

URBAN DESIGN (GR) (MUD)

MUD 6XX: MUD Placeholder Course**Credits:** 0**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture**MUD 600: Modeling Urban Enviro Perf**

This course aims to introduce principles, methods and applications of urban environmental performance simulations, and develop computational design workflows to integrate urban data exploration and environmental performance. The techniques introduced in this course are applicable at both architectural and urban scales; at its core, this course is about drawing with data, measuring environmental performance, and visualization for decision-making. Specifically, the simulation for urban environmental performance will include building energy use intensity and affiliated carbon emissions, solar energy potential, daylight, outdoor thermal comfort, visibility, neighborhood walkability, and access to green spaces and public transportation. The tools for iterative analytical explorations of the design and performance outputs will be also introduced, to allow students to not only determine the schemes with the optimum performance satisfying individual parameters, but also to explore the nuances of balancing trade-offs.

Credits: 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture**MUD 601: MS: Sustainable & Smrt Cities**

This introductory urban design studio will introduce fundamental concepts and methods of urban design, and explore sustainable and smart cities through four different scales: infrastructure, mobility, public space, and building. With the support of the other two courses on urban technology ("Advanced GIS - Urban Spatial Analytics" and "Modeling Urban Environmental Performance"), students will be able to use a variety of advanced analytical and simulation tools to "intelligently" design future neighborhoods and cities that are vibrant, healthy, and resilient. Specifically, various social and environmental indicators will be assessed and designed, such as accessibility to public transportation, amenities and green spaces, walkability, views, street vitality, daylight hours, and renewable energy potential. The studio will focus on the development of major metropolitan areas, and involve travel to large American cities, such as New York, Chicago, Los Angeles, Houston, and Philadelphia. Students will also have opportunities to engage with local practitioners, researcher and policymakers.

Credits: 6**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Studio**MUD 602: Hist & Theory of Urban Design**

This course analyzes major movements and theoretical constructs that have dominated urban design and the making of cities from pre-industrial periods to contemporary cities and megacities. Focus upon societal and environmental aspects, political and economic systems, scientific and technological changes, philosophical and ideological positions form the backdrop to an examination of the city as artifact and to decoding the meanings embedded within the urban fabric.

Credits: 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Seminar**MUD 603: MS: Towards Carbon Zero Cities**

Against the background of climate change and rapid urbanization, this research-based design studio (6 credits) aims to propose a Zero-Carbon City that is a resilient, compact, and car-free community, fully powered by renewable energy. Mass timber structural systems at both the building and urban scales will also be explored, in order to transform the city from a source of CO₂ into a carbon sink. Zero-Carbon City also proposes a closer, healthier, and more sustainable relationship between the city, people and nature. Various computational design and simulation tools will be taught and applied in the studio.

Credits: 6**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Studio**MUD 604: Emerg Dsgn &Tech Future Cities****Credits:** 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Hybrid, Lecture, On-Line**MUD 605: Adaptive Reuse Studio****Credits:** 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Studio**MUD 606: Master's Research Studio**

This 6-credit research studio challenges students to integrate knowledge and skills acquired throughout the curriculum and can be undertaken only after successful completion of appropriate coursework. Students will explore the historic and contemporary intersections among urban design, sustainability and technology by developing a self-directed, faculty monitored independent study through this studio. Possible research topics include: sustainable and resilient cities, urban data analytics, computational urban design, healthy and equitable cities, and histories and theories of urban design.

Credits: 6**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Studio**MUD 615: AdvGIS:Urban Spatial Analytics**

This advanced GIS course will cover topics in geospatial technology as related to the allied design disciplines: landscape architecture, architecture, urban design, planning and geodesign. The course prepares students to apply GIS within practical design processes such as site preparation and analysis; modeling terrains and hydrologic processes; integration of sustainable design criteria; and modeling the built environment in 3D. While this course will cover a broad suite of tools within the Esri ArcGIS platform, it will place heavy emphasis on raster-based GIS processes. This course will also feature workshops and/or presentations by professionals who use geospatial technology in various design disciplines. Cross-listed with GEOD-615 and cross-leveled with LARC-515

Credits: 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture, On-Line

MUD 617: Adv GIS: Urb Spat Analytics II

This advanced GIS course will focus on analysis and modeling of urban structure and dynamics. The focus of this course is on preparing students to apply GIS processes within practical situations such as market research, real estate development, transportation modeling, and socio-economic analysis. While this course will cover a broad suite of tools within the Esri ArcGIS platform, it will place heavy emphasis on the real world context of data collection, cleaning and preparation for urban analytics. Exercises will include simulating and modeling urban transportation systems, analyzing and modeling urban growth, and predicting urban changes and impacts. This course will also feature workshops and/or presentations by professionals who use geospatial technology in various design disciplines.

Credits: 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture, On-Line**MUD 621: Mst Std: Resilient Cities&Comm**

Students will take a trans-disciplinary approach to developing a campus or neighborhood scale-built environment project that integrates Socio-cultural, Experiential, Ecological and Performative design perspectives into a comprehensive regenerative design project. The first part of the semester will focus on the following: A comprehensive site inventory and analysis; comprehensive design requirements; guiding principles and resource benchmark. The second part of the semester focuses on the synthesis of the research to reach the highest levels of regeneration possible

Credits: 4**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture, Studio**MUD 623: Std Comp: Eco Sys for Rsil Com**

Landscape ecology is the study of landscapes and the critical role pattern plays in shaping interactions of species and ecosystems. As a multidisciplinary science it emphasizes the critical role landscape pattern plays in shaping interactions of all living species and ecosystems. Landscape ecology's conceptual and theoretical foundation links natural sciences with related human disciplines such as planning and design to understand spatial pattern and structure of landscapes. Landscape ecology also identifies the relationship between landscape pattern and process, the relationship of human activity to landscape pattern, process, and change, as well as the effect of scale and disturbance on landscapes. For this course students will identify, characterize, and interpret the rich interplay between spatial landscape pattern and process including where it originates, why it matters, and how it changes over time.

Credits: 2**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Lecture, Studio**MUD 631: Research Methodology**

This seminar guides students in the formulation of a research question tailored to the individual's professional goals whose original analysis and proposed solution contributes to the discourse in the field. Avenues of inquiry within the discipline are wide-ranging, encompassing either research-based or design-driven topics. Working with both faculty and professional advisors, each student investigates current debates relative to the topic, significant case studies and core literature, in addition to topic-specific research strategies. Through the thesis project, students demonstrate overall competency in principles, theory, practices and methodologies of urban design and research, as well as the acumen to perform independent research.

Credits: 3**College:** Jefferson Coll of Architecture & Built Environment**Schedule Type:** Seminar