Architecture (ARCH)

Courses

Expand all course descriptions [+]
Collapse all course descriptions [-]

ARCH 11A Introduction to Visual Representation and Drawing 4 Units

Terms offered: Summer 2021 8 Week Session, Fall 2020, Summer 2020 8 Week Session

Introductory studio course: theories of representation and the use of several visual means, including freehand drawing and digital media, to analyze and convey ideas regarding the environment. Topics include contour, scale, perspective, color, tone, texture, and design.

Introduction to Visual Representation and Drawing: Read More [+]

Rules & Requirements

Prerequisites: ENV DES 1 with C- or better

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 6 hours of studio per week
Summer: 8 weeks - 3.5 hours of lecture and 11 hours of studio per week

Additional Details

Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Formerly known as: Environmental Design 11A

Introduction to Visual Representation and Drawing: Read Less [-]

ARCH 11B Introduction to Design 5 Units

Terms offered: Summer 2021 8 Week Session, Spring 2021, Summer 2020 8 Week Session

Introduction to design concepts and conventions of graphic representation and model building as related to the study of architecture, landscape architecture, urban design, and city planning. Students draw in plan, section, elevation, axonometric, and perspective and are introduced to digital media. Design projects address concepts of order, site analysis, scale, structure, rhythm, detail, culture, and landscape.

Introduction to Design: Read More [+]

Rules & Requirements

Prerequisites: ARCH 11A with C- or better

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture, 3 hours of laboratory, and 6 hours of studio per week
Summer: 8 weeks - 4 hours of lecture, 6 hours of laboratory, and 11 hours of studio per week

Additional Details

Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Formerly known as: Environmental Design 11B

Introduction to Design: Read Less [-]

ARCH 24 Freshman Seminars 1 Unit

Terms offered: Spring 2021, Fall 2020, Spring 2019

The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.

Freshman Seminars: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Freshman Seminars: Read Less [-]
ARCH 39A Freshman/Sophomore Seminar 2 - 4 Units
Terms offered: Fall 2012, Fall 2003, Fall 2002
Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester.
Freshman/Sophomore Seminar: Read More [+]

Rules & Requirements
Prerequisites: Priority given to freshmen and sophomores
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 2-4 hours of seminar per week
Summer: 8 weeks - 4-8 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam not required.

Sophomore Seminar: Read Less [-]

ARCH 84 Sophomore Seminar 1 or 2 Units
Terms offered: Fall 2012, Spring 2012, Fall 2011
Sophomore seminars are small interactive courses offered by faculty members in departments all across the campus. Sophomore seminars offer opportunity for close, regular intellectual contact between faculty members and students in the crucial second year. The topics vary from department to department and semester to semester. Enrollment limited to 15 sophomores.
Sophomore Seminar: Read More [+]

Rules & Requirements
Prerequisites: At discretion of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring:
5 weeks - 3-6 hours of seminar per week
10 weeks - 1.5-3 hours of seminar per week
15 weeks - 1-2 hours of seminar per week
Summer:
6 weeks - 2.5-5 hours of seminar per week
8 weeks - 1.5-3.5 hours of seminar and 2-4 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final exam required.

Sophomore Seminar: Read Less [-]

ARCH 98 Special Group Study 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Spring 2020
This is a special topics course intended to fulfill the individual interests of students, and provide a vehicle for professors to instruct students based on new and innovative developments in the field of architecture.
Special Group Study: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Bulletin.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Special Group Study: Read Less [-]

ARCH 98BC Berkeley Connect 1 Unit
Terms offered: Spring 2021, Fall 2020, Spring 2020
Berkeley Connect is a mentoring program, offered through various academic departments, that helps students build intellectual community. Over the course of a semester, enrolled students participate in regular small-group discussions facilitated by a graduate student mentor (following a faculty-directed curriculum), meet with their graduate student mentor for one-on-one academic advising, attend lectures and panel discussions featuring department faculty and alumni, and go on field trips to campus resources. Students are not required to be declared majors in order to participate.
Berkeley Connect: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Bulletin.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Berkeley Connect: Read Less [-]
ARCH 100A Fundamentals of Architectural Design 6 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Introductory courses in the design of buildings. Problems emphasize conceptual strategies of form and space, site relationships and social, technological and environmental determinants. 100A focuses on the conceptual design process.
Fundamentals of Architectural Design: Read More [+]

Rules & Requirements
Prerequisites: Arch 11A & 11B With a C- or better. Must be taken in sequence
Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture, 2 hours of laboratory, and 6 hours of studio per week
Summer: 8 weeks - 4 hours of lecture, 3 hours of laboratory, and 12 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.

ARCH 100B Fundamentals of Architectural Design 6 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Introductory courses in the design of buildings. Problems emphasize conceptual strategies of form and space, site relationships and social, technological and environmental determinants. 100B stresses tectonics, materials, and energy considerations. Studio work is supplemented by lectures, discussions, readings and field trips.
Fundamentals of Architectural Design: Read More [+]

Rules & Requirements
Prerequisites: Arch 100A with a C- or better
Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture, 2 hours of laboratory, and 6 hours of studio per week
Summer: 8 weeks - 4 hours of lecture, 3 hours of laboratory, and 12 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.

ARCH 100C Architectural Design III 5 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This is a studio course in architectural design. Students work on individual and group design projects that build on topics from Architecture 100B with additional integration of conditions pertinent to architectural production that may include architectural precedents, context, landscape and urban issues, envelope, performance, structure, and tectonics in the design of buildings.
Architectural Design III: Read More [+]

Rules & Requirements
Prerequisites: Arch 100B with a C- or better
Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.

ARCH 100D Architectural Design IV 5 Units
Terms offered: Spring 2020, Spring 2019, Spring 2018
Students work on individual and/or group design projects that build on topics from previous studios with additional integration of conditions pertinent to architectural production that may include architectural precedents, context, landscape and urban issues, envelope, structure, and tectonics in the design of buildings. It may also include relevant and pertinent social, cultural, and technological issues facing architecture and design.
Architectural Design IV: Read More [+]

Rules & Requirements
Prerequisites: Arch 100B with a C- or better
Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
ARCH 102A Capstone Project Preparation Seminar 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This course is a course in architectural research methods with an emphasis on collaborative work. Students will work on individual facets of a collective topic of critical importance to the contemporary discipline of architecture within areas of faculty expertise. These include: architectural history and theory, structures, materials and methods of construction, building performance, energy and environment, and social factors and human behavior in architecture and the environment. The goal of Capstone Preparation is to develop a coherent research proposal that will be used as a topic for the Capstone Project course taken the following semester.

Capstone Project Preparation Seminar: Read More [+]

Objectives & Outcomes

Course Objectives: Ability to communicate research findings through oral, written and graphic modes of presentation to a variety of audiences. Comprehension of the ethics and professional responsibilities of research and how they relate to the discipline of architecture. Develop a research proposal of scholarly significance, identifying and effectively communicating the information sources, skill sets, and research process required to pursue the project. Formulate clear and precise questions, interpret information using abstract ideas, consider culturally diverse points of view, and reach well-reasoned conclusions. Gather, record, evaluate and apply information relevant to a research problem. Identify and critically assess the knowledge base and body of literature relevant to a specific research project. Understand the role of applied research in environmental design and its impact on human conditions, behavior and impact on the environment. Work with others to coordinate individual research ventures addressing a larger collective topic, and to learn to work in a supervised collaborative team.

Rules & Requirements

Prerequisites: Architecture 100A, Architecture 100B

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Capstone Project Preparation Seminar: Read Less [-]

ARCH 102B Architecture Capstone Project 5 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Through individual and collective efforts, students will address topics selected in the previous semester under the guidance of faculty mentors. Topics in the field which may serve as a basis for capstone projects include: the history and theory of architecture; structures; the materials and methods of construction; building performance; energy and the environment; and social factors and human behavior. This course is aimed at students who wish to strengthen their understanding of the research methods used by the discipline of architecture and related disciplines (e.g., engineering or history), and is not solely design oriented.

Architecture Capstone Project: Read More [+]

Objectives & Outcomes

Course Objectives: Communicate complex research questions, ideas and findings clearly, both orally and in writing, to a broad community. Demonstrate a critical understanding of how resources, including literature and data, are used in critical study and how these resources can be assessed for their validity and reliability. Demonstrate analytic skills. Understand the nature of research questions in the field, and how to choose appropriate architectural research methods given time, cost and skill constraints. Demonstrate critical thinking. Analyze, compare and critique information gathered. Organize a coherent argument. Derive objective conclusions based on the information and inquiry. Learn how to work in a supervised, collaborative research team, drawing on the diverse skills and knowledge of peers and faculty mentors. Understand the ethics and professional responsibilities of research and how this relates to the discipline of architecture.

Rules & Requirements

Prerequisites: Architecture 102A

Hours & Format

Fall and/or spring: 15 weeks - 4 hours of seminar and 4 hours of studio per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Alternative to final exam.

Architecture Capstone Project: Read Less [-]
ARCH 105 Deep Green Design 4 Units
Terms offered: Spring 2014, Fall 2013
This course explores the issues and practices of green architectural design through critical readings of seminal and current texts, lectures, films, field trips and projects that use both design and analysis as means of inquiry. The course examines varied approaches to sustainable design including using nature and wilderness as models, biophilia, biomimicry, material sources and reuse, accounting systems such as LEED, Zero Net Carbon and the 2030 Challenge, and the Living Building Challenge.

