3 Credits.

**IWKS 4680 -  Case Studies in Design**

Explores why some projects succeed and others fail. Many human-centered interventions fail to meet their designers’ objectives, reflecting the unique challenges associated with matching human need with feasibility. Explores how innovators can increase their chances for success by examining several successful (and unsuccessful) designs. Suggested Background: [IWKS 2100](https://catalog.ucdenver.edu/search/?P=IWKS%202100) & 3700. Max hours: 3 Credits.

**Landscape Architecture (LDAR)**

**LDAR 1015 -  Engaging Landscapes for Wicked Change**

This course will offer students the tools and perspectives to understand how landscapes impact them and others, analyze and describe the forces that inform landscape form, and propose changes to landscapes that will address the wicked problems of our time. Max Hours: 3 Credits.

**LDAR 3601 -  Intro to Landscape Arch: Engaging Designed Landscape**

This course is an overview of the historical development, social context and contemporary practice of landscape architecture, which has existed as a profession for over 120 years and has been practiced in one form or another for millennia. Restriction: Restricted to undergrads with sophomore standing or higher. Max hours: 3 Credits.

**LDAR 4421 -  History of Landscape Architecture**

Intro survey course fosters workable understanding of landscape architecture design history and theory and offers a base for understanding trends and ideas influencing contemporary practice. Emphasizes Western Europe and the United States from antiquity to early twentieth century. Prereq: Sophomore standing or higher. Cross-listed with [LDAR 5521](https://catalog.ucdenver.edu/search/?P=LDAR%205521). Max hours: 3 Credits.

**LDAR 4430 -  Site, Society and Environment**

Sites are defined by relationships within environmental and social settings. Therefore site design should be primarily ethical and secondarily technical. This course examines the implications of this idea through site methodologies, conceptual construction of site, site analysis and site typologies. Restriction: Restricted to students with sophomore standing or higher. Cross-listed with [LDAR 6630](https://catalog.ucdenver.edu/search/?P=LDAR%206630). Max hours: 3 Credits.

**LDAR 4432 -  Landform Manipulation**

Focuses on the fundamental technical aspects of landscape architectural design and site engineering of related topography, grading, drainage design, landform manipulation, earthwork calculations, and road alignment. Restriction: Restricted to undergraduate students in the College of Architecture and Planning or instructor permission. Cross-listed with [LDAR 5532](https://catalog.ucdenver.edu/search/?P=LDAR%205532). Max hours: 3 Credits.

**LDAR 4435 -  Community Engaged Design Practice**

Obtain real-world pre-design and conceptual design experience in complex urban environments focusing on evolving trends in sustainability. Using digital trans-disciplinary learning students will develop comprehensive sustainable strategies that draw from their own sustainable philosophy developed during this class. Cross-listed with [LDAR 6635](https://catalog.ucdenver.edu/search/?P=LDAR%206635) and [ARCH 6257](https://catalog.ucdenver.edu/search/?P=ARCH%206257). Restriction: Restricted to undergrads with sophomore standing or higher. Max hours: 3 Credits.

**LDAR 4436 -  Urban and Local Food Systems**

In this seminar, we will examine the connections between landscape architecture and food production in cities as well as the role that food production plays in rural landscapes. The course material may be historical, theoretical, or oriented toward contemporary research. Cross-listed with [LDAR 6636](https://catalog.ucdenver.edu/search/?P=LDAR%206636). Restriction: Restricted to undergrads with sophomore standing or higher. Max hours: 3 Credits

**LDAR 4470 -  Plants in Design**

Explores the challenges, opportunities and responsibilities of designing with living, growing, and ever-changing organisms. Students learn to identify plants that are commonly used in the Colorado region and the principles, theories, methods, and techniques for planting design. Restriction: Restricted to undergraduate students at a junior standing or higher. Cross-listed with [LDAR 6670](https://catalog.ucdenver.edu/search/?P=LDAR%206670). Max hours: 3 Credits.

**LDAR 4472 -  Ecology for Landscape Architects**

Course emphasizes continuity and change in an ecology of the natural and man-made landscape. Focuses on biological, geophysical, cultural, and perceptual factors involved in landscape, spatial organization, and urban and regional structure. Introduces field ecology for landscape architecture. Restriction: Restricted to undergraduate students in the College of Architecture and Planning, or instructor permission. Cross-listed with [LDAR 5572](https://catalog.ucdenver.edu/search/?P=LDAR%205572). Max hours: 3 Credits.

