

# COMPUTER AIDED DESIGN & DRAFTING (CADD)

This is a list of the Computer Aided Design & Drafting (CADD) courses available at Kwantlen.

Core Courses | Architectural | Industrial | Manufacturing and Fabrication | Structural

## Architectural Courses

### CADA 1200 CR-3

#### Architectural Fundamentals

Students will study and apply architectural theory, the architectural development process, and the design process. They will learn to identify codes and standards, construction materials, and methods. Students will learn about building components and their application.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

### CADA 1210 CR-4

#### Single Family Residential

Students will prepare a site plan, floor plans, and a foundation plan for a single-family residential building. They will prepare framing schematics, sections and details, and exterior elevations. Students will develop schedules and present the project.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

### CADA 1220 CR-4

#### Commercial Buildings

Students will develop the design and then prepare a site plan, building plans, schematics, sections and details for a commercial building. They will use glazing and storefront components, apply codes and standards, and prepare interior and exterior elevations. Students will develop schedules and specifications, explain coordination procedures to ensure completion of the project, and give a presentation of the project. They will explain Leadership in Energy and Environmental Design (LEED) standards and its applications.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

### CADA 1250 CR-4

#### Introduction to Building Information Modeling (BIM) Software for Architectural

Students will identify types of 3-dimensional (3D) Architectural software. They will use 3D sketch software to create and combine assemblies to produce a building model. Students will use BIM software interface and identify principles of creating a building information model. They will identify families of components, set up a project, and set up views. Students will apply annotation and scheduling.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1302 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

### CADA 2100 CR-4

#### Multi-Family Residential

Students will follow best practice design development procedure to prepare a site plan, floor plans, and a foundation plan for a multi-family residential building. They will prepare framing schematics, sections and details, and exterior elevations and material schedules. Students will prepare documents to applicable codes and standards, follow procedures to ensure completion and coordination of the project and present completed construction documentation. They will prepare and present project features for public reviews.

*Prerequisites: Certificate in CADD - Architectural Specialty or DRAF 1110 and DRAF 1210 and DRAF 1310*

### CADA 2150 CR-4

#### Building Information Model (BIM) Software for Architectural - Project

Students will create advanced components, apply interior fittings, and use Building Information Model (BIM) software to output, input and link information. They will apply collaboration and design integration, use massing and phasing tools, and apply design options. Students will apply detailing, apply site design, and use advanced rendering techniques. They will use BIM software to complete a project.

*Prerequisites: CADA 1250*

## Core Courses

### CADD 1100 CR-4

#### Drafting Fundamentals

Students will set up drawings and use geometric construction and appropriate line-types to produce orthographic and pictorial representations of models. They will use projection techniques to construct intersections and developments of various three dimensional shapes. Students will apply sections and conventions and use details to enhance the representation fill-in title blocks and use quality control procedures to complete drawings. They will prepare a mechanical assembly drawing.

*Transferable (refer to transfer guide)*

### CADD 1110 CR-4

#### Summative Project

Students will follow the design process and use sketches, standards and codes to produce a set of drawings that would be suitable to mechanical, industrial or architectural projects. They will produce site and other required plans along with cross sections and elevations. Students will extract details and produce schedules. They will select appropriate presentation scales and apply annotation, dimensions and symbols as per industry standards.

*Transferable (refer to transfer guide)*

**CADD 1150 CR-4****Computer Aided Drafting & Design (CADD) Software**

Students will operate CADD software and use advanced construction techniques. They will use CADD software to perform analytical calculations, and to import and export data using external references and other techniques. Students will create three-dimensional (3D) solid and wire frame models. They will use presentation techniques to create two-dimensional (2D) images and 3D rendered images from 3D models. Students will customize the software user interface.

*Transferable (refer to transfer guide)*

**CADD 1160 CR-3****Introduction to Office Procedures and Software**

Students will use office software with CADD software to exchange data and graphics. They will follow basic office procedures to produce memos, change orders, and to follow document control and revision procedures. Students will investigate a variety of disciplines in the Drafting/CADD field and write a report or give a presentation on the discipline of their choice. Students will apply geometric, algebraic, and trigonometric principles to solve problems. They will develop educational plans and run student meetings.

*Transferable (refer to transfer guide)*

**CADD 2100 CR-4****CADD Graphics and Models: Rendering and Animation**

Students will render 2D graphics and create 2D perspectives. They will apply color, texture and shadows. Students will create digital 3D models, build physical models from common materials and use photo editing software to insert models into photographs. They will import 3D models into rendering and animation software and apply lighting and camera locations. Students will create motion paths, create flythrough paths and create assembly animations. They will give presentations of completed projects.

