CONSTRUCTION MANAGEMENT AND ARCHITECTURE

CMA-51. Introduction to Construction Management and Architecture (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Fundamental required core course for Construction Management and Architecture Program offers a comprehensive overview of the construction profession and summarizes areas within the industry. Course introduces specific essentials associated with the wide range of construction careers and technology, including construction processes, tools, skills, design, management, methods and materials, safety, required career education and training.

CMA-52. Construction Graphics (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Introduction to fundamental interpretation and analysis of construction drawings, CAD prints, specifications, and digital building information models, including use of manual sketching and computer modeling techniques for construction communication. Students will perform basic scale, measurement, and dimensional calculations.

CMA-53. Sustainable Construction Materials and Methods (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Introduction to use of basic construction materials, methods, and systems incorporating current accepted construction industry principles for sustainability.

CMA-54. Introduction to Construction Estimating (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Presents the art of estimating for purposes of construction bidding, by introducing and applying fundamental principles for quantity takeoffs and construction labor cost estimating. Spreadsheet construction estimates will be prepared in MS Excel for a wide range of common building materials, systems, and manufactured products. Students must possess basic computer skills. Instruction in necessary MS Excel skills included.

CMA-55. Introduction to Structural Design and Codes (3)
   **Pass/No Pass Option**
   **Lec 2 Hrs; Lab 3 Hrs**
Introduction to California Building Code requirements and basic principles of structural design: loads, foundations, columns, beams, static determinate frames, lateral load resisting systems, moment frames, and diaphragms.

CMA-56. Basic Principles of Construction Project (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Basic fundamental course introducing principles, methods, and standard industry practices specific to construction project accounting.

CMA-57. Construction Law and Contracts (3)
   **Pass/No Pass Option**
   **Lec 3 Hrs**
Overview of legal principles, rights, duties, and responsibilities of participants in project design and construction, accepted methods of dispute resolution, historical patterns of reasoning governing choice of applicable law, application of law to facts and circumstances, industry standard contracts, contract formation and interpretation, California license, mechanics’ lien, labor law, and risk management.

CMA-61. Construction Field Practice: Layout, Foundations and Framing (4)
   **Pass/No Pass Option**
   **Lec 2 Hrs; Lab 6 Hrs**
Covers first phases of residential and light commercial construction processes with focus placed on layout, rough framing principles, techniques, and skills. Students will construct simple structures on campus from basic architectural plans, beginning with building layout surveying, forming foundations ground floor construction, including both raised foundations and slabs on grade; progressing through floor framing, walls, door and window openings, stairs, second floor framing; and concluding with framing flat and sloped roofs, hip, valley, gable, eave, and parapet details.

CMA-62. Construction Field Practice: Exterior and Interior Finish (4)
   **Pass/No Pass Option**
   **Lec 2 Hrs; Lab 6 Hrs**
Covers second phase of residential and light commercial construction processes with focus placed on installation of simple mechanical, electrical, and plumbing systems, installation of doors and windows, and completion of exterior and interior finishes for simple small structures on campus from basic architectural plans. After completion, students will deconstruct and salvage building materials and fixtures for recycling.

CMA-63. Concrete and Masonry Technology (3)
   **Pass/No Pass Option**
   **Lec 2 Hrs; Lab 3 Hrs**
Fundamentals of the masonry and concrete industries, including residential, commercial, and civil field principles and practice, project layout, tools, materials, finishing, and sustainability issues.

CMA-64. Electrical Systems (3)
   **Pass/No Pass Option**
   **Lec 2 Hrs; Lab 3 Hrs**
An introductory study of electrical wiring techniques and practices used in both commercial and residential construction. Topics include safety, tools, principles, circuits, conductors, grounding, wiring, layout, lighting, codes and licenses. Energy-conserving products and solar electric installation topics are also discussed.

[CSU]
CMA-65. Plumbing and HVAC (3)
**Pass/No Pass Option**
Lec 2 Hrs; Lab 3 Hrs
Covers traditional plumbing and HVAC principles and skills such as piping materials and joining methods as well as innovative systems such as solar hot water and geothermal HVAC.