**Mathematics (MATH)**

**MATH 1376 -  Programming for Data Science**

The course introduces scientific computing using Python. Topics will include programming skills such as assignment, control statements, loops, and functions. Applications will focus on mathematical and data science topics. Prereq: [MATH 1109](https://catalog.ucdenver.edu/search/?P=MATH%201109) or [MATH 1110](https://catalog.ucdenver.edu/search/?P=MATH%201110) or [MATH 1120](https://catalog.ucdenver.edu/search/?P=MATH%201120) or [MATH 1130](https://catalog.ucdenver.edu/search/?P=MATH%201130) or [MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401) or [MATH 2830](https://catalog.ucdenver.edu/search/?P=MATH%202830) with a C- or higher OR entry into the MA30 or MA01 Student Group OR ALEKS PPL score 61-100. Max hours: 3 Credits.

**MATH 1401 -  Calculus I**  **\*CM STUDENTS ONLY\***

First course of a three-semester sequence ([MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401), [2411](https://catalog.ucdenver.edu/search/?P=MATH%202411), [2421](https://catalog.ucdenver.edu/search/?P=MATH%202421)) in calculus. Topics covered include limits, derivatives, applications of derivatives, and the definite integral. Note: No co-credit with [MATH 1080](https://catalog.ucdenver.edu/search/?P=MATH%201080). Prereq:[MATH 1109](https://catalog.ucdenver.edu/search/?P=MATH%201109) or [MATH 1070](https://catalog.ucdenver.edu/search/?P=MATH%201070) or [MATH 1110](https://catalog.ucdenver.edu/search/?P=MATH%201110) with a C- or higher and [MATH 1120](https://catalog.ucdenver.edu/search/?P=MATH%201120) with a C- or higher or [MATH 1130](https://catalog.ucdenver.edu/search/?P=MATH%201130) with a C- or higher or [MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401) with a C- or higher OR entry into the MA01 Student Group OR ALEKS PPL score 76-100. If you have any questions or concerns about this requisite, please notify MATH.Placement@ucdenver.edu. Max Hours: 4 Credits.

**MATH 2411 -  Calculus II  \*CM STUDENTS ONLY\***

The second of a three-semester sequence ([MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401), [2411](https://catalog.ucdenver.edu/search/?P=MATH%202411), [2421](https://catalog.ucdenver.edu/search/?P=MATH%202421)) in calculus. Topics covered include exponential, logarithmic, and trigonometric functions, techniques of integration, indeterminate forms, improper integrals and infinite series. Prereq: C- or better in [MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401). Note: Students with a grade of B- or better in [MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401) pass this course at a much higher rate. Term offered: fall, spring, summer. Max hours: 4 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-MA1.

**MATH 2421 -  Calculus III**

The third of a three-semester sequence in Calculus ([MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401), [2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) and [2421](https://catalog.ucdenver.edu/search/?P=MATH%202421)). Topics include vectors, vector-valued functions, partial differentiation, differentiation, multiple integration, and vector calculus. Prereq: C- or better in [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411). Note: Students with a grade of B- or better in [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) pass this course at a much higher rate. Term offered: fall, spring, summer. Max hours: 4 Credits. GT: Course is approved by the Colorado Dept of Higher Education for statewide guaranteed transfer, GT-MA1

**MATH 3000 -  Introduction to Abstract Mathematics**

Students learn to prove and critique proofs of theorems by studying elementary topics in abstract mathematics, including logic, sets, functions, equivalence relations and elementary combinatorics. Coreq: [MATH 2421](https://catalog.ucdenver.edu/search/?P=MATH%202421) or [MATH 3191](https://catalog.ucdenver.edu/search/?P=MATH%203191). Note: This course assumes that students have taken [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) or equivalent. Students who have a grade of B- or better in [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) pass at a much higher rate. Term offered: fall, spring, summer. Max hours: 3 Credits.

**MATH 3041 -  Fundamental Mathematics: Algebra, Probability and Data Analysis**

This course is particularly pertinent to prospective elementary teachers, involving algebra, probability and data analysis from a modern approach. Its primary emphasis is asking and answering questions intelligently about our world through the use of algebra, probability, and data analysis. Explorations focus on representing, analyzing, generalizing, formalizing, and communicating patterns and the chances of future events. Mathematics content will be presented in a problem solving and exploratory context, using appropriate instructional tools. This course will not satisfy the requirements for a major in Mathematics. Prereq: [MTED 3040](https://catalog.ucdenver.edu/search/?P=MTED%203040) with a C- or higher. Max hours: 3 Credits.