Deep Green Design: Read More [+]

Rules & Requirements
Prerequisites: Completion of a minimum of one design studio, two studios preferred

Hours & Format
Fall and/or spring: 15 weeks - 4 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Ubbelohde

Deep Green Design: Read Less [-]

ARCH 107 Introduction to the Practice of Architecture 3 Units
Terms offered: Prior to 2007
Introduction to the business of architecture including client, developer and contractor relations, design proposals, competitions, and other marketing approaches as well as ethical issues of professional practice.

Introduction to the Practice of Architecture: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: 120
Introduction to the Practice of Architecture: Read Less [-]

ARCH 108 Architectural Internship 5 Units
Terms offered: Summer 2021 8 Week Session, Summer 2020 8 Week Session, Summer 2019 8 Week Session
An intensive and structured exposure to the professional practice, using the resources of practicing architects' offices as the "laboratory." The seminar discussion focus on understanding how design happens, how projects are managed and how buildings are constructed.

Architectural Internship: Read More [+]

Rules & Requirements
Prerequisites: 100B or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture and 10.5 hours of internship per week

Summer: 8 weeks - 4 hours of lecture and 21 hours of tutorial per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructor: Comerio

Formerly known as: 128
Architectural Internship: Read Less [-]

ARCH 109 Special Topics in Architectural Design 1 - 4 Units
Terms offered: Summer 2021 8 Week Session, Summer 2020 8 Week Session, Fall 2019
Selected topics in the theories and concepts of architectural design. For current offerings, see department website.

Special Topics in Architectural Design: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of seminar per week

Summer: 8 weeks - 2-7.5 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Special Topics in Architectural Design: Read Less [-]
ARCH 110AC The Social and Cultural Processes in Architecture & Urban Design 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This class focuses on the significance of the physical environment in human life as citizens and as future design professionals and it introduces students to the field of human–environment studies. It shows how the social sciences and design can be mutually engaged, enriching the context for design evaluation and critique. Berkeley has long been known for attention to the social perspective on architecture, and this course falls in that tradition.

The Social and Cultural Processes in Architecture & Urban Design: Read More [+]

Rules & Requirements
Credit Restrictions: Students will receive no credit for Architecture 110AC after completing Architecture 110.

Requirements this course satisfies: Satisfies the American Cultures requirement

Hours & Format
Fall and/or spring: 10 weeks - 3 hours of lecture and 1.5 hours of discussion per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Chiesi

The Social and Cultural Processes in Architecture & Urban Design: Read Less [-]

ARCH 111 Housing: An International Survey 3 Units
Terms offered: Spring 2014, Spring 2013, Spring 2012
Introduction to international housing from the Architectural and City Planning perspective. Housing issues (social, cultural, and policy) ranging from micro-scale (house) to macro-scale (city) presented with a comparison of housing situations in developed and developing countries.

Housing: An International Survey: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Housing: An International Survey: Read Less [-]

ARCH 119 Special Topics in the Social and Cultural Basis of Design 1 - 4 Units
Terms offered: Fall 2019, Fall 2014, Spring 2014
Selected topics in the social and cultural basis of design. For current offerings, see departmental website.

Special Topics in the Social and Cultural Basis of Design: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of seminar per week
Summer: 8 weeks - 2-8 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

ARCH 122 Principles of Computer Aided Architectural Design 4 Units
Terms offered: Fall 2009
This course introduces students to Architecture's New Media; why and how computers are being used in architecture, and what are their current and expected impacts on the discipline and practice of architecture. Topics include presentation and re-presentation (including sketching, drafting, modeling, animating, and rendering); generating design solutions (including generative systems, expert systems, genetic algorithms, and neural networks); evaluation and prediction (using examples from structures, energy, acoustics, and human factors); and the future uses of computers in architectural design (including such topics as construction automation, smart buildings, and virtual environments). The laboratories introduce students to REVIT, a state-of-the-art architectural software, including drafting, modeling, rendering, and for building information modeling. This course is co-listed with 222.

Principles of Computer Aided Architectural Design: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1.5 hours of laboratory per week
Summer: 8 weeks - 6 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: 132

Principles of Computer Aided Architectural Design: Read Less [-]
ARCH 123 2-D Computer Technology 2 Units
Terms offered: Summer 2012 8 Week Session, Summer 2011 10 Week Session, Summer 2011 8 Week Session
The course provides students with practical hands-on experience in using professional architectural drafting software (e.g., Autocad). The course covers the process of creating, manipulating, and communicating through digital drawings.
2-D Computer Technology: Read More [+]

Hours & Format
Summer:
6 weeks - 5 hours of laboratory per week
8 weeks - 3.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: 133A

ARCH 124A 3-D Computer Technology 2 Units
Terms offered: Summer 2021 Second 6 Week Session, Summer 2020 Second 6 Week Session, Summer 2019 Second 6 Week Session
The course provides students with practical hands-on experience in using professional architectural modeling software (e.g., 3DStudioMax, Maya, Rhino, etc.). The course covers the process of creating, manipulating, and communicating through digital architectural models.
3-D Computer Technology: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of laboratory per week
Summer:
6 weeks - 5 hours of laboratory per week
8 weeks - 3.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: 133B

ARCH 124B 3-D Computer Technology 2 Units
Terms offered: Summer 2017 8 Week Session, Summer 2016 10 Week Session, Summer 2016 8 Week Session
The course provides students with practical hands-on experience in using professional architectural modeling software (e.g., 3DStudioMax, Maya, Rhino, etc.). The course covers the process of creating, manipulating, and communicating through digital architectural models.
3-D Computer Technology: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of laboratory per week
Summer:
6 weeks - 5 hours of laboratory per week
8 weeks - 3.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: 133B

ARCH 127 Workshop in Designing Virtual Places 4 Units
Terms offered: Spring 2010
This course introduces students to designing web-accessible, Multi User, Virtual Environments (MUVEs), inhabited through avatars. Such worlds are used in video games and web-based applications, and are assuming their role as alternative 'places' to physical spaces, where people shop, learn, are entertained, and socialize. Virtual worlds are designed according to the same principles that guide the design of physical spaces, with allowances made for the absence of gravity and other laws of nature. The course combines concepts from architecture, film studies, and video game design. It uses a game engine software and a modeling software to build, test, and deploy virtual worlds.
Workshop in Designing Virtual Places: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar and 1.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Workshop in Designing Virtual Places: Read Less [-]
ARCH 129 Special Topics in Digital Design Theories and Methods 1 - 4 Units
Terms offered: Summer 2021 8 Week Session, Spring 2021, Summer 2020 8 Week Session
Topics cover advanced and research-related issues in digital design and New Media, related to architecture. For current offerings, see department website.
Special Topics in Digital Design Theories and Methods: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer: 8 weeks - 2-8 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Special Topics in Digital Design Theories and Methods: Read Less [-]

ARCH 130 Introduction to Architectural Design Theory and Criticism 4 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This class introduces students to the history and practice of design theory from the late 19th century to the present, with emphasis on developments of the last four decades. Readings and lectures explore specific constellations of theory and practice in relation to changing social and historical conditions. The course follows the rise of modernist design thinking, with particular emphasis on the growing influence of technical rationality across multiple fields in the post World War II period. Systematic approaches based in cybernetics and operations research (amongst others) are examined in the context of wider attempts to develop a science of design. Challenges to modernist design thinking, through advocacy planning and community-based design, the influence of social movements and countercultures, and parallel developments in postmodernism within and beyond architecture, provide the critical background for consideration of recent approaches to design theory, including those informed by developments in digital media and technology, environmental and ecological concerns, questions surrounding the globalization of architectural production, and the development of new materials.
Introduction to Architectural Design Theory and Criticism: Read More [+]
Rules & Requirements
Prerequisites: Open to upper division undergraduates
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Crysler
Formerly known as: 130A
Introduction to Architectural Design Theory and Criticism: Read Less [-]
ARCH 133 Architectures of Globalization: Contested Spaces of Global Culture 3 Units
Terms offered: Fall 2010, Fall 2009
This seminar examines the relationship between architecture and the processes associated with globalization. The social and spatial changes connected to the global economic restructuring of the last four decades are explored in relation to distinctive national conditions and their connection to historical forces such as colonization and imperialism. Theoretical arguments about international urban political economy, uneven development, deindustrialization, and the growth of tourism and service industries, are grounded in specific urban and architectural contexts. Case studies explore issues such as urban entrepreneurialism and the branding of cities and nationstates; heritage practices and the postcolonial politics of place; border cities, and the urbanism of transnational production; cities, terrorism, and the global architecture of security; critical regionalism, localism, and other responses to debates on place and placelessness. Readings and class discussions examine course themes in a comparative framework and consider their implications for architectural design, education, and professional practice.

