ARCHITECTURE (ARCH)

Professional Courses

ARCH 500 Architecture Core Studio I: Project
Crosslisted with: ARCH 800
Prerequisites: Admission into the 3 Year Master of Architecture program or permission.
Description: Introduction to architectural design through spatial and formal projects using representational techniques. A series of collaborative and individual projects introduce design process, iteration, tectonics, representation, and structure as fundamental aspects of design that relate architecture to the human subject.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO
Prerequisite for: ARCH 501, ARCH 801

ARCH 501 Architecture Core Studio II: Incorporate
Crosslisted with: ARCH 801
Prerequisites: ARCH 500 or permission.
Description: The studio extends the methodologies from the preceding studio to include outside influences such as site, urbanism, program, culture, and materiality. Projects increase in scope and complexity and integrate a wide range of inputs through research and analysis.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 510 Advanced Architectural Design I
Crosslisted with: ARCH 810
Prerequisites: 5th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 511 Advanced Architectural Design II
Crosslisted with: ARCH 811
Prerequisites: 5th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 518 Fabrication and Construction Team
Crosslisted with: ARCH 418, ARCH 818
Prerequisites: Permission.
Description: The shifting relationship between conceiving and making through hands-on, collaborative experience with actual design-construct projects in which students play a decisive role in all aspects of research, design and construction of the commission.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

ARCH 526 Digital Fabrication
Crosslisted with: ARCH 826
Prerequisites: Permission
Description: Examination of the theory and application of the file-to-factory design process. Exploratory case study projects include small fabricated architectural models of forms, surface and structure.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 527 Parametric Modeling for Design
Prerequisites: ARCH 527
Description: Introduction to parametric and related basic computational concepts for design. Explorations in specific parametric modeling software techniques.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

ARCH 532A Seismic Design for Architects
Crosslisted with: ARCH 832A
Prerequisites: Permission.
Description: Introduction to basic seismic design principles. Making critical decisions concerning the overall performance of a building during an earthquake.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Format: LEC

ARCH 540 Details
Crosslisted with: ARCH 440, ARCH 840
Prerequisites: ARCH 341 or permission.
Description: Focused study of architectural theory and problems of practice and physicality examined in the context of the architectural detail.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 543 Architectural Representations: Theory + Application
Crosslisted with: ARCH 443, ARCH 843
Prerequisites: ARCH 311 or by Permission.
Description: Explores architectural practice relative to representational communication both internally within the design process as well as with an external audience. This course also investigates the impact of tangential techniques appropriated to the practice. Readings, discussions, and projects will focus on issues of perception and projection relative to these systems and how they impact the practice of architecture in a contemporary context. Course structure is both a theory seminar addressing the position of representation through readings, as well as a laboratory for investigating their application.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ARCH 547 African Architecture
Crosslisted with: ARCH 347, AHIS 366, ETHN 347
Prerequisites: Sophomore standing.
Description: Survey of the architectural traditions of the African continent, from pre-historic times to the present day. Buildings-famous and typical-theories, and approaches that are appropriate to the specific cultural environments.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 558 The Changing Workplace
Crosslisted with: ARCH 458, ARCH 858, IDES 458, IDES 858
Description: Survey and integration of theory, methods, research and findings from the social, behavioral, and managerial sciences as they relate to the design of work environments. Factors effecting change in the contemporary workplace.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 561 Urbanism
Crosslisted with: ARCH 461, LARC 461, ARCH 861
Prerequisites: Admission to a professional program in the College of Architecture or permission
Description: Issues of contemporary urbanism and the processes of urban design. Experiential nature of cities, role of public policy, ideology, genesis and development of urban form and space.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 562 Urbanism and the Catalysts of Change
Crosslisted with: ARCH 862
Prerequisites: Admission into the graduate portion of the professional program in architecture or permission
Description: Exploration into the relationship between the evolution of urbanism and the cultural, economic and scientific advances made by civilization.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 563 Project Territory
Crosslisted with: ARCH 863
Prerequisites: Admission into the graduate portion of the professional program in architecture or permission
Description: Comprehensive review and examination of territorial relationships between spatial development, engineering, ecology, and architecture. Focuses on emerging factors affecting urban, suburban, and rural communities and spatial configurations beyond the binary of city and country.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 566 Community Design Center
Crosslisted with: ARCH 466, ARCH 866
Prerequisites: Permission.
Description: Community-oriented design studio. The design process and its relationship to the environmental development process.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

