COMPUTER AIDED DRAFT (CAD) AND BUILDING INFORMATION MODELLING (BIM) TECHNICIAN DIPLOMA

Purpose

Graduates of this program will develop the Computer Aided Drafting (CAD) and Building Information Modeling (BIM) skills gained in two specialty areas. During their first year, they will develop skills in either Architectural, Civil/Structural, Mechanical or Steel Construction Modelling with Steel Detailing. Students will further develop their skills by adding an additional specialty of either Architectural, Civil/Structural, Mechanical or Steel Construction Modelling with Steel Detailing. They will learn to analyze and apply the current practices of a 3D Integrated Design Process (IDP) and contribute to the design/build team utilizing Integrated Project Delivery (IPD) methods.

Graduates will be well prepared to work as team members on a wide variety of projects, examples of which are:

- Residential housing developments, commercial buildings and institutional complexes.
- A wide variety of steel and concrete structures including schools, sports stadiums, bridges, commercial buildings and high-rise offices.
- Highway construction and subdivision development work.
- A wide variety of mechanical applications in the mining industry, chemical process plants, energy infrastructure, oil and gas, as well as mechanical systems for buildings and development work.

Graduates will apply qualifications from two disciplines to become more competitive in the job market and adaptive in the work place.

Students receive a CAD and BIM Technician Diploma upon successful completion of the program.

Duration

The program is 2 years of full-time study. The Diploma is seventy (70) credits: Forty (40) credits of the first year Certificate, and thirty (30) credits of second year courses to complete the Diploma.

Candidates have up to 5 years to complete the Diploma from the start of year one.

Upon successful completion of the first year of study and the successful completion of forty (40) credits, students may choose to exit the program and receive a Certificate credential in the specialty they completed in the first year: either (i) Architectural Technician Certificate, (ii) Civil/Structural Technician Certificate, (iii) Steel Construction Modelling Technician Certificate, or (iv) Mechanical Drafting Technician Certificate.

Learning Outcomes

Upon successful completion of **year one** of this program, students will be able to:

- Use drawing techniques to complete projects in orthographic projection, sectioning, and dimensioning, auxiliary view and machine detailing.
- Describe concepts in orthographic projection, sectioning, and dimensioning, auxiliary view and machine detailing.
- Employ Computer Aided Drafting (CAD) and three dimensional modelling systems skills to produce drawings from data, designs and/or specifications.
- Demonstrate drafting and 3D modeling skills and conventions.
- Develop knowledge and related trade skills in drafting and 3D Building Information Modeling (BIM).
- Utilize critical thinking, team building and interpersonal communication skills.
- Prepare a comprehensive professional portfolio.
- Prepare a résumé and letters of application and perform other related job search skills.

And one (1) set of outcomes from their chosen specialty:

Architectural Specialty:

- Use concepts of building construction and technology to plan and detail residential and commercial buildings in accordance with local by-laws and the BC Building Code.
- Prepare Architectural drawings of residential and commercial structures, which incorporate concrete, steel and wood.

Civil/Structural Specialty:

- Apply concepts of civil technology and planning to produce drawings and three dimensional models for the development of a civil site.
- Use structural engineering theories and BIM practices to prepare engineering drawings for three dimensional models of structures, which incorporate reinforced concrete and structural steel.

Steel Construction Modelling Specialty:

- Utilize data from current building codes and fabrication standards to develop practical connections between components that are code-compliant and practical to fabricate and install on site.
- Use structural engineering drawings and specifications to prepare three dimensional models of structures that utilise structural steel.
- Employ current Computer Aided Drafting (CAD) and three dimensional modelling systems as a tool to produce structural steel fabrication and arrangement drawings from data, designs and/or specifications.

Mechanical Specialty:

- Apply concepts of building construction and technology to plan and detail mechanical systems for commercial and industrial facilities in accordance with local by-laws and the *BC Building Code*.
- Utilize concepts of mechanical and process technology and planning to produce drawings and 3D models of industrial facilities.
- Employ mechanical engineering theories and BIM practices to prepare engineering drawings from 3D model that incorporate mechanical, electrical, and plumbing (MEP) systems in building structures.