Rules & Requirements
Prerequisites: This course is open to all graduate students and upper division undergraduates
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Crysler
Architectures of Globalization: Contested Spaces of Global Culture: Read More [+]

ARCH 136 The Literature of Space 3 Units
Terms offered: Spring 2012, Spring 2011, Spring 2010
The concept of space as it is applied to the fields of architecture, geography and urbanism can be understood as a barometer of the condition that we call "modernity." This course explores connections between the larger cultural frameworks of the past century, and the idea of space as it has been perceived, conceived and lived during this period. Readings include essays from the disciplines of philosophy, geography, architecture, landscape, and urbanism, and short works of fiction that illustrate and elucidate the spatial concepts. The readings are grouped according to themes that form the foundation for weekly seminar discussions. Chronological and thematic readings reveal the force of history upon the conceptualization of space, and its contradictions.
The Literature of Space: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Stoner
The Literature of Space: Read Less [-]

ARCH 139 Special Topics in Architectural Design Theory and Criticism 1 - 4 Units
Terms offered: Spring 2021, Spring 2020, Fall 2019
Topics cover contemporary and historical issues in architectural design theory and criticism. For current offerings, see department website.

Special Topics in Architectural Design Theory and Criticism: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer: 8 weeks - 2-8 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Special Topics in Architectural Design Theory and Criticism: Read Less [-]
ARCH 140 Energy and Environment 4 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
This course provides undergraduates and graduates with an introduction to issues of physical building performance including building thermodynamics, daylighting, and solar control. The course presents the fundamentals of building science while recognizing the evolving nature of building technologies, energy efficiency, ecology, and responsible design. The course begins with a detailed explication of the thermal properties of materials, heat transfer through building assemblies, balance point temperature, solar geometry, and shading analysis. Students apply these principles later in the course to a design project. The latter part of the course also provides a survey of broader building science topics including mechanical system design, microclimate, and current developments in energy-efficient design.

Rules & Requirements
Prerequisites: Physics or equivalent, or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of discussion per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructors: Brager, Schiavon

ARCH 144 Introduction to Acoustics 1 Unit
Terms offered: Spring 2021, Fall 2019, Fall 2018
This course focuses on what architects need to know about acoustics. The first part deals with the fundamentals of acoustics including how sound levels are described and measured, and human response to sound. The course then covers building acoustics, mechanical equipment noise and vibration control, office acoustics, design of sound amplification systems, and environmental acoustics.

Rules & Requirements
Prerequisites: 140 and consent of instructor
Repeat rules: Course may be repeated for credit without restriction

Hours & Format
Fall and/or spring: 5 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam required.
Instructor: Salter

ARCH 142 Sustainability Colloquium 1 or 2 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Presentations on a variety of topics related to sustainability, offering perspectives from leading practitioners: architectural designers, city planners, consultants, engineers, and researchers. Students can enroll for one unit (required attendance plus reading) or two units (with additional writing assignments).

Rules & Requirements
Prerequisites: 140 and consent of instructor
Repeat rules: Course may be repeated for credit without restriction

Hours & Format
Fall and/or spring: 15 weeks - 1.5 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Brager

ARCH 149 Special Topics in Energy and Environment 1 - 4 Units
Terms offered: Fall 2019, Summer 2019 8 Week Session, Fall 2018
Special topics include climatic design, heating, ventilating, air-conditioning systems, lighting, and acoustics. For current offerings, see department website.

Rules & Requirements
Prerequisites: 140 and consent of instructor
Repeat rules: Course may be repeated for credit without restriction

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer: 8 weeks - 2-8 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam required.
ARCH 150 Introduction to Structures 4 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Study of forces, materials, and structural significance in the design of buildings. Emphasis on understanding the structural behavior of real building systems.
Introduction to Structures: Read More [+]

Rules & Requirements

Prerequisites: Physics 8A

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 2 hours of discussion per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Black

Introduction to Structures: Read Less [-]

ARCH 154 Design and Computer Analysis of Structure 3 Units
Terms offered: Spring 2020, Spring 2018, Spring 2017
Design and analysis of whole structural building systems with the aid of finite element analytical methods. Advanced structural concepts explored in a laboratory environment.
Design and Computer Analysis of Structure: Read More [+]

Rules & Requirements

Prerequisites: 150

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 3 hours of laboratory per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Final exam not required.

Instructor: Black

Design and Computer Analysis of Structure: Read Less [-]

ARCH 155 Structure, Construction, and Space 3 Units
Terms offered: Fall 2009
In profound buildings, the structural system, construction materials, and architectural form work together to create an integrated work of art. Current practice segregates these three areas by assigning separate and rigid roles to 1) an engineer, 2) a contractor, and 3) an architect. The goal of this class is to blur these traditional boundaries and erase the intellectual cleft through hands-on experience. Students are given weekly assignments which focus on one or more of the three areas. They may be asked to analyze a structure, to construct something from actual materials, or research a case study and present it to the class. Each assignment is geared to help students integrate construction and structural issues into their architectural design, so that they can maintain control of the entire design process.
Structure, Construction, and Space: Read More [+]

Rules & Requirements

Prerequisites: 150

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Black

Structure, Construction, and Space: Read Less [-]

ARCH 159 Special Topics in Building Structures 1 - 4 Units
Terms offered: Spring 2020, Spring 2018, Spring 2017
Special topics such as experimental structures and architectural preservation. For current offerings, see department website.
Special Topics in Building Structures: Read More [+]

Rules & Requirements

Prerequisites: 150 and consent of instructor

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Summer: 8 weeks - 2-8 hours of lecture per week

Additional Details

Subject/Course Level: Architecture/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Special Topics in Building Structures: Read Less [-]
ARCH 160 Introduction to Construction 4 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
This introduction to the materials and processes of construction takes architecture from design to realization. The course will cover four material groups commonly used in two areas of the building assembly (structure and envelope): wood, concrete, steel, and glass. You will understand choices available and how materials are conventionally used. By observing construction, you'll see how our decisions affect the size of materials, connections, and where they are assembled. Architects must understand not only conventions, but also the potential in materials, so we will also study unusual and new developments.

Introduction to Construction: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 3 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Instructor: Black

Introduction to Construction: Read Less [-]

ARCH 169 Special Topics in Construction Materials 1 - 4 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
For current offerings, see department website.
Special Topics in Construction Materials: Read More [+]

Rules & Requirements
Prerequisites: 160 and consent of instructor
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer: 8 weeks - 2-8 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.
Formerly known as: 169X

Special Topics in Construction Materials: Read Less [-]

ARCH 170A An Historical Survey of Architecture and Urbanism 4 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
The first part of this sequence studies the ancient and medieval periods; the second part studies the period since 1400; the aim is to look at architecture and urbanism in their social and historical context.

An Historical Survey of Architecture and Urbanism: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

ARCH 170B An Historical Survey of Architecture and Urbanism 4 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
The first part of this sequence studies the ancient and medieval periods; the second part studies the period since 1400; the aim is to look at architecture and urbanism in their social and historical context.

An Historical Survey of Architecture and Urbanism: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: 169X

An Historical Survey of Architecture and Urbanism: Read Less [-]
**ARCH 173 Case Studies in Modern Architecture 3 Units**
Terms offered: Fall 2010, Fall 2009, 1974
This course examines developments in design, theory, graphic representation, construction technology, and interior programming through case studies of individual buildings. Our survey technique will be highly focused rather than panoptic. Each lecture will delve deeply into one or two buildings to examine program, spatial organization, graphic representation, critical building details, construction technology, and the relationship of the case study building with regard to other contemporary structures and the architect’s overall body of work. From this nucleus, we will spiral outward to consider how the case study is embedded within a constellation of social and economic factors crucial to its design and physical realization. This survey of “modernism’s built discourses” provides multiple perspectives on the variety of architectural propositions advanced to express the nature of modernity as a way of life.

**Rules & Requirements**

**Prerequisites:** 170A-170B and consent of instructor

**Hours & Format**

Fall and/or spring: 15 weeks - 3 hours of lecture per week

**Subject/Course Level:** Architecture/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Formerly known as:** 173A

Case Studies in Modern Architecture: Read More [+]

**ARCH C174 Architecture in Depression and War 4 Units**
Terms offered: Spring 2010
The Great Depression and World War II are arguably the two most influential events for the development of the built environment in the 20th century. Not only did they alter the socio-economic and political landscape on which architecture and urban planning depend, but they also led to technological innovations and vital debates about the built environment. This course examines the 1930’s and 1940’s topically, studying the work of the New Deal, corporate responses to the Depression and war, the important connections between architecture and advertising, the role of the Museum of Modern Art in the promotion of Modernism, the concept of the ideal house, and key tests, theories, and projects from the period.

**Architecture in Depression and War: Read More [+]**

**Rules & Requirements**

**Repeat rules:** Course may be repeated for credit when topic changes.

**Hours & Format**

Fall and/or spring: 15 weeks - 3-4 hours of lecture and 0-1 hours of discussion per week

Summer: 6 weeks - 7.5 hours of lecture and 0-2.5 hours of discussion per week

**Subject/Course Level:** Architecture/Undergraduate

**Grading/Final exam status:** Letter grade. Final exam required.

**Instructor:** Shanken

**Also listed as:** AMERSTD C111A

Architecture in Depression and War: Read Less [-]
ARCH 175 Introduction to Architectural Theory 1945-Present 3 Units
Terms offered: Prior to 2007
This seminar provides an introduction to architectural theory since 1945, with emphasis on developments over the last three decades. Class readings and discussions explore the post-World War II crisis within modernism, postmodernism within and beyond architectural culture, and more recent developments around issues such as rapid urbanization, sustainability, the politics of cultural identity, and globalization. Transformations in architectural theory are examined in relation to historical forces such as the economy, the growth and transformation of cities, and the changing relationship between design professions and disciplines. The influences of digital media, new materials and production techniques on architectural education and practice are explored and the implications for architectural theory assessed. Key issues are anchored in case studies of buildings, urban spaces, and the institutions and agents of architectural culture.

