INSTITUTE OF TECHNOLOGY DEVELOPMENT OF CANADA

PROGRAM OUTLINE

Information Technology, System Programming

PROGRAM DESCRIPTION

Concentration 1:

Embedded Programming

This **co-op diploma** program focuses on preparing you to work as a programmer requiring the application of current programming policies, practices, procedures and tools.

Concentration 2:

Game Programming

This **co-op diploma** program focuses on preparing you to work as a programmer with a specialization in the video game industry, requiring the application of current industry policies, practices, procedures and tools.

LEARNING OBJECTIVES

Concentration 1:

Embedded Programming

Upon successful completion, students will have demonstrated the ability to apply theoretical knowledge and hands-on skills in industry standard programming languages, C and C++. You will also become very proficient at assembly language, a low level programming language used in architecture specific solutions.

Concentration 2:

Game Programming

Upon successful completion, students will have demonstrated the ability to apply theoretical knowledge and hands-on skills in industry standard programming languages, database design and application, fundamentals of object oriented programming, HTML, JavaScript, graphical assets and practical software applications.

ADMISSION REQUIREMENTS

- Grade 12 graduate or mature student status (British Columbia, 19 years or older)
- Meet minimum English language proficiency requirements.

DELIVERY METHODS

☒ In-class instruction
☒ Distance education
☒ Combined delivery (both in-class and distance)

PROGRAM DURATION

Total instructional hours	960
Total Co-op hours	0
Total program hours	960
Total program length (weeks)	48

GRADUATION REQUIREMENTS

- Successful completion of all program courses.
- Successful completion of program coop.

CAREER OPPORTUNITIES

Concentration 1:

Embedded Programming

Upon successful completion graduates will be able to secure employment as system programmers, to analyze design and program new systems, maintain existing systems and in the development of firmware.

Concentration 2:

Game Programming

Upon successful completion graduates will be able to secure employment as application programmers and specifically as a PC game developer.

Information Technology, System Programming

PROGRAM BREAKDOWN

Concentration 1:
Embedded Programming

Course No.		Hours
ICR100	Information Technology Essentials	40
ICR110	Problem solving and analytical thinking	40
ICR120	Markup Essentials	60
ICR130	Scripting for Web Development	60
ICR140	Databases Design and Modeling	40
IGP300	System Programming	60
IGP310	Object Oriented Programming	160
IGP320	System programing workshop	20
IEP300	Algorithm & Design Patterns I	40
IEP310	Low Level Programming	80
IGP420	Portable Programming	120
IEP400	Algorithm & Design Patterns II	40
IGP400	Computer Networks	60
IEP410	Embedded Systems Programming	140

PROGRAM BREAKDOWN

Concentration 2:
Game Programming

Course No.		Hours
ICR100	Information Technology Essentials	40
ICR110	Problem solving and analytical thinking	40
ICR120	Markup Essentials	60
ICR130	Scripting for Web Development	60
ICR140	Databases Design and Modeling	40
IGP300	System Programming	60
IGP310	Object Oriented Programming	160
IGP320	System programing workshop	20
IGA200	Game Engine Essentials	80
IGP220	Cross Platform Programming	80
IEP300	Algorithm & Design Patterns I	40
GRD110	Digital Imaging I	40
IGP400	Computer Networks	60
IEP400	Algorithm & Design Patterns II	40
IGA400	3D and Level Design Workshop	80
IGA410	Game Engine Programming	60

Information Technology, System Programming

All Concentrations:

ICR100 Information Technology Essentials

This is an introductory to the basics of computer hardware, especially those components that are used frequently by programmers including RAM and CPU. Students will also be introduced to operating systems.

ICR110 Problem Solving and analytical thinking

Understanding the language, grammar and syntax of a programming language is key to the application of that language in solving programming problems. All programming languages have been created around a fundamental set of language theories and conventions. This course introduces the student to theory and practice of programming and programming logic. This course does not introduce the student to a specific programming language but rather to the basic language, grammatical, and syntactical constructs and logic found in all programming languages. Students will solve programming problems using pseudo-code.

ICR120 Markup Essentials

This course will introduce students to web page and simple website infrastructure. Students will construct simple webpage and websites using authoring tools, HTML 4.0 and JavaScript. Student will learn basic programming principles and best practices. Students will use their programming skills to enhance a web site they have developed by building simple interactive functionality into their webpages.

ICR130 Scripting for Web Development

You will learn how to create all of the key components required in a 21st century commercial web site. You will learn how to apply your HTML, CSS, and JavaScript skills in a commercial context.

ICR140 Databases Design and modeling

This is an introductory database course. You will be introduced to the role and function of databases and to accepted dbase design and development methodologies. You will also be introduced to database software manipulation systems using Classic ASP and Microsoft Access tools.