ARCH 567 Planting Design
Crosslisted with: ARCH 467, ARCH 867, LARC 467, HORT 467
Prerequisites: HORT/LARC/NRES 212; ARCH 101 or HORT/LARC 266.
Description: Design processes, principles, and elements as applied to the use of native and ornamental plant materials. Aesthetic, functional, and micro-climatic arrangements of plant material in parks, on commercial property, on home grounds, along roadways, and in urban open spaces. Develop a palette of plants and graphics for designs.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Format: LEC

ARCH 581 Women in Design
Crosslisted with: ARCH 481, ARCH 881, IDES 481
Prerequisites: Admission to the BSD program or permission.
Description: Intensive study of particular historical and contemporary contributions by women to the design professions related to the built environment. Evaluation of design work by and about women seen in their aesthetic and intellectual context. Examinations of the roles and values of women in design and their impact on the assumptions and issues currently held by the profession.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 582 Advanced Color Theory
Crosslisted with: ARCH 482, ARCH 882, IDES 482, IDES 882
Prerequisites: Admission to the third year in architecture or Interior Design Program; or permission.
Description: Advanced color theories and their application to the Built environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 589 Design Research
Crosslisted with: ARCH 489, ARCH 889, IDES 489, IDES 889, LARC 489
Description: Comprehensive overview of the complementary and contributory relationship between research and design, with a particular emphasis on design research as a projective activity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ARCH 597 Selected Topics in Architecture
Crosslisted with: ARCH 497, ARCH 497H, ARCH 697, ARCH 897
Prerequisites: Permission.
Description: Group investigation of a topic in architecture originated by
the instructor.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 24
Format: LEC

ARCH 598 Problems in Architecture
Crosslisted with: ARCH 498, ARCH 498H, ARCH 898
Prerequisites: Permission.
Description: Individual investigation of a topic in architecture.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 9
Format: IND

ARCH 610 Advanced Architectural Design III
Crosslisted with: ARCH 910
Prerequisites: 6th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 611 Advanced Architectural Design IV
Crosslisted with: ARCH 911
Prerequisites: 6th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 613 Architectural Design: Terminal Project Studio I
Crosslisted with: ARCH 913
Prerequisites: ARCH 510/*810, submission of a statement of intent and a
contract with a faculty mentor
Description: Advanced architectural design. The first part of a year-long
design project initiated by the student and developed in conjunction
with a faculty mentor. The first course in the sequence consists of
initial studies that are further developed and completed in the following
semester. These initial studies lead to a written and visual proposal
that sets the parameters and the agenda for detailed formal design
explorations in the following semester.
Credit Hours: 6
Max credits per semester: 6
Max credits per degree: 6
Format: SDO

ARCH 614 Architectural Design: Terminal Project Studio II
Crosslisted with: ARCH 914
Prerequisites: ARCH 613/913
Description: Advanced architectural design. The second part of a year-
long design project initiated by the student under the supervision and
guidance of a faculty mentor. The second course in the sequence
develops the formal expression and representation of a specific
architectural project as described in the previous semester's work.
Credit Hours: 6
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