Rules & Requirements
Prerequisites: Open to upper division undergraduates and graduate students

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructor: Crysler

Introduction to Architectural Theory 1945-Present: Read More [+]
Introduction to Architectural Theory 1945-Present: Read Less [-]

ARCH 176 American Architecture 3 Units
Terms offered: 1974
The first half of this course surveys American architecture from Colonial times to contemporary trends. Stylistic and spatial analysis is linked with the socioeconomic, political, and environmental influences on architecture, issues on originality, American exceptionalism, the influence from abroad, regionalism, and the role of technology. The second half delves more deeply into the history of specific building types—house, church, museum, library—grafting the earlier themes onto a history of modern institutions as they took shape in the United States.

American Architecture: Read More [+]
American Architecture: Read Less [-]

Rules & Requirements
Prerequisites: A previous architectural history class. For undergraduates, ARCH 170B or equivalent

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Crawford

California Architecture: Read Less [-]

ARCH 177 California Architecture 3 Units
Terms offered: Fall 2019
Many California architects came from other places: Maybeck from New York via the Ecole des Beaux Arts; Schindler and Neutra from Vienna; Frank Gehry from Chicago.
But, once they arrived, their encounters with the Golden State produced new and original forms of architecture. This seminar will examine the qualities of the state's environment, culture, economy, and population that have produced unique buildings and landscapes during the 20th century. It will look at both Northern and Southern California architecture, starting with canonical designers then moving beyond them to consider lesser-known regional architects whose work embodies local characteristics.

California Architecture: Read More [+]
California Architecture: Read Less [-]

Rules & Requirements
Prerequisites: Open to upper division undergraduates and graduate students

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructor: Crysler

Introduction to Architectural Theory 1945-Present: Read Less [-]

ARCH 178 Visionary Architecture 3 Units
Terms offered: Prior to 2007
This course explores architectural visions as historical windows, examining them from a number of angles. Using a variety of case studies drawn from different media (architectural theory, film, advertisements, architectural projects, and so on) and periods (turn of the century, the Modern Movement, Depression, World War II, 1960's, etc.) it provides a sampling of possibilities and models for the final student project, an in-depth, original research paper. Several themes thread their way through the course, including the role of the “unbuilt” in architectural practice; the uses of the future in the construction of national and personal identities, cultural narratives, and modern mythologies; and the importance of the future as cliche, and the role of play in cultural production.

Visionary Architecture: Read More [+]
Visionary Architecture: Read Less [-]

Rules & Requirements
Prerequisites: Open to upper division undergraduates and graduate students

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam not required.
Instructor: Shanken

Visionary Architecture: Read Less [-]
ARCH 179 Special Topics in the History of Architecture 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Spring 2020
Special topics in Architectural History. For current section offerings, see departmental announcement.
Special Topics in the History of Architecture: Read More [+]

Rules & Requirements
Prerequisites: 170A-170B and consent of instructor
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer: 6 weeks - 2.5-10 hours of lecture per week
8 weeks - 1.5-7.5 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Final exam required.

ARCH 188 Utopian Freehand Drawing and Painting: Architecture and the City 3 Units
Terms offered: Prior to 2007
The intention of this class is to keep alive this type of free (irrational, exploratory, open and playful) passion and make us realize that on the one hand the interdependence between Design and Drawing, and on the other hand, that any of our artistic productions may contain architectural ideas that are nascent, not yet fully developed but useful seeds for our future practice. With this objective in mind, each week, besides producing a single (large) drawing-painting, students will reflect on this process and on the architectural design lessons learned, in the form of an itemized list of condensed realizations.
Utopian Freehand Drawing and Painting: Architecture and the City: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Letter grade. Alternative to final exam.
Instructor: Bourdier

ARCH 198 Special Group Study 1 - 4 Units
Terms offered: Fall 2018, Spring 2018, Spring 2017
Studies developed to meet needs.

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Bulletin.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week
Summer: 8 weeks - 1.5-7.5 hours of directed group study per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

ARCH 198BC Berkeley Connect 1 Unit
Terms offered: Spring 2021, Fall 2020, Spring 2020
Berkeley Connect is a mentoring program, offered through various academic departments, that helps students build intellectual community. Over the course of a semester, enrolled students participate in regular small-group discussions facilitated by a graduate student mentor (following a faculty-directed curriculum), meet with their graduate student mentor for one-on-one academic advising, attend lectures and panel discussions featuring department faculty and alumni, and go on field trips to campus resources. Students are not required to be declared majors in order to participate.
Berkeley Connect: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Bulletin.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Berkeley Connect: Read Less [-]
ARCH 199 Supervised Independent Study and Research 1 - 4 Units
Terms offered: Summer 2021 8 Week Session, Summer 2020 8 Week Session, Summer 2016 Second 6 Week Session
Enrollment is restricted by regulations in the General Catalog. Studies developed to meet individual needs.
Supervised Independent Study and Research: Read More [+]

Rules & Requirements
Credit Restrictions: Enrollment is restricted; see the section on Academic Policies-Course Number Guide in the Berkeley Bulletin.
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of independent study per week
Summer:
6 weeks - 2.5-10 hours of independent study per week
8 weeks - 2-7.5 hours of independent study per week

Additional Details
Subject/Course Level: Architecture/Undergraduate
Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study and Research: Read Less [-]

ARCH 200A Introduction to Architecture Studio 1 5 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Introductory course in architectural design and theories for graduate students. Problems emphasize the major format, spatial, material, tectonic, social, technological, and environmental determinants of building form. Studio work is supplemented by lectures, discussions, readings, and field trips.
Introduction to Architecture Studio 1: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Steinfeld

Introduction to Architecture Studio 1: Read Less [-]

ARCH 200B Introduction to Architecture Studio 2 5 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Introductory course in architectural design and theories for graduate students. Problems emphasize the major format, spatial, material, tectonic, social, technological, and environmental determinants of building form. Studio work is supplemented by lectures, discussions, readings, and field trips.
Introduction to Architecture Studio 2: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Introduction to Architecture Studio 2: Read Less [-]

ARCH 200C Representational Practice in Architectural Design 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This course will address three distinct levels of representational practice in architectural design: 1) cultivate an understanding of the foundational discourse and diversity of approaches to architectural representation; 2) develop a fluency in the canonical methods found in architectural practice; 3) encourage the development of a personal relationship to forms of modeling and formats of drawing.
Representational Practice in Architectural Design: Read More [+]

Rules & Requirements
Credit Restrictions: 200C must be taken in conjunction with 200A.

Hours & Format
Fall and/or spring: 15 weeks - 4 hours of seminar and 1 hour of laboratory per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Steinfeld

Representational Practice in Architectural Design: Read Less [-]
ARCH 201 Architecture & Urbanism Design Studio 5 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
The design of buildings or communities of advanced complexity. Each section deals with a specific topic such as housing, public and institutional buildings, and local or international community development. Studio work is supplemented by lectures, discussions, readings, and field trips.
Architecture & Urbanism Design Studio: Read More [+]
Rules & Requirements
Prerequisites: 100A-100B or 200A-200B
Repeat rules: Course may be repeated for credit without restriction.
Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture and 6 hours of studio per week
Summer:
6 weeks - 7.5 hours of lecture and 13 hours of studio per week
8 weeks - 5.5 hours of lecture and 9.5 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Architecture & Urbanism Design Studio: Read Less [-]

ARCH 202 Graduate Option Studio 5 Units
Terms offered: Spring 2020, Spring 2019, Spring 2018
Focused design and research for graduate students.
Graduate Option Studio: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Graduate Option Studio: Read Less [-]

ARCH 203 Integrated Design Studio 5 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
The Integrated Design Studio is the penultimate studio where students incorporate their accumulated knowledge into architectural solutions. The students demonstrate the integrative thinking that shapes complex architectural design and technical solutions. Students will possess an understanding to classify, compare, summarize, explain and/or interpret information. The students will also become proficient in using specific information to accomplish a task, correctly selecting the appropriate information and accurately applying it to the solution of a specific problem while also distinguishing the effects of its implementation.
Integrated Design Studio: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Integrated Design Studio: Read Less [-]

ARCH 204 Final Project Studio: Studio Thesis Option 5 Units
Terms offered: Spring 2011, Spring 2010
Focused design research as the capstone project for graduate students.
Final Project Studio: Studio Thesis Option: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Formerly known as: 202A
Final Project Studio: Studio Thesis Option: Read Less [-]

ARCH 204A Thesis Seminar 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Focused design research as the capstone project for graduate students.
The students will possess an understanding to classify, compare, summarize, explain and/or interpret information. The students will also become proficient in using specific information to accomplish a task, correctly selecting the appropriate information and accurately applying it to the solution of a specific problem while also distinguishing the effects of its implementation.
Thesis Seminar: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Thesis Seminar: Read Less [-]
ARCH 204B Thesis Studio 5 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Focused design research as the capstone project for graduate students.
Thesis Studio: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Formerly known as: 204

Studio One, Fall: Read More [+]