*Prerequisites: CADA 1250 or CADI 1250 or CADM 1250 or CADS 1250*

**CADD 2110 CR-4****Surveying and Site Work**

Students will apply surveying fundamentals and use surveying equipment to collect coordinates and elevations. They will apply algebra, geometry, trigonometry and introductory calculus to perform surveying calculations. Students will prepare a subdivision drawing and indicate boundaries, access, roads and services. They will indicate contour lines and perform cut and fill calculations. Students will prepare a site layout, determine site grading and drainage, prepare retaining walls and outlines of buildings to complete a site plan drawing. They will use 3D modeling software for Civil applications.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or DRAF 1150) and (CADD 1160 or DRAF 1160 or DRAF 1270)*

**CADD 2160 CR-4****Professional Practice for Design and Drafting**

Students will explain document control procedures and apply a document change-manage process. They will follow health and safety procedures, describe the effects of office ergonomics, and follow appropriate office department related to design and drafting. Students will explain liability issues, follow ethical principles, and explain basic project management principles related to design and drafting. They will identify the roles of Engineering and Architectural professionals.

*Prerequisites: CADD 1160 or DRAF 1160*

**CADD 2210 CR-4****Document Control and Web Portfolio**

Students will explain the need for document control and identify roles and responsibilities in document control. They will categorize types of documents and their purposes and implement document control procedures. Students will set up document control websites, create information websites and create portfolio websites. They will participate in online meetings with document and application sharing. Students will give presentations of completed projects.

*Prerequisites: CADA 1250 or CADI 1250 or CADM 1250 or CADS 1250*

**CADD 2250 CR-4****CADD Customization and Networks**

Students will explain the need for CADD customization and identify programming languages used with CADD software. They will determine the appropriate programming language for a variety of CADD custom functions, use programming to customize CADD software and use scripting and macros. Students will explain the fundamentals of operating systems and describe command line interfaces and system utilities. They will install CADD software, set-up multi-user CADD local area network (LAN) with client/server, apply permissions and install printers.

*Prerequisites: CADA 1250 or CADI 1250 or CADM 1250 or CADS 1250*

## Industrial Courses

**CADI 1200 CR-3****Industrial Applications**

Students will identify industrial processes and codes and standards. They will describe industrial design development, identify information from external resources, and describe types of drawings. Students will prepare a flow chart and a general arrangement, and identify materials handling equipment and components. They will identify piping equipment and components, and participate in industrial field trips.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADI 1210 CR-4**

##### **Conveyor Systems**

Students will identify types of transfer decks, apply design criteria, and identify design principles to prepare a transfer deck. They will identify types of conveyors, draw and detail a belt conveyor, and prepare chute details. Students will apply appropriate drafting practice.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADI 1220 CR-4**

##### **Process Piping**

Students will prepare piping and instrumentation diagrams, lay out a general arrangement, and prepare details of piping equipment. They will develop pipe routing and follow design principles to output piping orthographics and isometrics. Students will produce isometric spool drawings and apply appropriate drafting practice.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADI 1250 CR-4**

##### **Introduction to Industrial 3-Dimensional Modeling Software**

Students will identify 3-dimensional (3D) software for industrial and mechanical applications. They will use 3D parametric modeling software to make effective sketches, model parts and generate 2-dimensional (2D) drawings. Students will create assembly files, presentation drawings and assembly drawings. They will use process piping software to place components into a piping model, create orthographic piping working drawings, and to automatically generate piping isometric drawings with a bill of materials. Students will use piping and instrumentation diagram (P&ID) software to create piping schematics.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 plus DRAF 1302 plus DRAF 1306]) and (CADD 1160 or DRAF 1160)*

## **Manufacturing and Fabrication Courses**

#### **CADM 1200 CR-3**

##### **Fundamentals of Manufacturing and Fabrication**

Students will use manufacturing terms and definitions, follow safety procedures, and describe the characteristics of manufacturing materials. They will identify the roles of manufacturing professionals, and describe the manufacturing process flow. Students will identify manufacturing and fabrication equipment, identify heat treatments, and describe manufacturing and fabrication processes. They will describe assembly processes, identify sources of parts and materials, use measuring tools and techniques and apply geometric tolerance and dimensioning. Students will describe tolerancing and its effect on processes. They will identify welding processes, and identify common material stock shapes.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 and DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADM 1210 CR-4**