ARCH 617 Product Design
Crosslisted with: ARCH 417, ARCH 817, IDES 417
Prerequisites: Junior standing or permission.
Description: Practical investigation in the use of materials and their
fabrication process with emphasis on wood, plastic, and steel. Generate a
design from conception to a finished product.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 680 Professional Practice
Crosslisted with: ARCH 880
Description: Orientation to professional practice through a study of
the architects' and the contractors' relationships to society, specific
clients, their professions, and other collaborators in the environmental
design and construction fields. Ethics; professional communication
and responsibility; professional organizations; office management;
construction management; legal and contractual relationships;
professional registration; and owner-architect-contractor relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 691 Seminar in Architecture
Crosslisted with: ARCH 991
Prerequisites: ARCH 550/850 and permission
Description: Contemporary problems in design and practice.
Credit Hours: 2-3
Min credits per semester: 2
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 695 Internship
Crosslisted with: ARCH 895
Prerequisites: ARCH 550/850 and permission
Description: Exposure to the architectural profession through office
application including job promotion, client relations, data collection,
design, production drawings, estimating, specifications, bid documents,
and quality control.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Format: FLD
ARCH 697 Selected Topics in Architecture
Crosslisted with: ARCH 497, ARCH 497H, ARCH 597, ARCH 897
Prerequisites: Permission.
Description: Group investigation of a topic in architecture originated by the instructor.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 24
Format: LEC

ARCH 699 Masters Thesis
Crosslisted with: ARCH 899
Prerequisites: ARCH *896; any two of ARCH 511/911, 612/*812, or 613/913; admission to masters degree program and permission of major adviser
Description: Projects to place special emphasis upon a major field of interest. Design problem or written thesis.
Credit Hours: 1-10
Min credits per semester: 1
Max credits per semester: 10
Max credits per degree: 10
Format: IND

Graduate Courses

ARCH 800 Architecture Core Studio I: Project
Crosslisted with: ARCH 500
Prerequisites: Admission into the 3 Year Master of Architecture program or permission.
Description: Introduction to architectural design through spatial and formal projects using representational techniques. A series of collaborative and individual projects introduce design process, iteration, tectonics, representation, and structure as fundamental aspects of design that relate architecture to the human subject.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO
Prerequisite for: ARCH 501, ARCH 801

ARCH 801 Architecture Core Studio II: Incorporate
Crosslisted with: ARCH 501
Prerequisites: ARCH 800 or permission.
Description: The studio extends the methodologies from the preceding studio to include outside influences such as site, urbanism, program, culture, and materiality. Projects increase in scope and complexity and integrate a wide range of inputs through research and analysis.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 810 Advanced Architectural Design I
Crosslisted with: ARCH 510
Prerequisites: 5th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 811 Advanced Architectural Design II
Crosslisted with: ARCH 511
Prerequisites: 5th year standing, professional program
Description: Vertically integrated 5th and 6th year studio.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Format: SDO

ARCH 815 Architectural Design: Terminal Project Studio I
Prerequisites: MAff/MCRP dual degree candidate
Description: Initial investigation into the parameters and agenda leading to a proposal for the terminal studio project.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: SDO

ARCH 816 Architectural Design: Terminal Project Studio II
Prerequisites: Permission.
Description: Detailed formal design development of the terminal studio project established in ARCH 815 and CRPL 990.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: SDO

ARCH 817 Product Design
Crosslisted with: ARCH 417, ARCH 617, IDES 417
Prerequisites: Junior standing or permission.
Description: Practical investigation in the use of materials and their fabrication process with emphasis on wood, plastic, and steel. Generate a design from conception to a finished product.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

ARCH 818 Fabrication and Construction Team
Crosslisted with: ARCH 418, ARCH 518
Prerequisites: Permission.
Description: The shifting relationship between conceiving and making through hands-on, collaborative experience with actual design-construct projects in which students play a decisive role in all aspects of research, design and construction of the commission.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

ARCH 826 Digital Fabrication
Crosslisted with: ARCH 526
Prerequisites: Permission.
Description: Examination of the theory and application of the file-to-factory design process. Exploratory case study projects include small fabricated architectural models of forms, surface and structure.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ARCH 832A Seismic Design for Architects  
Crosslisted with: ARCH 532A  
Prerequisites: Permission  
Description: Introduction to basic seismic design principles. Making critical decisions concerning the overall performance of a building during an earthquake.  
Credit Hours: 1  
Max credits per semester: 1  
Max credits per degree: 1  
Format: LEC  