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CMA-66. Introduction to Heavy Construction (3)
**Pass/No Pass Option**
Lec 3 Hrs
Provides a comprehensive overview of highway and other heavy construction. Emphasis is placed on communications, plans, specifications and grade control; equipment; below grade construction and earthmoving; plant operations; paving and structures. Prepares the student to pass the NCCER (National Center for Construction Education and Research) competency test for this level of instruction. Class will make a field visit to a highway construction job.

[CSU]

CMA-69. Introduction to Revit Architecture (3)
**Advisory:** DRA-52
**Pass/No Pass Option**
**Fall Only**
Lec 2 Hrs; Lab 3 Hrs
This course covers the basics of Revit Architecture, from schematic design through construction documentation. Students will learn how to: set up a new building information model; create a basic floor plan; work with basic architectural elements (walls, doors, windows, floors, ceilings, roofs, curtain walls, stairs and railings); create sections, elevations and callouts views; add annotations including dimensions, text, tags, schedules and legends; and share designs by working in teams, creating architectural visualization renderings and plotting finished drawings.

CMA-70. Architectural Design and Visual Communication I (3)
**Advisory:** CMA-81
**Pass/No Pass Option**
**Fall Only**
Lec 2 Hrs; Lab 3 Hrs
Fundamental issues, concepts, and processes involved in two- and three-dimensional architectural drawing and design are introduced. Emphasis is placed upon acquisition of architectural visualization and graphic skills necessary to solve architectural design problems. Students prepare and present design solutions in drawings, using freehand diagrams, gesture sketches, and hard-line drawings, in multi-view, paraline, and perspective systems. A range of techniques and media are employed to comprehend, generate and visually communicate three-dimensional forms, spaces, and environments in two-dimensional architectural drawings. Integration of traditional manual design methods is introduced in development and refinement of a digital three dimensional architectural model. Students who have completed DRA 70 with grade "C" or better are not allowed to take this course.

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CMA-71. Architectural Design and Visual Communication II (3)
**Prerequisite:** CMA-70 with a grade of "C" or better.
**Pass/No Pass Option**
**Spring Only**
Lec 2 Hrs; Lab 3 Hrs
Course will extend and add to competency achieved in two- and three-dimensional architectural drawing and design communication in CMA-70, using a variety of media including digital drawing and design tools. Drawing and design content will include architectural visual and experiential complexity, spatial definition, structural stability, color theory, shadow casting, digital model building, and representation of materials, transparency, and reflection. Formerly DRA-71. Not open to students who have completed DRA-71 with grade of "C" or better.

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CMA-72. Architectural Design and Visual Communication III (3)
**Prerequisite:** CMA-70 with a grade of "C" or better.
**Pass/No Pass Option**
**Spring Only**
Lec 2 Hrs; Lab 3 Hrs
Covers a range of various media, including both manual and digital drawing and design tools used as part of architectural design and visual communication processes. The expressive qualities of architecture, communication design, diagramming, building analysis, site analysis, response to context, and accommodation of human activities will be explored. Students will create an annotated final architectural design presentation utilizing a 3D digital model. Formerly DRA-72. Not open to students who have completed DRA 72 with grade "C" or better.

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CMA-74. Industrial Drawing and Print Reading (3)
**Pass/No Pass Option**
Lec 2 Hrs; Lab 3 Hrs
Introduction to print reading and technical drawing. Students will learn to apply the principles of orthographic projection, technical sketching, applied geometry, reading, interpreting technical drawings, technical sketching, the use of drawing instruments, drawing layout, standards and dimensioning techniques. Not open to students who have completed DRA-50 or DRA-64 with a "C" or better.

CMA-75. Engineering Drawing with Solidworks (3)
**Advisory:** CMA-74
**Pass/No Pass Option**
**Spring Only**
Lec 2 Hrs; Lab 3 Hrs
Introduces students to essential features of the SolidWorks 3-D computer-aided design modeling application software. Students will construct parts, solid models, assemblies, as well as generate orthographic drawings, add dimensions and plot to produce engineering documentation packages. Formerly EGN-12 and DRA-55. Not open to students who have completed EGN-12 or DRA-55 with a grade of "C" or better.)