**MATH 3191 -  Applied Linear Algebra**

Linear algebra is the mathematics of vectors and matrices and is fundamental for the representation and manipulation of data. List of topics covered: Definition and use of vectors and matrices, Matrix algebra, Systems of linear equations, Reduced Row Echelon Form, Trace and determinant, Linear independence and span, Basis and dimension, Null space and range, Rank theorem, Vector spaces and linear transformations, Eigenvalues and Eigenvectors, Diagonalization, Inner products, Orthogonal projections, Gram-Schmidt algorithm, Diagonalization of symmetric matrices, Singular value decomposition. Applications such as computer graphics, machine learning, Markov chains, and data reduction are considered. Note: No co-credit with [MATH 3195](https://catalog.ucdenver.edu/search/?P=MATH%203195). Prereq: [MATH 1401](https://catalog.ucdenver.edu/search/?P=MATH%201401) with a C- or higher. Term offered: fall, spring, summer. Max hours: 3 Credits.

**MATH 3195 -  Linear Algebra and Differential Equations**

Presents the essential ideas and methods of linear algebra and differential equations, emphasizing the connections between and the applications of both subjects. The course is designed for students in the sciences and engineering. This course will not satisfy the requirements for a major in Mathematics. Note: No co-credit with [MATH 3200](https://catalog.ucdenver.edu/search/?P=MATH%203200) and [MATH 3191](https://catalog.ucdenver.edu/search/?P=MATH%203191). Prereq: [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) with a C- or higher. Term offered: fall, spring, summer. Max hours: 4 Credits.

**MATH 3200 -  Elementary Differential Equations**

First and second order differential equations, Laplace transforms, systems of equations, with an emphasis on modeling and applications. Note: No co-credit with [MATH 3195](https://catalog.ucdenver.edu/search/?P=MATH%203195). Prereq: [MATH 2411](https://catalog.ucdenver.edu/search/?P=MATH%202411) with a C- or higher. Coreq: [MATH 3191](https://catalog.ucdenver.edu/search/?P=MATH%203191). Term offered: fall, spring, summer. Max hours: 3 Credits.

**MATH 3810 -  Introduction to Probability**

Fundamentals of probability theory with connection to practical application through simulation. Topics include: Axioms of probability, conditional probability, independence, law of total probability, Bayes theorem, random variables, probability distributions, expected value and variance. Important distributions such as binomial, normal, exponential, and Poisson distributions. Joint and conditional distributions, conditional expectation and variance, functions of random variables. Laws of large numbers (weak and strong), Central Limit Theorem. An emphasis will be placed on using simulation to solve problems. Note: No co-credit with [MATH 3800](https://catalog.ucdenver.edu/search/?P=MATH%203800). Coreq: [MATH 2421](https://catalog.ucdenver.edu/search/?P=MATH%202421). Term offered: fall, spring. Max hours: 3 Credits.

**MATH 4820 -  Introduction to Mathematical Statistics**

Sampling distributions, maximum likelihood and method of moments estimation, properties of estimators, classical methods for confidence intervals and hypothesis testing, simple linear regression. Prereq: Grade of C- or better in [MATH 3800](https://catalog.ucdenver.edu/search/?P=MATH%203800) or MATH 4810 (preferred). Note: Students who have a grade of A in [MATH 3800](https://catalog.ucdenver.edu/search/?P=MATH%203800) or a B- or better in MATH 4810 pass this course at a much higher rate. Term offered: spring. Max hours: 3 Credits.

**MATH 4830 -  Applied Statistics**

Review of estimation, confidence intervals and hypothesis testing; Anova; categorical data analysis; non-parametric tests; linear and logistic regression. No co-credit with [MATH 4387](https://catalog.ucdenver.edu/search/?P=MATH%204387) or [5387](https://catalog.ucdenver.edu/search/?P=MATH%205387). This course will not satisfy the requirements for a major in Mathematics. Cross-listed with [MATH 5830](https://catalog.ucdenver.edu/search/?P=MATH%205830). Prereq: [MATH 2830](https://catalog.ucdenver.edu/search/?P=MATH%202830) with a C- or higher. Term offered: spring. Max hours: 3 Credits.

**Sustainability (SUST)**

**SUST 3010 -  Sustainability: Past, Present, and Future**

This course draws on theoretical perspectives to critically analyze contemporary environmental issues across ecological, sociocultural, historical, political and economic contexts. Term offered: fall, spring. Max hours: 3 Credits.