IGP300 System Programming

This course introduces students to basic C programming principles and structures. Students will learn to develop console applications in C while they learn the Visual Studio IDE. Pointers will be introduced. Students will learn how to use pointers to self-referential data structures.

IGP310 Object Oriented Programming

In this course students will learn object oriented terminology and concepts using C++. Students will learn to create classes and implement inheritance and polymorphism. Advanced concepts like templates and operator overloading are also discussed in this course.

IGP320 System Programming Workshop

In this course students will apply what they have learned to a programming problem.

IEP300 Algorithm & Design Patterns I

Programing effectively and in a way that the code can be reused is a major goal for every programmer. Once a person understands the programing and logic, they must start thinking about software engineering concepts that make the code faster, effective and reusable. In this course students will learn quite a few algorithms and software engineering tools plus two fundamental design patterns that are the base for understanding other design patterns. Students also will be introduced to the standard template library, abstract data types, trees and recursion as well as sort and search algorithms.

IEP400 Algorithm and Design Patterns II

This is an advanced course that introduces advanced software engineering principles, techniques and algorithms. Students will learn to apply multiple design patterns with different intents to make their code more effective and reusable. Topics will include façade, flyweight, iterator, builder, bridge, composite and model view controller design patterns, graph processing and compression

Information Technology, System Programming

All Concentrations:

IGP400 Computer Networks

Computer networks allow for increased productivity and simplified instantaneous information sharing. The Internet, the World Wide Web and the 'cloud' continue build upon basic network theory and practice. This is an introductory course were you will learn to design and implement simple networks based on client needs, using existing network tools, practice and hardware.

Concentration 1:
Embedded Programming

IEP310 Low Level Programming

Assembly language is the oldest programming language, and of all languages, bears the closest resemblance to native machine language. It provides direct access to computer hardware, requiring users to understand much about their computer's architecture and operating system. This course focuses on programming microprocessors compatible with the Intel IA-32 and AMD x86 processors running under Microsoft Windows. The x86 processor type is appeared in the Intel 80386 processor, and continued with processors such as the Intel Pentium, Intel Pentium 4, Intel Pentium Core Duo, and the Advanced Micro Devices (AMD) Athlon.

IGP420 Portable Programming

In this advanced course students will explore the Java language along with related Java classes from simple applets to advanced servlets. In this course students will also learn object oriented terminology and concepts. Students will learn to create classes and implement inheritance and polymorphism.

IEP410 Embedded Systems Programming

ANSI C and C++ are extensively used beside assembly language to program embedded systems. Any smart device which has the capability of being programmed has a chip in it that is programed by Assembly, C or C++. In this course students will learn how to program microcontrollers or other chips using C and C++ and taking advantage of Arduino development Environment.

Concentration 2:
Game Programming

IGA200 Game Engine Essentials

The fundamentals of engaging game play are based on underlying principles of physics and mathematics. This course introduces the essential mathematical and physical concepts used in graphics programming and in 2D and 3D physics based animation. Students will be re-introduced to basic high school math and physics and then a number of key concepts such as vectors, matrices and transpositions, physics of motion, kinematics, Laws of motion, fixed axis rotation and circular movement.

IGP220 Cross Platform Programming

In this course students learn how to create desktop applications using C#.Net. Students will learn how to create windows based applications along with database connectivity. They will learn simple concepts of Object Oriented Programming and create multiple projects based on Object Oriented concepts in C#. Students will also learn Inheritance and polymorphism along with the concept of static and dynamic binding.

GRD110 Digital Imaging I

This course introduces students to industry standard digital imaging software – Photoshop. Students will learn the fundamentals of digital image manipulation, editing tools and techniques.

IGA400 3D and Level Design Workshop

In this course you will apply theory to practice by creating a prototypical version of a computer game based on everything you have learned in the program. You can work as part of team or develop the game as an independent producer.

IGA410 Game Engine Programming

In this course students will learn how to use C++ to create GUIs, how to create an original Windows application in Native mode, how manipulate Device Dependent and Device Independent bitmaps and how to take advantage of Microsoft Foundation Class (MFC) to do similar tasks more efficiently.

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ITD

Information Technology, System Programming

Methods of Evaluation
Course grading is indicated on each course outline.
Generally assessment will consist of quizzes, exams, and assignments.

Required Course Material
Not all courses may have textbooks. Textbooks are listed on the course outline. Textbooks may not be available through the college.

Equipment
Computer and requisite software are provided at the college. No other equipment is required unless otherwise indicated on the course outline.

Program
Course currency and relevancy may change depending on the requirements of industry. The school may make changes at any time. Changes will be effective when made.

Other
For proof of *English Language Proficiency* please refer the Student Handbook.