[CSU;UC]
CMA-76. Computer-Aided Mechanical Drawing and Detailing (3)  
Advisory: CMA-75  
Pass/No Pass Option  
Fall Only  
Lec 2 Hrs; Lab 3 Hrs  
An advanced study of orthographic projection with precision dimensioning. Includes tolerance and fit, geometric tolerance, different types of sectional views, and fastening devices for manufacturing industries. Emphasis is placed on modern and applied drafting and methods established by the American National Standard Institute (ANSI). Computer aided drafting and design tools such as SolidWorks, Autodesk's Inventor or similar will be used. Formerly DRA 58. Not open to students who have completed DRA-58 with a grade of "C" or better.  
[CSU]

CMA-81. Computer Aided Drafting and Design I (3)  
Fall Only  
Lec 2 Hrs; Lab 3 Hrs  
Introduces how to use AutoCAD to set up drawings and construct lines, circles, arcs, other objects, geometric shapes and constructions, and text. Students will use display and editing techniques, obtain information about their drawings, and work with drawing files. Also introduces recommended drafting standards to prepare technical drawings and also covers topics in basic dimensioning, parametric drafting, drawing layout, plotting, and creating sheet sets. Formerly DRA-52. Not open to students who have completed DRA-52 with a grade of "C" or better.  
[CSU]

CMA-82. Computer Aided Drafting and Design II (3)  
Prerequisite: CMA-81 with a grade of "C" or better.  
Spring Only  
Lec 2 Hrs; Lab 3 Hrs  
Builds on the knowledge acquired in CMA-81 Computer Aided Design I. Examines dimensioning, blocks and attributes, section views, multi-view layouts, annotative objects, external references, and sheet sets. Students will learn how to use AutoCAD advanced dimension tools, create section lines and graphic patterns, design symbols, attributes for multiple use, and isometric drawings. Explores the three-dimensional solid modeling and viewing capabilities of AutoCAD. Formerly DRA-53. Not open to students who have completed DRA-53 with a grade "C" or better.  
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CMA-83. Introduction to Revit Architecture (3)  
Advisory: CMA-81  
Pass/No Pass Option  
Fall Only  
Lec 2 Hrs; Lab 3 Hrs  
Covers the basics of Revit Architecture, from schematic design through construction documentation. Students will learn how to: set up a new building information model; create a basic floor plan; work with basic architectural elements (walls, doors, windows, floors, ceilings, roofs, curtain walls, stairs and railings); create sections, elevations and callouts views; add annotations including dimensions, text, tags, schedules and legends; and share designs by working in teams, creating architectural visualization renderings and plotting finished drawings. Formerly CMA-69. Not open to students who have completed CMA-69 with a grade of "C" or better.  
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CMA-84. Sustainable Construction Detailing (3)  
Pass/No Pass Option  
Lec 2 Hrs; Lab 3 Hrs  
Examination of residential and commercial building science principles for purposes of creation of three-dimensional construction details and product specifications to improve building sustainability and energy efficiency.  
[CSU]

CMA-90. BIM and Digital Technology Tools for Construction (3)  
Pass/No Pass Option  
Lec 2 Hrs; Lab 3 Hrs  
Exploration of construction management technical products and software including Building Information Modeling (BIM) applications, Sketch-up, and project management applications. Students should be familiar with standard computer functions prior to enrolling in this course.  
[CSU]

CMA-91. Construction Management and Scheduling (3)  
Spring Only  
Lec 2 Hrs; Lab 3 Hrs  
Course presents principles of construction project management, development and application of project control methods for compliance with construction contracts and specifications, general and supplementary conditions, and Construction Specifications Institute (CSI) specifications, cost, schedule, quality, safety, and change orders. Introduces work breakdown structures, critical path method; planning, monitoring and updating of schedules utilizing computer scheduling software.  
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