**SUST 3011 -  Toward a Sustainable Future**

This is the second of a two-course sequence that examines the interrelations among the historical, political, cultural, ecological, and economic aspects of contemporary environmental issues. SUST II provides students with theoretical perspectives on sustainability through a series of current, problem-oriented case studies. Note: this course assumes that students have completed 1 Natural Science Core course and 1 Social Science Core course. Max hours: 3 Credits.

**Public Administration (PUAD)**

**PUAD 2001 -  Management for Public Service**

Learn how managers in public sector organizations foster human capital and manage performance in a diverse, inclusive, and collaborative workforce. Examine strategic management techniques, human resource law and procedures. Explore the values of character and competence in creating effective organizations. Max hours: 3 Credits.

**PUAD 3001 -  Financial Management for Public Service**

Explore topics in public financial management including budget preparation, monitoring, and reporting. Learn how to build public service capacity through sound fiscal discipline and equitable allocation of resources for the public good. Max hours: 3 Credits.

**PUAD 3002 -  Program Design, Evaluation, and Decision-Making**

Effective public service program outcomes are systematically managed, monitored, and evaluated. Learn the analytical, critical thinking, and problem-solving skills required for program design, implementation, evaluation, and evidence based decision-making. Max hours: 3 Credits.

**PUAD 3005 -  Collaboration Across Sectors**

Organizations across sectors respond to complex problems with innovative and flexible responses through networks. Managing within and across organizations is essential to effective performance in a networked system. Explore collaborative governance across sectors--nonprofit, for-profit, and public--with analyses and applications. Max hours: 3 Credits.

**PUAD 3500 -  Managing and Leading in Environmental Organizations**

Students will explore the intersections between management, science, regulations, policies, and sustainable programs, and issues associated with “being green.” Students will also consider the intersection of environmental laws with efforts by businesses, governments, NGOs, and other organizations to protect natural resources, build collaborations for effective environmental management, and the deep-seated value conflicts over the causes, or even the existence, of environmental problems and the appropriate solutions to address them. Max hours: 3 Credits.

**PUAD 3600 -  Managing and Leading in International Development**

Students will learn about the history of development paradigms and understand the relationships among development actors and how they address persistent global problems such as poverty, human trafficking, trade, education, health, and human rights, as examples. Students will understand the impact of colonialism and the finite resources available to address complex social issues in the developing world. Max hours: 3 Credits.

**PUAD 4001 -  Ethics in Public Service**

Understand ethics in public service, explore ethical concerns in public affairs, and confront ethical challenges in government and nonprofit organizations. Through theoretical and case study readings and applied projects, students analyze ethical issues and proposed responses. Max hours: 3 Credits.

**PUAD 4002 -  Leading for the Public Good**

Explore how service and regulation intersect and challenge public servants to balance management, politics, and law. Investigate cultural competency, social justice, and citizenship, and issues related to organizational development, leadership, motivation, change management, and teamwork. Max hours: 3 Credits.

**PUAD 4003 -  Effective Communication for Public Service**

Cultivate skills in making a well-reasoned argument, locating supporting evidence, speaking and writing persuasively, and effectively fostering partnerships across sectors and media. Address varied audiences with presentations that communicate diverse viewpoints in the public service context. Max hours: 3 Credits.

**PUAD 4004 -  Building Public and Financial Support for Nonprofit Organizations**

Examines methods, techniques, and directed experience in fundraising for nonprofit agencies. Explores relationships with umbrella organizations, government funding, grantsmanship, budget control, and accountability. Discusses social entrepreneurship and social innovation. Examines communications, marketing, and public relations intersection with resource development. Max hours: 3 Credits.

**PUAD 4006 -  Organizational Development**

Examine structures, life-cycles, and change dynamics of government and nonprofit organizations including organizational culture, the relationship between organizational structure and service provision, and organizational strategy and effectiveness. Learn diagnostic and assessment tools, methods, and processes for improving organizational performance. Max hours: 3 Credits.

**PUAD 4007 -  Nonprofit HR: Governance, Staff, Volunteer Management**

Current issues in human resource administration for employees of nonprofit organizations. Topics include such areas as recruitment, staff development, volunteer management, performance, evaluation, labor-management issues, and affirmative action. Max hours: 3 Credits.

**PUAD 4008 -  Current Issues in Public Sector Organizations**

Explore the impact on public sector organizations of emergent issues such as globalization, changing demographics of the citizenry and workforce, sustainability, declining budgets, and information technology. Examine ways public sector organizations adapt to these trends. Max hours: 3 Credits.