ARCH 205A Studio One, Fall 5 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
The first semester of a one-year, post-professional design studio intended for those students who have a professional architecture degree and wish to explore current design issues in a stimulating, rigorous, and highly experimental studio setting.
Studio One, Fall: Read More [+]

Rules & Requirements
Prerequisites: Consent of Chair or graduate advisors during fall semester

Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Studio One, Fall: Read Less [-]

ARCH 205B Studio One, Spring 5 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
This course is the second semester of a one-year, post-professional studio intended for those students who have a professional architecture degree and wish to explore current design issues in a stimulating, rigorous, and highly experimental studio setting.
Studio One, Spring: Read More [+]

Rules & Requirements
Prerequisites: Consent of chair or graduate advisors

Hours & Format
Fall and/or spring: 15 weeks - 8 hours of studio per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Formerly known as: 205

Studio One, Spring: Read Less [-]

ARCH 207A Architecture Lectures Colloquium 1 Unit
Terms offered: Fall 2020, Fall 2019, Fall 2018
This course accompanies the required introductory design studio in the three-year option of the Master of Architecture program. It is the first in a series of three one-unit colloquia, scheduled consecutively for the first three semesters of the program. Students will attend all Wednesday evening lectures of the College of Environmental Design lecture series. Every third week, they will meet with the instructor for a one-hour discussion.
Architecture Lectures Colloquium: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Architecture Lectures Colloquium: Read Less [-]

ARCH 207B Architecture Research Colloquium 1 Unit
Terms offered: Fall 2020, Fall 2019, Spring 2019
This course accompanies the second semester of the required introductory design studio in the three-year option of the Master of Architecture program. It is the second in a series of three one-unit colloquia, scheduled consecutively for the first three semesters of the program. For a one-hour session each week, faculty in the department of architecture and other departments of the College of Environmental Design will present lectures on their research and design practice.
Architecture Research Colloquium: Read More [+]

Rules & Requirements
Prerequisites: Co-requisite with Architecture 200B
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Architecture Research Colloquium: Read Less [-]
ARCH 207C Professional Practice Colloquium 1 Unit
Terms offered: Fall 2020, Spring 2020, Fall 2018
This course accompanies the required comprehensive design studio in the three-year option of the Master of Architecture program. It is the third in a series of three one-unit colloquia, scheduled consecutively for the first three semesters of the program.

Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1 hour of lecture per week

Subject/Course Level: Architecture/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.

Professional Practice Colloquium: Read More [+]

ARCH 207D The Cultures of Practice 3 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
The nature of architectural practice, how it has evolved and how it is changing in today’s world is the theme of the class. The course considers how diverse cultures—both anthropological and professional—contribute to practice, and how the culture of practice evolves. The class has three five-week modules, devoted to the following themes: traditions of practice, research in the culture of the profession, and innovations in practice.

The Cultures of Practice: Read More [+]

Rules & Requirements
Prerequisites: 201

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Instructors: Comerio, Cranz

The Cultures of Practice: Read Less [-]

ARCH 209 Special Topics in Architectural Design 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Spring 2020
Topics deal with major problems and current issues in architectural design. For current offerings, see departmental website.

Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Summer:
6 weeks - 2.5-10 hours of lecture per week
8 weeks - 2-8 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Formerly known as: 209X

Special Topics in Architectural Design: Read Less [-]

ARCH 211 Theory and Methods in the Social and Cultural Basis of Design 3 - 4 Units
Terms offered: Spring 2017, Spring 2013, Spring 2011
Explores a variety of theories which explain and document the relationship between humans and the environment they build; outlines the research methods appropriate to each theory.

Theory and Methods in the Social and Cultural Basis of Design: Read More [+]

Rules & Requirements
Prerequisites: 110 or consent of instructor
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Instructor: Cranz

Theory and Methods in the Social and Cultural Basis of Design: Read Less [-]
ARCH 212 Body-Conscious Design: Shoes, Chairs, Rooms, and Beyond 3 Units
This seminar prepares students to evaluate and design environments from the point of view of how they interact with the human body. Tools and clothing modify that interaction. Semi-fixed features of the near environment, especially furniture, may have greater impact on physical well being and social-psychological comfort than fixed features like walls, openings, and volume. Today, designers can help redefine and legitimize new attitudes toward supporting the human body by, for example, designing for a wide range of postural alternatives and possibly designing new kinds of furniture. At the urban design scale, the senses of proprioception and kinesthetics can be used to shape architecture and landscape architecture. This course covers these topics with special emphasis on chair design and evaluation. The public health implications of a new attitude toward posture and back support are explored. The course heightens students’ consciousness of their own and others’ physical perceptions through weekly experiential exercises. Students produce three design exercises: shoe, chair, and a room interior.

ARCH 215 Landscape, Architecture, Infrastructure, and Urbanism 3 Units
Terms offered: Spring 2014, Spring 2013, Spring 2012
This seminar aims to explore how the physical and conceptual understanding of landscape can enrich current forms of architectural and urban design practice. At the junction of landform, infrastructure, urban design, and architecture lies a rich field of possibilities that is increasingly superseding the narrower field of each of the disciplines by themselves. In the past century, contemporary culture and technology—automobiles, televisions, cell phones, and the internet have socially, culturally, environmentally, and physically reshaped the urban fabric, calling into question the very definition of urbanity. The course will explore the implications for public space in an era of increased security and risk mitigation and how designers may direct the various invisible forces which give form to the world around us.

ARCH 216 The Sociology of Taste in Environmental Design 3 Units
Terms offered: Fall 2016, Fall 2012, Fall 2011
Taste is at work in the way we display our things as much as in the qualities of things themselves. A performance-oriented model of taste observes that objects fall into two broad categories: pragmatic (that support behavior) and symbolic (that identify a person). People visually organize these two categories of objects using both explicit and subconscious aesthetic rules to produce visually unified displays. Depending on how it is used, how it is placed in relation to other things, an object’s meaning can vary. The display of taste is where objects take on—and shed—meanings, depending on how they are combined with one another. This seminar reviews the extensive body of 20th-century theory and empirical research on taste and considers the implications of theories about taste for design creation, design education, and for client-professional relations.

Rules & Requirements
Prerequisites: 110, or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Cranz

The Sociology of Taste in Environmental Design: Read Less [-]
ARCH 217 Social Aspects of Housing Design: Mid-Rise Urbanism 3 Units
Terms offered: Fall 2012, Fall 2011
The course explores strategies to bring coherence and continuity back to the city focusing on mid-rise, higher density urbanism and the potential and difficulties of this scale of urban fabric to contribute to the form of cities, without losing the potential of choice and diversity. The seminars are organized in case studies revolving around four cities: Amsterdam, Barcelona, Beijing, and New York. Design exercises parallel the case studies as a way to test and challenge the potentials of mid-rise urbanism.

ARCH 219 Special Topics in the Social and Cultural Basis of Design 1 - 4 Units
Terms offered: Fall 2019, Fall 2017, Spring 2017
Topics include the sociology of taste, personal and societal values in design, participatory design, semantic ethnography, environments for special populations such as the elderly, and building types such as housing, hospitals, schools, offices, and urban parks. For current offerings, see departmental website.

ARCH 218 Housing, Urbanization, and Urbanism: Design, Planning, and Policy Issues in Developing Countries 4 Units
Terms offered: Prior to 2007
This seminar is concerned with the study of housing, urbanization, and urbanism in developing countries, studying not only the physical landscapes of settlements, but also the social, economic, political, and cultural dimensions. This course's focus will be on housing, its lens will be their processes of urbanization, and its intent will be to investigate the space for action by the professionals of the "urban" in the arena of housing. While the emphasis of the course will be on diverse trajectories of developing countries, "First World" experiences will also be used to illuminate the specific transnational connections and their use in the making of housing theory and policy. The seminar complements the series of lectures offered in 111 and City Planning 111.

ARCH 221 Graduate Seminar in Digital Design Theories and Methods 3 Units
Terms offered: Spring 2013, Spring 2010, Fall 2009
This seminar is intended to help graduate students develop a coherent research agenda in the area of digital design theories and methods. In addition, it is intended to serve as a forum for the exchange of ideas (e.g., work in progress, potential directions for research, etc.) in the area of shared interest. The course provides students with a set of questions as guides, readings, and guest lectures.

ARCH 217 Social Aspects of Housing Design: Mid-Rise Urbanism 3 Units
Prerequisites: Consent of instructor

ARCH 219 Special Topics in the Social and Cultural Basis of Design 1 - 4 Units
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.