ARCH 840 Details  
Crosslisted with: ARCH 440, ARCH 540  
Prerequisites: ARCH 341 or permission.  
Description: Focused study of architectural theory and problems of practice and physicality examined in the context of the architectural detail.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC  

ARCH 843 Architectural Representations: Theory + Application  
Crosslisted with: ARCH 443, ARCH 543  
Prerequisites: ARCH 311 or by Permission.  
Description: Explores architectural practice relative to representational communication both internally within the design process as well as with an external audience. This course also investigates the impact of tangential techniques appropriated to the practice. Readings, discussions, and projects will focus on issues of perception and projection relative to these systems and how they impact the practice of architecture in a contemporary context. Course structure is both a theory seminar addressing the position of representation through readings, as well as a laboratory for investigating their application.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC  

ARCH 847 Details  
Crosslisted with: ARCH 447, ARCH 547  
Prerequisites: Admission to a professional program in the College of Architecture or permission.  
Description: Issues of contemporary urbanism and the processes of urban design. Experiential nature of cities, role of public policy, ideology, genesis and development of urban form and space.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC  

ARCH 861 Urbanism  
Crosslisted with: ARCH 461, LARC 461, ARCH 561  
Prerequisites: Admission to a professional program in the College of Architecture or permission  
Description: Issues of contemporary urbanism and the processes of urban design. Experiential nature of cities, role of public policy, ideology, genesis and development of urban form and space.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC  

ARCH 862 Urbanism and the Catalysts of Change  
Crosslisted with: ARCH 562  
Prerequisites: Admission into the graduate portion of the professional program in architecture or permission  
Description: Exploration into the relationship between the evolution of urbanism and the cultural, economic and scientific advances made by civilization.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC  

ARCH 863 Project Territory  
Crosslisted with: ARCH 563  
Prerequisites: Admission into the graduate portion of the professional program in architecture or permission  
Description: Comprehensive review and examination of territorial relationships between spatial development, engineering, ecology, and architecture. Focuses on emerging factors affecting urban, suburban, and rural communities and spatial configurations beyond the binary of city and country.  
Credit Hours: 3  
Min credits per semester: 1  
Max credits per semester: 6  
Max credits per degree: 6  
Format: LEC  

ARCH 867 Planting Design  
Crosslisted with: ARCH 467, ARCH 567, LARC 467, HORT 467  
Prerequisites: HORT/LARC/NRES 212; ARCH 210 or HORT/LARC 266.  
Description: Design processes, principles, and elements as applied to the use of native and ornamental plant materials. Aesthetic, functional, and micro-climatic arrangements of plant material in parks, on commercial property, on home grounds, along roadways, and in urban open spaces. Develop a palette of plants and graphics for designs.  
Credit Hours: 4  
Max credits per semester: 4  
Max credits per degree: 4  
Format: LEC  

ARCH 880 Professional Practice  
Crosslisted with: ARCH 680  
Description: Orientation to professional practice through a study of the architects’ and the contractors’ relationships to society, specific clients, their professions, and other collaborators in the environmental design and construction fields. Ethics, professional communication and responsibility, professional organizations; office management; construction management; legal and contractual relationships; professional registration; and owner-architect-contractor relationships.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Format: LEC
ARCH 881 Women in Design  
**Crosslisted with:** ARCH 481, ARCH 581, IDES 481  
**Prerequisites:** Admission to the BSD program or permission.  
**Description:** Intensive study of particular historical and contemporary contributions by women to the design professions related to the built environment. Evaluation of design work by and about women seen in their aesthetic and intellectual context. Examinations of the roles and values of women in design and their impact on the assumptions and issues currently held by the profession.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

ARCH 882 Advanced Color Theory  
**Crosslisted with:** ARCH 482, ARCH 582, IDES 482, IDES 882  
**Prerequisites:** Admission to the third year in architecture or Interior Design Program; or permission.  
**Description:** Advanced color theories and their application to the Built environment.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

ARCH 885 Research Methods in Architecture and Interior Design  
**Crosslisted with:** IDES 885  
**Description:** Research methods employed by the diverse specializations within the disciplines of architecture and interior design. Methods which contribute to a theoretical and informational body of knowledge as well as those contributing directly to design application.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