##### **Component Assembly and Details**

Students will apply information from reference sources, follow relevant codes and standards, and follow Enterprise Resources Planning (ERP) and Material Resources Planning (MRP) procedures. They will describe the design intent of the assembly, source manufactured components, and prepare assembly and sub-assembly detail drawings. Students will prepare drawings of discrete parts, weldment drawings and sheet metal drawings. They will apply methods of dimensioning and specify machining techniques. Students will follow document control procedure for revised parts and identify quality control procedures. They will prepare bill of materials and material pull sheets, and follow document control procedures.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 and DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADM 1220 CR-4**

##### **Integrated Machine Design Systems**

Students will identify the systems involved in machine design, and differentiate between the design concepts; function and form. They will describe alternative approaches to problem solving and the relationship to design. Students will identify structural, mechanical, electrical, electronic, and electro-mechanical principles related to machine design. They will identify software platforms used in industrial applications, apply trouble-shooting techniques, perform diagnostics, and perform analysis of basic designs.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 and DRAF 1306]) and (CADD 1160 or DRAF 1160)*

#### **CADM 1250 CR-4**

##### **3 Dimensional (3D) Parametric Solids Modeling Software**

Students will identify 3D software for each discipline, and list types of 3D parametric modeling software. They will use 3D parametric software interface and viewing commands and use 2 dimensional (2D) sketches to create 3D solids and surfaces. Students will create multiple configurations using tables and apply top-down modeling techniques to create assemblies with constraints. They will identify output formats and their applications. Students will create 2D rendered pictorial drawings, exploded assembly drawings and animation of assemblies.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [DRAF 1150 and DRAF 1306]) and (CADD 1160 or DRAF 1160)*

# Structural Courses

## CADS 1200 CR-4

### Introduction to Structural Drafting and Concrete

Students will describe the structural discipline and apply information from appropriate reference drawings and design notes to prepare concrete floor plans and foundation details, and apply reinforcing information. They will identify concrete characteristics, apply geotechnical information and identify principles of foundation design to prepare anchor bolt and equipment pad details. Students will identify precast / prestressed concrete and calculate reinforcing / concrete quantities. They will develop sections and elevations from plans.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [(DRAF 1150 plus DRAF 1306)]) and (CADD 1160 or DRAF 1160)*

## CADS 1210 CR-4

### Structural Steel

Students will apply structural steel shapes, prepare line diagrams and apply bridging and open web steel joist extensions. They will prepare bolted and welded steel connections and prepare shop drawings. Students will calculate structural steel quantities.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [(DRAF 1150 plus DRAF 1306)]) and (CADD 1160 or DRAF 1160)*

## CADS 1220 CR-4

### Wood Frame and Heavy Timber

Students will apply wood framing fundamentals. They will prepare drawings and details for a bridge approach span, a bridge main span and an abutment for a timber bridge. Students will indicate high and low water levels and prepare timber connections and an expansion joint detail.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [(DRAF 1150 plus DRAF 1306)]) and (CADD 1160 or DRAF 1160)*

## CADS 1250 CR-3

### Introduction to Building Information Model (BIM) Software for Structural

Students will identify types of 3-dimensional (3D) used in structural applications. They will use 3D sketch software to model structural components and combine components to create a building model. Students will identify fundamentals of building modeling and will use Building Information Modeling software (BIM). They will identify hierarchies of components, set up drawings and output, import and export information. Students will apply annotation and scheduling.

*Prerequisites: (CADD 1100 or DRAF 1100) and (CADD 1110 or DRAF 1110) and (CADD 1150 or [(DRAF 1150 plus DRAF 1306)]) and (CADD 1160 or DRAF 1160)*

## CADS 2100 CR-4

### Site Work

Students will indicate contour lines, prepare site layout, and determine site grading. They will prepare site drainage, retaining walls, outline of buildings and prepare site access. Students will complete a site plan drawing.

*Prerequisites: Certificate in CADD - Structural Specialty or DRAF 1360*

## CADS 2150 CR-4

### Building Information Model (BIM) for Structural - Project

Students will explain document control procedures and apply a document change-manage process. They will follow health and safety procedures, describe the effects of office ergonomics, and follow appropriate office department related to design and drafting. Students will explain liability issues, follow ethical principles, and explain basic project management principles related to design and drafting. They will identify the roles of Engineering and Architectural professionals, and apply algebraic and trigonometric concepts and methods to solve problems.

*Prerequisites: CADS 1250*