ARCH 218 Housing, Urbanization, and Urbanism: Design, Planning, and Policy Issues in Developing Countries 4 Units
Instructor: AlSayyad

ARCH 221 Graduate Seminar in Digital Design Theories and Methods 3 Units
Instructor: Chow

Repeat rules: Course may be repeated for credit without restriction.
ARCH 222 Principles of Computer Aided Architectural Design 4 Units
Terms offered: Fall 2009
This course introduces students to Architecture's New Media; why and how computers are being used in architecture and what are their current and expected impacts on the discipline and practice of architecture. Topics include presentation and re-presentation (including sketching, drafting, modeling, animating, and rendering); generating design solutions (generative systems, expert systems, genetic algorithms, and neural networks); evaluation and prediction (using examples from structures, energy, acoustics, and human factors); and the future uses of computers in architectural design (including such topics as construction automation, smart buildings, and virtual environments). The laboratories introduce students to a REVIT, a state-of-the-art architectural software, including drafting, modeling, rendering, and building information modeling. This course is co-listed with 122. Graduate students will have a discussion section instead of the laboratory that 122 students undertake.
Principles of Computer Aided Architectural Design: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week
Summer: 8 weeks - 6 hours of lecture and 2 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Principles of Computer Aided Architectural Design: Read Less [-]

ARCH 226 Collaboration by Digital Design 3 Units
Terms offered: Prior to 2007
This project-based seminar studies the problem of multi-disciplinary and cross-cultural collaboration in the building industry. It employs two complementary approaches: 1) a theoretical approach, which examines the nature of collaboration in general and in architecture in particular, looks at the methods that have been used to foster and support it, and interrogates their advantages and shortcomings; and 2) a practical approach, which use a web-based multi-person design 'game' that allow students to play different roles (architect, clients, engineer, builder, etc.) while collaborating in the design of a building.
Collaboration by Digital Design: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Collaboration by Digital Design: Read Less [-]

ARCH 227 Workshop in Designing Virtual Places 4 Units
Terms offered: Spring 2010
This course introduces students to designing web-accessible, Multi User, Virtual Environments (MUVEs), inhabited through avatars. Such worlds are used in video games and web-based applications, and are assuming their role as alternative 'places' to physical spaces, where people shop, learn, are entertained, and socialize. Virtual worlds are designed according to the same principles that guide the design of physical spaces, with allowances made for the absence of gravity and other laws of nature. The course combines concepts from architecture, film studies, and video game design. It uses a game engine software and a modeling software to build, test, and deploy virtual worlds.
Workshop in Designing Virtual Places: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar and 1.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Workshop in Designing Virtual Places: Read Less [-]

ARCH 229 Special Topics in Digital Design Theories and Methods 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Spring 2020
Selected topics in digital design theories and methods. For current offerings, see departmental website.
Special Topics in Digital Design Theories and Methods: Read More [+]

Rules & Requirements
Prerequisites: 210 or consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Special Topics in Digital Design Theories and Methods: Read Less [-]
ARCH 229A Introduction to Construction Law
1 - 4 Units
Introduction to Construction Law: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Formerly known as: 229F
Introduction to Construction Law: Read Less [-]

ARCH 230 Advanced Architectural Design Theory and Criticism 3 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Seminar in the analysis and discussion of contemporary and historical issues in architectural design theory and criticism.
Advanced Architectural Design Theory and Criticism: Read More [+]

Rules & Requirements
Prerequisites: 130A or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Advanced Architectural Design Theory and Criticism: Read Less [-]

ARCH 231 Research Methods in Architectural Design Theory and Criticism 2 Units
Terms offered: Spring 2004, Spring 2003, Spring 2002
Seminar in methods and use of research in contemporary and historical architectural design theory and criticism. Required for doctoral students in this study area.
Research Methods in Architectural Design Theory and Criticism: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 2 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Research Methods in Architectural Design Theory and Criticism: Read Less [-]

ARCH 233 Architectures of Globalization: Contested Spaces of Global Culture 3 Units
Terms offered: Fall 2010, Fall 2009
This seminar examines the relationship between architecture and the processes associated with globalization. The social and spatial changes connected to the global economic restructuring of the last four decades are explored in relation to distinctive national conditions and their connection to historical forces such as colonization and imperialism. Theoretical arguments about international urban political economy, uneven development, deindustrialization and the growth of tourism and service industries, are grounded in specific urban and architectural contexts. Case studies explore issues such as urban entrepreneurialism and the branding of cities and nation-states; heritage practices and the postcolonial politics of place; border cities, and the urbanism of transnational production; cities, terrorism and the global architecture of security; critical regionalism, localism and other responses to debates on place and placelessness. Readings and class discussions examine course themes in a comparative framework and consider their implications for architectural design, education and professional practice.
Architectures of Globalization: Contested Spaces of Global Culture: Read More [+]

Rules & Requirements
Prerequisites: This course is open to all graduate students and upper division undergraduates

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Crysler
Architectures of Globalization: Contested Spaces of Global Culture: Read Less [-]
ARCH 236 The Literature of Space 3 Units
Terms offered: Spring 2012, Spring 2011, Spring 2010
The concept of space as it is applied to the fields of architecture, geography, and urbanism can be understood as a barometer of the condition that we call “modernity.” This course explores connections between the larger cultural frameworks of the past century, and the idea of space as it has been perceived, conceived, and lived during this period. Readings include key essays from the disciplines of philosophy, geography, architecture, landscape, and urbanism, and short works of fiction that illustrate and elucidate the spatial concepts. The readings are grouped according to themes that form the foundation for weekly seminar discussions. Chronological and thematic readings reveal the force of history upon the conceptualization of space, and its contradictions.

The Literature of Space: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Stoner

The Literature of Space: Read Less [-]

ARCH 237 Ulterior Speculation: Monographs and Manifestos 3 Units
Terms offered: Spring 2013, Spring 2012, Spring 2011
An examination and analysis of architectural manifestos and monographs from the first half of the 20th century to today. The class analyzes the possibilities and limits of grounding a discourse in practice as well as theory. The seminar complements thesis preparation or can serve as an introduction to critical thinking in architecture.

Ulterior Speculation: Monographs and Manifestos: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Fernau

Ulterior Speculation: Monographs and Manifestos: Read Less [-]

ARCH 238 The Dialectic of Poetics and Technology 3 Units
Terms offered: Spring 2020, Spring 2019, Spring 2017
This seminar examines the relationship between technology and design philosophy in the work of architects through analysis of individual buildings within the context of the complete oeuvre and an examination of the architect's writings and lectures. The seminar poses questions such as: What is the role of technology in the design philosophy of the architect and how is this theoretical position established in the architect's writings, lectures, and interviews? A series of lectures explores these questions in relation to the architect and a set of required readings introduces the work of the architect and explores the relationship between technology and design philosophy.

The Dialectic of Poetics and Technology: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Ubbelohde

Formerly known as: 209A

The Dialectic of Poetics and Technology: Read Less [-]

ARCH 239 Special Topics in Architecture Design Theory and Criticism 1 - 4 Units
Terms offered: Spring 2021, Spring 2020, Fall 2019
Selected topics in contemporary and historical architectural design theory and criticism. For current offerings, see departmental website.

Special Topics in Architecture Design Theory and Criticism: Read More [+]

Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Special Topics in Architecture Design Theory and Criticism: Read Less [-]
ARCH 240 Advanced Study of Energy and Environment 3 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Minimizing energy use is a cornerstone of designing and operating sustainable buildings, and attention to energy issues can often lead to greatly improved indoor environmental quality. For designers, using computer-based energy analysis tools are important not only to qualify for sustainability ratings and meet energy codes, but also to develop intuition about what makes buildings perform well. This course will present quantitative and qualitative methods for assessing energy performance during design of both residential and commercial buildings. Students will get hands-on experience with state-of-the-art software -- ranging from simple to complex -- to assess the performance of building components and whole-building designs.
Advanced Study of Energy and Environment: Read More [+]
Rules & Requirements
Credit Restrictions: Students will receive no credit for Architecture 240 after taking Architecture 240A.

Hours & Format
Fall and/or spring: 15 weeks - 1.5 hours of lecture and 3 hours of laboratory per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Advanced Study of Energy and Environment: Read Less [-]

ARCH 241 Research Methods in Building Sciences 3 Units
Terms offered: Fall 2020, Fall 2018, Fall 2017
Required for doctoral students in the area of environmental physics.
Research Methods in Building Sciences: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Brager
Research Methods in Building Sciences: Read Less [-]

ARCH 242 Sustainability Colloquium 1 or 2 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
Presentations on a variety of topics related to sustainability, offering perspectives from leading practitioners: architectural designers, city planners, consultants, engineers, and researchers. Students can enroll for one unit (required attendance plus reading) or two units (with additional assignments.
Sustainability Colloquium: Read More [+]
Hours & Format
Fall and/or spring: 15 weeks - 1.5 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Instructor: Brager
Sustainability Colloquium: Read Less [-]

ARCH 243 Natural Cooling: Sustainable Design for a Warming Planet 3 Units
Terms offered: Fall 2016, Fall 2014, Fall 2013
Course focuses on zero- and no-energy climate responsive cooling strategies for both residential and commercial scale buildings. The course reviews designs and technologies that include low- and high-tech solutions, dynamic high performance facades, natural ventilation, and a range of other innovative cooling strategies. The course also explores the relationship between building design and operation, energy use, and climate change.
Natural Cooling: Sustainable Design for a Warming Planet: Read More [+]
Rules & Requirements
Prerequisites: 140 or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Brager
Natural Cooling: Sustainable Design for a Warming Planet: Read Less [-]
ARCH 244 The Secret Life of Buildings 3 Units
Terms offered: Fall 2011, Fall 2010, Fall 2009
This exploratory seminar addresses a secret life of buildings related to physical performance. Students examine architectural, lighting, and mechanical systems in existing buildings with attention to energy use, occupant well-being, and architectural spacemaking. The seminar applies a collection of measurement techniques, often involving novel approaches, to reveal operating patterns in the complex environment of contemporary buildings. The personal experience students gain in performing the evaluations contributes to the students’ experiential base at a formative time. Analysis of data collected in the field and the comparison of these data to values given by simulation tools provides a foundation for understanding the more abstract tools and standards used by designers in practice. The juxtaposition of design intention and post-occupancy performance can be a powerful learning experience now, as well as preparation for evaluating building performance in the future.