**PUAD 4009 -  Human Service Organizations**

Provides an overview of human services delivery in government and nonprofit organizations. Explore causes and conditions that give rise to the need for effective and equitable human service organizations. Learn essential skills including cultural competencies, boundaries, and collaboration. Max hours: 3 Credits.

**PUAD 4010 -  Public Service in Emergency Management and Homeland Security**

Introduces emergency management and homeland security including: management of hazards, emergencies, disasters, and the networks of government and nonprofit organizations providing services. Focuses on principles of emergency management and homeland security at state and local jurisdictional levels. Cross-listed with [PUAD 5650](https://catalog.ucdenver.edu/search/?P=PUAD%205650), [CRJU 4010](https://catalog.ucdenver.edu/search/?P=CRJU%204010), and [CRJU 5650](https://catalog.ucdenver.edu/search/?P=CRJU%205650). Max hours: 3 Credits.

**PUAD 4012 -  Principles of Emergency Management**

Introduces the discipline and practice of emergency management. Topics include administrative practice and processes by which public policy shapes governmental responses to hazards, emergencies, and disasters. Cross-listed with [PUAD 5655](https://catalog.ucdenver.edu/search/?P=PUAD%205655), [CRJU 4012](https://catalog.ucdenver.edu/search/?P=CRJU%204012) and [CRJU 5655](https://catalog.ucdenver.edu/search/?P=CRJU%205655). Max Hours: 3 Credits.

**PUAD 4020 -  Social Entrepreneurship**

Social entrepreneurship, practices, theories, and allied concepts. Using private, nonprofit, and government examples, explore innovation, creativity, profit for social welfare, and innovative management. Advance an organization’s social good mission, and increase effectiveness, accountability, and efficiency through market-based techniques. Max hours: 3 Credits.

**PUAD 4140 -  Nonprofit Financial Management**

Provides a grounding in financial management for the "non-accountant" by focusing on an array of knowledge and management skill areas necessary for allocating and controlling resources and for analyzing, reporting and protecting the fiscal health of the organization. Topics include key accounting principles, understanding and using financial statements, the budget development process, cash flow analysis, banking relationships, using the audit report, maximizing investment policy and strategy, and understanding the boundaries of tax exemption. Cross-listed with [PUAD 5140](https://catalog.ucdenver.edu/search/?P=PUAD%205140) and [CRJU 5140](https://catalog.ucdenver.edu/search/?P=CRJU%205140). Max hours: 3 Credits.

**PUAD 4145 -  Philanthropy**

Today, the organized field of philanthropy and its companion field, impact investing, are growing at a remarkable speed. This course will explore the origins of philanthropy and impact investing and provide students with an in-depth understanding of how philanthropy works today and the nuances that exist among different forms of philanthropy and investment: individual giving, foundations, corporate philanthropy, and impact investing. It will also explore new trends among individual and institutional investors and unpack the different approaches that funders are taking to influence how services are delivered and the striking efforts to affect systems changes. Cross-listed with [PUAD 5145](https://catalog.ucdenver.edu/search/?P=PUAD%205145). Max hours: 3 credits

**PUAD 4160 -  Nonprofit Boards and Executive Leadership**

The important roles and responsibilities of a voluntary board of directors and the process of governing are often misunderstood. This course explores the special powers of a nonprofit board of directors as framed by and responsive to public policy. From the perspective of organizational behavior and theory, the course examines the leadership role and interplay between board members and the executive director. The examination includes a comparative analysis of different governing models, and explores fundamental questions of board composition, the role of advisor boards, achieving effective board meetings, the realm of liability, using committees, and the board's role in fundraising, among other special subject matter. Cross-listed with [PUAD 5160](https://catalog.ucdenver.edu/search/?P=PUAD%205160). Max hours: 3 Credits.

**PUAD 4220 -  Human Resource Management**

Covers human resource functions in public and nonprofit agencies. Topics include job analysis, compensation, recruiting, selection, rewarding, training and development. Contemporary issues concerning civil service reforms are also presented. Cross-listed with [PUAD 5220](https://catalog.ucdenver.edu/search/?P=PUAD%205220). Max Hours: 3 Credits.