ARCH 889 Design Research  
**Crosslisted with:** ARCH 489, ARCH 589, IDES 489, IDES 889, LARC 489  
**Description:** Comprehensive overview of the complementary and contributory relationship between research and design, with a particular emphasis on design research as a projective activity.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

ARCH 895 Internship  
**Crosslisted with:** ARCH 695  
**Prerequisites:** ARCH 550/850 and permission  
**Description:** Exposure to the architectural profession through office application including job promotion, client relations, data collection, design, production drawings, estimating, specifications, bid documents, and quality control.  
**Credit Hours:** 1-6  
**Min credits per semester:** 1  
**Max credits per semester:** 6  
**Max credits per degree:** 6  
**Format:** FLD

ARCH 897 Selected Topics in Architecture  
**Crosslisted with:** ARCH 497, ARCH 497H, ARCH 597, ARCH 697  
**Prerequisites:** Permission.  
**Description:** Group investigation of a topic in architecture originated by the instructor.  
**Credit Hours:** 1-6  
**Min credits per semester:** 1  
**Max credits per semester:** 6  
**Max credits per degree:** 24  
**Format:** LEC

ARCH 898 Problems in Architecture  
**Crosslisted with:** ARCH 498, ARCH 498H, ARCH 598  
**Prerequisites:** Permission.  
**Description:** Individual investigation of a topic in architecture.  
**Credit Hours:** 1-10  
**Min credits per semester:** 1  
**Max credits per semester:** 10  
**Max credits per degree:** 10  
**Format:** IND

ARCH 899 Masters Thesis  
**Crosslisted with:** ARCH 699  
**Prerequisites:** ARCH *896; any two of ARCH 511/911, 612/*812, or 613/913; admission to masters degree program and permission of major adviser  
**Description:** Projects to place special emphasis upon a major field of interest. Design problem or written thesis.  
**Credit Hours:** 1-10  
**Min credits per semester:** 1  
**Max credits per semester:** 10  
**Max credits per degree:** 10  
**Format:** IND

ARCH 910 Advanced Architectural Design III  
**Crosslisted with:** ARCH 610  
**Prerequisites:** 6th year standing, professional program  
**Description:** Vertically integrated 5th and 6th year studio.  
**Credit Hours:** 5  
**Max credits per semester:** 5  
**Max credits per degree:** 5  
**Format:** SDO

ARCH 911 Advanced Architectural Design IV  
**Crosslisted with:** ARCH 611  
**Prerequisites:** 6th year standing, professional program  
**Description:** Vertically integrated 5th and 6th year studio.  
**Credit Hours:** 5  
**Max credits per semester:** 5  
**Max credits per degree:** 5  
**Format:** SDO
ARCH 913 Architectural Design: Terminal Project Studio I
Crosslisted with: ARCH 613
Prerequisites: ARCH 510/*810, submission of a statement of intent and a contract with a faculty mentor
Description: Advanced architectural design. The first part of a year-long design project initiated by the student and developed in conjunction with a faculty mentor. The first course in the sequence consists of initial studies that are further developed and completed in the following semester. These initial studies lead to a written and visual proposal that sets the parameters and the agenda for detailed formal design explorations in the following semester.
Credit Hours: 6
Max credits per semester: 6
Max credits per degree: 6
Format: SDO

ARCH 914 Architectural Design: Terminal Project Studio II
Crosslisted with: ARCH 614
Prerequisites: ARCH 613/913
Description: Advanced architectural design. The second part of a year-long design project initiated by the student under the supervision and guidance of a faculty mentor. The second course in the sequence develops the formal expression and representation of a specific architectural project as described in the previous semester's work.
Credit Hours: 6
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

ARCH 991 Seminar in Architecture
Crosslisted with: ARCH 691
Prerequisites: ARCH 550/850 and permission
Description: Contemporary problems in design and practice.
Credit Hours: 2-3
Min credits per semester: 2
Max credits per semester: 3
Max credits per degree: 3
Format: LEC