The Secret Life of Buildings: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Benton

The Secret Life of Buildings: Read Less [-]

ARCH 245 Daylighting 3 Units
Terms offered: Spring 2017, Spring 2014, Fall 2012
This seminar introduces theories, technologies, design strategies and analytical methods of architectural daylighting, including issues of visual experience, integration with electrical lighting and energy use. The course provides foundation for intelligent daylighting design by developing frameworks for thinking about design, performance and tools. The work examines two archetypal daylighting conditions: a toplighted (roof-lighted) space and a side-lighted (window-lit) space with range of methods including readings, on-site observation and measurement, case studies, design exercises and analysis through models and simulation. This is a graduate seminar: attendance, pin-ups, readings and engaged participation are required each week.

Daylighting: Read More [+]

Rules & Requirements
Prerequisites: 140 or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Ubbelohde

Daylighting: Read Less [-]

ARCH 249 Special Topics in the Physical Environment in Buildings 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Fall 2019
Special Topics in the Physical Environment in Buildings: Read More [+]

Rules & Requirements
Prerequisites: 140
Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Special Topics in the Physical Environment in Buildings: Read Less [-]

ARCH 250 Introduction to Structures 3 Units
Terms offered: Spring 2021, Spring 2020
This class focuses on the fundamental principles that affect the structural behavior of buildings. Through digital and hands-on exercises, students will learn analytical techniques for measuring and evaluating the flow of forces through structural systems. Students will also learn to consider the structural behavior of buildings as a fundamental factor in the design of architectural proposals. The goal of the class is to gain a fundamental understanding of the forces, moments, and stresses in typical building elements such as columns, beams, frames and walls and to make better informed decisions when designing resource- and environmentally-friendly buildings with lightweight and material-efficient structural systems.

Introduction to Structures: Read More [+]

Rules & Requirements
Credit Restrictions: Students will receive no credit for ARCH 250 after completing ARCH 250. A deficient grade in ARCH 250 may be removed by taking ARCH 250.

Hours & Format
Fall and/or spring: 15 weeks - 1.5 hours of lecture and 1.5 hours of laboratory per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Introduction to Structures: Read Less [-]
ARCH 252 Form and Structure 3 Units
Terms offered: Fall 2020, Fall 2019
The class investigates the interplay between geometry and structural behavior of different structural systems categorized with respect to their load-bearing mechanism. Special focus is placed on form-active and surface-active structures like cable nets, membranes, gridshells, and continuous shells. The class will begin by providing a holistic overview of ancient and cutting-edge form-finding approaches and analysis methods. Using playful physical experiments, students will gain a hands-on understanding of how different structural states can affect the shape of a structure and how this interrelation could be used creatively to drive the design process.

Form and Structure: Read More [+]

Rules & Requirements
Prerequisites: Consent of instructor required

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Form and Structure: Read Less [-]

ARCH 253 Seismic Design and Construction 3 Units
Terms offered: Fall 2012, Summer 2012 10 Week Session, Fall 2011
Contemporary design and construction techniques for improving the performance of new and existing buildings in earthquakes. Topics will include 1) basic principles of seismic design and building performance, 2) retrofit of existing buildings and evaluation techniques, 3) design and planning for disaster recovery and rebuilding. The course will use Bay Area and campus buildings as case studies.

Seismic Design and Construction: Read More [+]

Rules & Requirements
Prerequisites: 150

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Black

Seismic Design and Construction: Read Less [-]

ARCH 255 Structure, Construction, and Space 3 Units
Terms offered: Prior to 2007
In profound buildings, the structural system, construction materials, and architectural form work together to create an integrated work of art. Current practice segregates these three areas by assigning separate and rigid roles to 1) an engineer, 2) a contractor, and 3) an architect. The goal of this class is to blur these traditional boundaries and erase the intellectual cleft through hands-on experience. Students are given weekly assignments which focus on one or more of the three areas. They may be asked to analyze a structure, to construct something from actual materials or research a case study and present it to the class. Each assignment is geared to help students integrate construction and structural issues into their architectural design so that they can maintain control of the entire design process.

Structure, Construction, and Space: Read More [+]

Rules & Requirements
Prerequisites: 150

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Black

Structure, Construction, and Space: Read Less [-]
ARCH 256 Structural Design in the Studio 1 - 3 Units
Terms offered: Spring 2016, Fall 2015, Fall 2013
Teaching structures to architecture students on their own turf: in a design studio. The course is organized around weekly desk reviews and assignments for students enrolled in a 201 design studio or thesis. The reviews and assignments focus on the structural issues of the students’ projects. A central goal of the course is to help students understand structural issues as they relate to design and to help them become comfortable with structural concepts so that they can begin to integrate the structure and architecture. The course can be taken for 1 unit, 2 units, or 3 units depending on the amount of time a student wishes to commit to it. A final report showing the evolution of each student’s project with clear reference to how structural understanding influenced design decisions is required of all students regardless of units taken. Enrollment strictly limited to 10 students.
Structural Design in the Studio: Read More [+]
Rules & Requirements
Prerequisites: 150 or equivalent
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Black
Structural Design in the Studio: Read Less [-]

ARCH 259 Special Topics in Building Structures 1 - 4 Units
Terms offered: Spring 2021, Spring 2020, Fall 2019
Selected topics in building structures such as experimental structures and architectural preservation. For current offerings, see departmental website.
Special Topics in Building Structures: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Buntrock
Special Topics in Building Structures: Read Less [-]

ARCH 259X Special Topics: Building Structures 1 - 4 Units
Terms offered: Spring 2009, Fall 2008, Spring 2008
Special topics such as experimental structures and architectural preservation.
Special Topics: Building Structures: Read More [+]
Rules & Requirements
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Special Topics: Building Structures: Read Less [-]

ARCH 260 Introduction to Construction, Graduate Level 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This course addresses the methods and materials of construction. While students will not be experts at the end of the semester, the course should give students the confidence to feel comfortable on a construction site or when designing a small building for a studio. The course will focus on four major territories: structural materials, building envelope, built elements such as stairs and cabinets, and costs, labor conditions, conventional practices, and the regulatory environments that control design.
Introduction to Construction, Graduate Level: Read More [+]
Rules & Requirements
Prerequisites: Graduate standing or consent of instructor
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Buntrock
Introduction to Construction, Graduate Level: Read Less [-]
ARCH 262 Architecture in Detail 3 Units
Terms offered: Fall 2019, Fall 2018, Fall 2017
This seminar will reevaluate the material nature of buildings by studying and understanding construction details and the new technologies that are revolutionizing design construction and labor relations in architecture.
Architecture in Detail: Read More [+]

Rules & Requirements

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Architecture/Graduate

Grading: Letter grade.

Instructor: Davids

ARCH 264 Off-Site Fabrication: Opportunities and Evils 3 Units
Terms offered: Spring 2020, Fall 2017, Fall 2010
This seminar looks at the implications of off-site fabrication in architecture: consistent, protected environments; worker efficiency and safety; coordination of trades; cheaper, semi-skilled labor; construction periods shortened; and completion dates more predictable. Off-site fabrication can allow for increased refinement and trial assemblies. However, it may also create monotonous sameness when the processes and results are not considered with care.
Off-Site Fabrication: Opportunities and Evils: Read More [+]

Rules & Requirements

Prerequisites: 160, 260 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of seminar per week

Additional Details

Subject/Course Level: Architecture/Graduate

Grading: Letter grade.

Instructor: Buntrock

ARCH 265 Japanese Craft and Construction 3 Units
Terms offered: Spring 2011, Spring 2009, Spring 2005
The class addresses the role craft and construction play in Japanese architecture and applies these lessons to the evaluation of an exemplary recent building having unusual technical features. Buildings are expressions of theoretic and technical intent and a response to cultural and economic forces; Japanese architecture is regarded as particularly innovative. In studying a system where there is an emphasis on collaboration, students also see the values of North American systems of architectural production.
Japanese Craft and Construction: Read More [+]

Rules & Requirements

Prerequisites: 150, 160, or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Architecture/Graduate

Grading: Letter grade.

Instructor: Buntrock

ARCH 269 Special Topics in Construction and Materials 1 - 4 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
Selected topics in construction and materials. For current offerings, see departmental website.
Special Topics in Construction and Materials: Read More [+]

Rules & Requirements

Prerequisites: Consent of instructor

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of lecture per week

Additional Details

Subject/Course Level: Architecture/Graduate

Grading: Letter grade.

Special Topics in Construction and Materials: Read Less [-]
ARCH 270 History of Modern Architecture 3 Units
Terms offered: Fall 2020, Fall 2019, Fall 2018
This course examines developments in design, theory, graphic representation, construction technology, and interior programming through case studies of individual buildings. Each lecture will delve deeply into one or sometimes two buildings to examine program, spatial organization, critical building details, and the relationship of the case study building with regard to other parallel works and the architect's overall body of work.