Upon successful completion of the **second year** of this program, students will be able to:

- Apply Integrated Design Process (IDP) to integrate people systems and practices into a process to reduce waste and optimize efficiency through all phases of design, fabrication and construction.
- Employ current Computer Aided Drafting (CAD) and three-dimensional modelling systems as a tool to produce drawings from data, designs and/or specifications.
- Apply terminology and conventions used in a project design team.
- Integrate a variety of CAD models for each discipline into a complete final model using CAD drafting, 3D BIM, and related trade skills and knowledge.
- Prepare a comprehensive professional portfolio.
- Contribute as part of a multidisciplinary design team.
- Use critical thinking, team building and interpersonal communication skills to work effectively in a team environment.
- Integrate various BIM software to communicate, collaborate and cooperate with a design team.
- Apply the concepts and processes of a second discipline (either Architectural, Mechanical or Civil/Structural), and apply those conceptions in a 3D BIM setting.
- Apply personal reflection and critical thinking to the relation between the program's learning outcomes and the student's individualized learning.
- Communicate effectively and work collaboratively in a design team setting.

Admission Requirements

- Grade 12 graduation or equivalent
- English Language Proficiency at a grade 12 level
- Knowledge of mathematics demonstrated by *one* of the following:
  - Workplace Mathematics 11 or equivalent, *or*
  - VCC Math Assessment with 80% Basic Arithmetic and 60% Basic Algebra

Applicants may be inserted into Term 4 of the program provided they have:

1. Successfully completed VCC's Architectural, Civil/Structural, Mechanical or Steel Modelling/Steel Detailing Technician Certificate within the last 4 years, *or*
2. Successfully completed a Drafting Technician Certificate (any discipline) at another institution with Department review and approval.

Notes:

- Applicants who do not meet the English language requirement may be admitted at the discretion of the Department
- Applicants who have met all the above requirements and have completed high school Drafting 11 and12 may, with Departmental approval, apply for direct entry into Term 2 of the program.
- VCC CAD Technician Short Certificate graduates (granted within the last 4 years) may insert into Term2 of the program.

Program Requirements

Code	Title	Credits
TERM 1		
DRFT 1010	CAD Drafting Fundamentals	4
DRFT 1011	CAD Drafting Applied	3
DRFT 1012	Office & Construct Site Safety	1
DRFT 1013	Construction Mathematics	1
TERM 2 AND 3		31
SELECT YOUR 1ST SPECIALIZATION		
ARCHITECTURAL		
DRFT 1270	Residential Design	
DRFT 1271	Site Planning	
DRFT 1272	Codes and Regulations 1	
DRFT 1273	Construction Assemblies 1	
DRFT 1274	Single Family Residences	
DRFT 1275	Codes and Regulations 2	
DRFT 1276	Construction Assemblies 2	
DRFT 1277	Multi Family Residences	
DRFT 1278	Drawing Plan Reading	
DRFT 1326	Job Search Skills	
DRFT 1370	Technical Communications	
DRFT 1371	Codes and Regulations 3	
DRFT 1372	Construction Assemblies 3	
DRFT 1373	Commercial Retail Buildings	
DRFT 1374	Introduction to 3D and BIM	
DRFT 1375	Commercial Layouts Using BIM	
CIVIL/STRUCTURAL		
DRFT 1226	Construction Drawing Reading	
DRFT 1280	Industrial Site Layout	
DRFT 1281	Autodesk Civil 3D	
DRFT 1282	Road Alignment Detailing	
DRFT 1283	Steel Structures	
DRFT 1284	Princ for Reinforced Concrete	
DRFT 1285	Foundation Design Concepts	
DRFT 1286	Engineering Statics	
DRFT 1326	Job Search Skills	
DRFT 1327	Revit Structures	
DRFT 1330	Advanced Road Design	
DRFT 1331	Civil Utility Services	
DRFT 1370	Technical Communications	
DRFT 1380	CAD 3D and Assemblies	
DRFT 1381	Miscellaneous Steel	
DRFT 1383	Quantity Take Offs	
DRFT 1384	Concrete Slab on Grade Flr Sys	
DRFT 1385	Reinforced Concret Struc Comp	
STEEL CONSTRUCTION MODELLING		
DRFT 1290	Struct Steel Fab Codes & Stand	
DRFT 1291	Introduction to Steel Detail	
DRFT 1292	Structural Bolting & Welding	
DRFT 1293	Indust & Comm Basic Framing	
DRFT 1294	Connection & Layout Geometry	
DRFT 1295	Detail of Inclined Components	