**PUAD 4325 -  Public Private Partnerships**

This course has been designed to introduce students to public private partnerships (PPPs) as a field of study and practice using Colorado as a laboratory for current practice, policy, strategy, management and finance. Students will engage current examples of PPPs as cases, learn and exchange in class presentations with guest lecturers currently leading PPPs and evaluate projects in class assignments doing research, analysis, and field interviews. Students will enhance their knowledge as well as skills commonly used in public, private, nonprofit and enterprise management and the public policy context and narrative of PPPs in international and U.S. practice. Cross-listed with [PUAD 5325](https://catalog.ucdenver.edu/search/?P=PUAD%205325). Max hours: 3 credits

**PUAD 4440 -  Negotiation and Conflict Resolution**

Focuses on concepts and skills necessary to negotiate policy and management decisions and manage internal and external conflicts. Designed to help students understand the dynamics that affect negotiations and to apply the principles and strategies of negotiation in a variety of decision making and dispute resolution contexts. Cross-listed with [PUAD 5440](https://catalog.ucdenver.edu/search/?P=PUAD%205440). Max hours: 3 Credits.

**PUAD 4630 -  Economic Development**

As governments search for new ways to be efficient, improve performance and leverage resources, they are also looking at their communities, states and regions in terms of competitiveness, international trade and globalization innovation, collaboration and partnerships. This course will look at practices where economic development includes these elements: the Colorado Innovation Network, the Colorado Office of Economic Development and International Trade, the Metro Denver and Denver South Economic Development Partnerships, Mile High Connects, the Downtown Denver Partnership, and public-private partnerships across multiple sectors in transportation, broadband, water and innovation. Students will develop an economic development strategy based on knowledge and tools learned in the course. Political and professional leadership will be part of the dialog. Cross-listed with [PUAD 5630](https://catalog.ucdenver.edu/search/?P=PUAD%205630). Max hours: 3 credits

**PUAD 4633 -  Economic Development**

As governments search for new ways to be efficient, improve performance and leverage resources, they are also looking at their communities, states and regions in terms of competitiveness, international trade and globalization innovation, collaboration and partnerships. This course will look at practices where economic development includes these elements: the Colorado Innovation Network, the Colorado Office of Economic Development and International Trade, the Metro Denver and Denver South Economic Development Partnerships, Mile High Connects, the Downtown Denver Partnership, and public-private partnerships across multiple sectors in transportation, broadband, water and innovation. Students will develop an economic development strategy based on knowledge and tools learned in the course. Political and professional leadership will be part of the dialog. Cross-listed with PUAD 5633. Max hours: 3 credits.

**PUAD 4638 -  Colorado Politics, Policy, and Administration**

This course focuses on the state-level policy-making process in Colorado, and how that process is affected by local, state, and federal politics, administration, and other policy-making constraints applicable to the state. Substantive topics covered will vary, but students will be exposed to a wide range of perspectives and experiences from practitioners and policy influencers engaged in state-level politics, policy-making, and administration. Cross-listed with [PUAD 5638](https://catalog.ucdenver.edu/search/?P=PUAD%205638). Max Hours: 3 Credits.

**PUAD 4740 -  Sustainable Energy Policy**

This course will cover the basic principles and operation of policy and regulation that impact the production and use of energy (with a focus on transportation and electricity generation) from all of the major sources currently available and used. We will analyze (and, through a sustainability lens, critically evaluate) energy from water (hydroelectric, hydrokinetic), coal, domestic and international petroleum, natural gas and nuclear reactors. A significant portion of the course will focus on electricity generation and associated policy, technologies and regulation. In the context of each energy source and use, we will review and discuss sustainability practices, policies, and, issues. Cross-listed with [PUAD 5740](https://catalog.ucdenver.edu/search/?P=PUAD%205740). Max hours: 3 credits

**Urban & Regional Planning (URPL)**

**URPL 3000 -  Planning the Built Environment**

Learn the multidisciplinary field of urban planning, focusing on how to plan and design sustainably at multiple scales: site, neighborhood, city, region. We use lecture, discussion, and applied learning techniques, including fieldwork, mapping, case studies, guest practitioners, and in-class workshops. Restriction: Restricted to undergrads with junior standing or higher, or by instructor consent. Max hours: 3 Credits.

**URPL 4000 -  Sustainable Urban Planning**

Covers the multidisciplinary practice of urban planning, focusing on concepts, policies, and tools to plan sustainably at multiple scales; site, neighborhood, city, and region, using lecture, discussion, and applied learning through field work, case studies, guest practitioners, and in-class workshops. Prereq: [ENGL 1020](https://catalog.ucdenver.edu/search/?P=ENGL%201020). Restriction: Restricted to students with junior standing or higher. Max hours: 3 Credits.