History of Modern Architecture: Read More [+]

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Instructor: Castillo

History of Modern Architecture: Read Less [-]

ARCH 271 Methods in Historical Research and Criticism in Architecture 4 Units
Terms offered: Spring 2021, Spring 2019, Fall 2014
Methods in Historical Research and Criticism in Architecture: Read More [+]

Rules & Requirements
Prerequisites: Doctoral candidate or consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 0 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Methods in Historical Research and Criticism in Architecture: Read Less [-]

ARCH 273 Case Studies in Modern Architecture 3 Units
Terms offered: Fall 2010
This course examines developments in design, theory, graphic representation, construction technology, and interior programming through case studies of individual buildings. Our survey technique will be highly focused rather than panoptic. Each lecture will delve deeply into one or two buildings to examine program, spatial organization, critical building details, construction technology, and the relationship of the case study building with regard to other contemporary structures and the "architect's overall body of work". From this nucleus, we will spiral outward to consider how the case study is embedded within a constellation of social and economic factors crucial to its design and physical realization. This survey of "modernism's built discourses" provides multiple perspectives on the variety of architectural propositions advanced to express the nature of modernity as a way of life.

Case Studies in Modern Architecture: Read More [+]

Rules & Requirements
Prerequisites: 170A-170B and consent of instructor

Hours & Format
Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

Case Studies in Modern Architecture: Read Less [-]
**ARCH 275 Introduction to Architectural Theory 1945 - Present 3 Units**

Terms offered: Prior to 2007

This seminar provides an introduction to architectural theory since 1945, with emphasis on developments over the last three decades. Class readings, and discussions explore the post-WWII crisis within modernism, postmodernism within and beyond architectural culture, and more recent developments around issues such as rapid urbanization, sustainability, the politics of cultural identity and globalization. Transformations in architectural theory are examined in relation to historical forces such as the economy, the growth and transformation of cities, and the changing relationship between design professions and disciplines. The influences of digital media, new materials and production techniques on architectural education and practice are explored and the implications for architectural theory assessed. Key issues are anchored in case studies of buildings, urban spaces, and the institutions and agents of architectural culture.

**Rules & Requirements**

**Prerequisites:** The course is open to upper division undergraduates and graduate students.

**Hours & Format**

Fall and/or spring: 15 weeks - 3 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Architecture/Graduate

**Grading:** Letter grade.

**Instructor:** Crysler

Introduction to Architectural Theory 1945 - Present: Read More [+] 

**ARCH 276 Spaces of Recreation and Leisure, 1850-2000 3 Units**

Terms offered: Spring 2014, Spring 2012, Spring 2010

A reading and research seminar surveying the building types, social relations, and cultural ideas of recreation in the American city, including the tensions between home, public, and commerical leisure settings.

**Spaces of Recreation and Leisure, 1850-2000: Read More [+]**

**Rules & Requirements**

**Prerequisites:** A previous architectural history class

**Hours & Format**

Fall and/or spring: 15 weeks - 3 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Architecture/Graduate

**Grading:** Letter grade.

**Instructor:** Groth

Spaces of Recreation and Leisure, 1850-2000: Read Less [-]

**ARCH 277 California Architecture 3 Units**

Terms offered: Fall 2019

Many California architects came from other places: Maybeck from New York via the Ecole des Beaux Arts; Schindler and Neutra from Vienna; Frank Gehry from Chicago. But, once they arrived, their encounters with the Golden State produced new and original forms of architecture. This seminar will examine the qualities of the state's environment, culture, economy, and population that have produced unique buildings and landscapes during the 20th century. It will look at both Northern and Southern California architecture, starting with canonical designers then moving beyond them to consider lesser-known regional architects whose work embodies local characteristics.

**Rules & Requirements**

**Prerequisites:** 170A-170B and consent of instructor

**Hours & Format**

Fall and/or spring: 15 weeks - 3 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Architecture/Graduate

**Grading:** Letter grade.

**Instructor:** Crawford

California Architecture: Read Less [-]

**ARCH 278 Visionary Architecture 3 Units**

Terms offered: Prior to 2007

This course explores architectural visions as historical windows, examining them from a number of angles. Using a variety of cases studies drawn from different media (architectural theory, film, advertisements, architectural projects, and so on) and periods (turn of the century, the Modern Movement, Depression, World War II, 1860's, etc.) It provides a sampling of possibilities and models for the final student project, an in-depth, original research paper. Several themes thread their way through the course, including the role of the "unbuilt" in architectural history and architectural practice; the uses of the future in the construction of national and personal identities, cultural narratives, and modern mythologies; the importance of the future as cliche, and the role of play in cultural production.

**Visionary Architecture: Read More [+]**

**Rules & Requirements**

**Prerequisites:** 170A-170B and consent of instructor

**Hours & Format**

Fall and/or spring: 15 weeks - 3 hours of seminar per week

**Additional Details**

**Subject/Course Level:** Architecture/Graduate

**Grading:** Letter grade.

**Instructor:** Shanken

Visionary Architecture: Read Less [-]
ARCH 279 Special Topics in the History of Architecture 1 - 4 Units
Terms offered: Spring 2021, Fall 2020, Spring 2020
Selected topics in the history of architecture. For current offerings, see department website.
Special Topics in the History of Architecture: Read More [+]
Rules & Requirements
Prerequisites: Consent of instructor
Repeat rules: Course may be repeated for credit when topic changes.
Hours & Format
Fall and/or spring: 15 weeks - 1-4 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Special Topics in the History of Architecture: Read Less [-]

ARCH 281 Methods of Inquiry in Architectural Research 4 Units
Terms offered: Fall 2019, Fall 2018, Fall 2017
This is the introductory course in methods of inquiry in architecture research to be required of all entering Ph.D. students in all areas of the program. The purpose is to train students in predissertation and prethesis research strategies, expose them to variety of inquiry methods including the value of scholarly research, the nature of evidence, critical reading as content analysis and writing, presenting and illustrating scholarship in the various disciplines of architecture.
Methods of Inquiry in Architectural Research: Read More [+]
Rules & Requirements
Prerequisites: M.S. or Ph.D. standing or consent of instructor
Hours & Format
Fall and/or spring: 15 weeks - 4 hours of lecture per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.
Methods of Inquiry in Architectural Research: Read Less [-]

ARCH 280 Dissertation Writing Seminar in Architectural History, Theory, and Society 4 Units
Terms offered: Prior to 2007
Post-candidacy research and writing seminar focused on dissertation completion.
Dissertation Writing Seminar in Architectural History, Theory, and Society: Read More [+]
Rules & Requirements
Prerequisites: Advancement to candidacy or instructor permission
Repeat rules: Course may be repeated for credit with advisor consent.
Hours & Format
Fall and/or spring: 15 weeks - 3 hours of seminar per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Offered for satisfactory/unsatisfactory grade only.
Dissertation Writing Seminar in Architectural History, Theory, and Society: Read Less [-]

ARCH 298 Special Group Study 1 - 4 Units
Terms offered: Fall 2018, Spring 2018, Fall 2016
Special group studies on topics to be introduced by instructor or students.
Special Group Study: Read More [+]
Rules & Requirements
Credit Restrictions: May be repeated for credit up to unit limitation.
Repeat rules: Course may be repeated for credit up to a total of 4 units.
Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Summer: 8 weeks - 8-32 hours of independent study per week
Additional Details
Subject/Course Level: Architecture/Graduate
Grading: The grading option will be decided by the instructor when the class is offered.
Special Group Study: Read Less [-]
ARCH 299 Individual Study and Research for Master's and Doctoral Students 1 - 12 Units
Terms offered: Summer 2018 8 Week Session, Fall 2015, Spring 2015
Individual studies including reading and individual research under the supervision of a faculty adviser and designed to reinforce the student's background in areas related to the proposed degree.

Rules & Requirements
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 1-12 hours of independent study per week
Summer: 8 weeks - 1.5-22.5 hours of independent study per week

Additional Details
Subject/Course Level: Architecture/Graduate
Grading: Letter grade.

ARCH 375 Seminar in the Teaching of Architecture 2 Units
Terms offered: Spring 2021, Spring 2020, Spring 2019
This class is intended for first-time graduate student instructors, especially those working in studio and lab settings. The class covers a range of issues that normally come up when teaching, offers suggestions regarding how to work well with other graduate student instructors and faculty, and how to manage a graduate student instructor's role as both student and teacher. The greatest benefit of this class comes from the opportunity to explore important topics together. Using a relatively light, but provocative set of readings, the seminar will explore the issues raised each week. There will be one assignment intended to help students explore their own expectations as educators.

Seminar in the Teaching of Architecture: Read More [+]

Additional Details
Subject/Course Level: Architecture/Professional course for teachers or prospective teachers
Grading: Offered for satisfactory/unsatisfactory grade only.
Formerly known as: Architecture 300

ARCH 602 Individual Study for Doctoral Students 1 - 8 Units
Terms offered: Fall 2015, Fall 2014, Fall 2013
Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. This course may not be used for units or residence requirements for the doctoral degree.

Rules & Requirements
Repeat rules: Course may be repeated for credit without restriction.

Hours & Format
Fall and/or spring: 15 weeks - 0 hours of independent study per week
Summer: 8 weeks - 2-8 hours of independent study per week

Additional Details
Subject/Course Level: Architecture/Graduate examination preparation
Grading: Offered for satisfactory/unsatisfactory grade only.

Individual Study for Doctoral Students: Read Less [-]