DRFT 1296	Miscellaneous Metals Detailing	
DRFT 1391	Introduction to BIM Software	
DRFT 1380	CAD 3D and Assemblies	
DRFT 1392	Working with BIM Software	
DRFT 1370	Technical Communications	
DRFT 1393	Heavy Structural Steel Framing	
DRFT 1326	Job Search Skills	
DRFT 1352	Steel Trusses	
MECHANICAL		
DRFT 1256	Plumbing Systems for Buildings	
DRFT 1257	Electrical Systems for Bldgs	
DRFT 1258	Utility Data	
DRFT 1259	HVAC Systems for Buildings	
DRFT 1260	Fire Suppression Systems	
DRFT 1261	Process Flow Diagrams	
DRFT 1262	Pipe Components	
DRFT 1263	Piping and Instrumentation	
DRFT 1264	Plant and Equipment Layout	
DRFT 1265	Process and Utility Piping	
DRFT 1266	Piping Fabrication Isometrics	
DRFT 1332	Professional Preparation	
DRFT 1370	Technical Communications	
DRFT 1362	BIM Basic for Mechanical	
DRFT 1363	BIM Project for MEP	
DRFT 1364	MEP for Pipe Fabrication	
DRFT 1365	Piping BIM Proj & Spec Setup	
DRFT 1366	3D BIM Pipe Struc Equip Model	
DRFT 1367	3D BIM Ortho Iso and BOM	
DRFT 1394	Industrial Building Modeling	
DRFT 1395	Mech Equip Modeling & Layout	
DRFT 1396	Piping Sys Modeling & Layout	
TERM 4		
DRFT 2100	Integrated BIM Project	9
TERM 5		15
SELECT YOUR 2ND SPECIALIZATION (MUST BE DIFFERENT FROM YOUR FIRST)		
ARCHITECTURAL		
DRFT 2270	Dipl. Residential Design	
DRFT 2271	Dipl. Site Planning	
DRFT 2272	Dipl. Codes and Regulations 1	
DRFT 2273	Dipl. Constr. Assemblies 1	
DRFT 2274	Dipl. Single Family Residences	
DRFT 2275	Dipl. Codes and Regulations 2	
DRFT 2276	Dipl. Constr. Assemblies 2	
DRFT 2277	Dipl. Multi Family Residences	
DRFT 2278	Dipl. Drawing Plan Reading	
CIVIL/STRUCTURAL		
DRFT 2266	Dipl Piping Isometrics	
DRFT 2280	Dipl. Industrial Site Layout	
DRFT 2281	Dipl. Autodesk Civil 3D	
DRFT 2282	Dipl. Road Alignment Detailing	
DRFT 2283	Dipl. Steel Structures	
DRFT 2284	Dipl. Princ. Reinforced Concrt	
DRFT 2285	Dipl. Foundation Design Concpt	
DRFT 1286	Engineering Statics	
MECHANICAL		
DRFT 2256	Dipl Plumbing Systems	
DRFT 2257	Dipl Electrical Systems	
DRFT 2258	Dipl Utility Data & Setup Proj	
DRFT 2259	Dipl HVAC Systems for Building	
DRFT 2260	Dipl Fire Suppression Systems	
DRFT 2261	Dipl Process Flow Diagrams	
DRFT 2262	Dipl Pipe Components	
DRFT 2263	Dipl Pipe & Instrumentation	
DRFT 2264	Dipl Plant and Equipment	
DRFT 2265	Dipl Process & Utility Piping	
DRFT 2266	Dipl Piping Isometrics	
STEEL CONSTRUCTION MODELLING		
DRFT 2290	Dipl. Struc Steel Fab Cde & St	
DRFT 2291	Dipl. Intro to Steel Detail	
DRFT 2292	Dipl. Structural Bolt & Weld	
DRFT 2293	Dipl. Indust & Com Basic Frame	
DRFT 2294	Dipl. BIM Softw for Steel Det	
DRFT 2295	Dipl. Detail of Inclined Comp	
DRFT 2296	Dipl. Misc Metals Detailing	
TERM 6		
DRFT 2107	Capstone Project using BIM	6
Total Credits		**70**

Evaluation of Student Learning

Students are evaluated through practical projects, exams, drawings, and presentations.

Student Program Progression

In order to be granted a Certificate or Diploma credential upon completion of the program, a student must:

1. Maintain an overall minimum 2.00 GPA (C average); *and*
2. Successfully complete all courses to qualify for the credential.

Note: A student will not receive a credential if they fail to maintain a C average, or if they receive an F grade in any course(s).

NOTE: Following a grade of D in any course, continuation will be permitted only upon approval of the Department Head. If such approval is given, a letter of continuation may be issued to the student indicating the reasons and conditions under which they will be allowed to continue to the next course.

Students who receive an F grade in any course within any term/level may not be allowed to progress.

See individual Course Outlines for course prerequisite details.

Program Absences

If a student misses more than 10% of instruction contact hours in any course for any reason, the instructor may refer the student to the

Department Head for review (e.g. a two (2) week course is ten (10) days, therefore 10% is one (1) day).

If the Department Head identifies a pattern of absenteeism, the student will be formally reprimanded. Further excessive absence may result in the student being required to withdraw.

Prior Learning Assessment and Recognition (PLAR)

Students may request formal recognition of prior learning attained through informal education, work, or other life experience, including Indigenous ways of knowing. Credits may be granted to students who are able to sufficiently demonstrate the learning outcomes of specific courses.

PLAR is available for the following courses:

- DRFT 1010 CAD Drafting Fundamentals
- DRFT 1011 CAD Drafting Applied
- DRFT 1013 Construction Mathematics

Students may complete up to 20% of program credits through PLAR. Tuition and fees may still apply to PLAR candidates.

Methods of PLAR vary by course, and may include exams, portfolios, interviews, and other evaluations.

To request PLAR, please contact the department directly.

Transcript of Achievement

The evaluation of learning outcomes for each student is prepared by the instructor and reported to the Student Records Department at the completion of semesters.

The transcript typically shows a letter grade for each course. The grade point equivalent for a course is obtained from letter grades as follows:

Grading Standard

Grade	Percentage	Description	Grade Point Equivalency
A+	96-100		4.33
A	91-95		4.00
A-	86-90		3.67
B+	81-85		3.33
B	76-80		3.00
B-	71-75		2.67
C+	66-70		2.33
C	61-65		2.00
C-	56-60		1.67
D	50-55	Minimum Pass	1.00
F	0-49	Failing Grade	0.00
S		Satisfactory – student has met and mastered a clearly defined body of skills and performances to required standards	N/A
U		Unsatisfactory – student has not met and mastered a clearly defined body of skills and performances to required standards	N/A
I		Incomplete	N/A
IP		Course in Progress	N/A
W		Withdrawal	N/A
Course Standings			
R		Audit. No Credit	N/A
EX		Exempt. Credit Granted	N/A
TC		Transfer Credit	N/A

Grade Point Average (GPA)

1. The course grade points shall be calculated as the product of the course credit value and the grade value.
2. The GPA shall be calculated by dividing the total number of achieved course grade points by the total number of assigned course credit values. This cumulative GPA shall be determined and stated on the Transcript at the end of each Program level or semester.
3. Grades shall be assigned to repeated courses in the same manner as courses taken only once. For the purpose of GPA calculation of grades for repeated courses, they will be included in the calculation of the cumulative GPA.