COMPUTER PROGRAMMER ANALYST

Program Outline

Major: COPA
Length: 3 Years
Delivery: 6 Semesters, plus 2 work terms
Credential: Ontario College Advanced Diploma, Co-op
Effective: 2017-2018
Location: Barrie
Start: Fall (Barrie), Winter (Barrie), Summer (Barrie)

Description

In this program, students focus on computer programming, web development and leveraging data to help organizations make meaningful business decisions. Throughout the program, students learn how to write code using a variety of languages such as Arduino, ASP.NET, C#, C++, Java, JavaScript, PHP, SQL and Swift. Students gain experience developing software for diverse platforms including embedded systems, desktop, mobile, and mainframe systems. In addition, students are exposed to advanced concepts including systems analysis, Business Intelligence (BI), application security, data structures, and game and simulation programming. With a strong emphasis on business and entrepreneurial values, students gain experience in problem solving, troubleshooting and systems building through a series of applied assignments, projects, and co-op work terms.

Career Opportunities

Graduates are well suited to fulfil a wide-range of entry and intermediate-level roles related to software development. They could work independently or as a member of a team to analyze, design, enhance, and maintain software applications on platforms such as desktop, mobile, web, and mainframe systems. Graduates will also be able to participate in the management of activities associated with a software development project, and may be employed in related fields including systems analysis, business

analysis, database design and management, web development, and mobile application development.

Program Learning Outcomes

The graduate has reliably demonstrated the ability to:

- troubleshoot and document problems associated with software installation and customization;
- analyze and define the specifications of a system based on requirements;
- design, test, document, and deploy programs based on specifications;
- apply knowledge of the design, modeling, implementation, and maintenance of a database;
- apply knowledge of networking concepts to develop, deploy, and maintain programs;
- propose and justify the design and development of an integrated solution based on an analysis of the business environment;
- use relevant methodologies, policies, and standards to develop integrated solutions;
- apply knowledge of security issues in the analysis, design, and implementation of integrated solutions;
- develop and maintain effective working relationships with clients;
- articulate, defend, and conform to workplace expectations found in information technology (IT) environments;
- contribute to the successful completion of the project applying the project management principles in use;
- describe technologies and techniques that can be used to reduce the impact of information technology on the environment;
- apply basic entrepreneurial strategies to identify and respond to new opportunities.

Practical Experience:

Co-operative Education is a mandatory component of all Co-op programs at Georgian College; it has been designed as a process by which students integrate their academic education with work experience related to their programs of study. This integration affects much more than simply earning a salary, including the adjustment to the work environment and the development of professionalism. It also reinforces skills and theory learned during academic semesters, develops professional contacts, job knowledge and career path, improves human relations and communication skills, and promotes personal maturity and financial independence.

Students are requested to register, attend and participate in their scheduled co-operative education classes. These classes are scheduled for all first year students and are expected to be completed in order for students to proceed successfully to their first co-op work experiences. To ensure students are eligible to proceed onto any co-op work experience, students should refer to Promotional Status and Eligibility for Co-op as outlined in the

College Calendar. Co-op policies and procedures can be located on our website:
www.georgiancollege.ca/student-services/co-op-and-career-services/students-tab/

Georgian College follows the Co-operative Education guidelines set out by the Canadian
Association for Co-operative Education (CAFCE) and Education at Work Ontario
(EWO) by supporting the learning outcomes designed for the program specific graduate
profile and curriculum as set out by the Ministry of Training, Colleges and Universities.

The Program Progression:
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Fall Intake - Barrie

Sem 1 | Sem 2  | Work Term 1 | Sem 3 | Work Term 2 | Sem 4  | Sem 5
------------------------------------------------------------------
Fall  | Winter | Summer      | Fall  | Winter      | Summer | Fall
2017  | 2018   | 2018        | 2018  | 2019        | 2019   | 2019

Sem 6
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Winter
2020


Winter Intake - Barrie

Sem 1  | Sem 2  | Work Term 1 | Sem 3  | Sem 4  | Sem 5 | Sem 6
---------------------------------------------------------------
Winter | Summer | Fall        | Winter | Summer | Fall  | Winter
2018   | 2018   | 2018        | 2019   | 2019   | 2019  | 2020

Work Term 2
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Summer
2020


Summer Intake - Barrie

Sem 1  | Sem 2 | Work Term 1 | Sem 3  | Sem 4 | Work Term 2 | Sem 5
------------------------------------------------------------------
Summer | Fall  | Winter      | Summer | Fall  | Winter      | Fall
2018   | 2018  | 2019        | 2019   | 2019  | 2020        | 2020

Sem 6
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Winter
2021
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Articulation:
A number of articulation agreements have been negotiated with universities and other
institutions across Canada, North America and internationally. These agreements are
assessed, revised and updated on a regular basis. Please contact the program co-ordinator

for specific details if you are interested in pursuing such an option. Additional information can be found on our website at http://www.georgiancollege.ca/admissions/credit-transfer/

Admission Requirements:
OSSD or equivalent with
- Grade 12 English (C or U)
- any Grade 12 Mathematics (C or U)

Mature students, non-secondary school applicants (19 years or older), and home school applicants may also be considered for admission. Eligibility may be met by applicants who have taken equivalent courses, upgrading, completed their GED, and equivalency testing. For complete details refer to: www.georgiancollege.ca/admissions/policies-procedures/

Applicants who have taken courses from a recognized and accredited post-secondary institution and/or have relevant life/learning experience may also be considered for admission; refer to the Credit Transfer Centre website for details: www.georgiancollege.ca/admissions/credit-transfer/

Additional Information:
To be successful in this program, students are required to have a personal notebook computer (either PC or Mac architecture) prior to the start of the program that meets or exceeds the following hardware specifications:
-        Intel I5 processor or AMD equivalent
-        8GB of memory
-        250GB hard drive

Additional operating systems, tools, and software used in the program are provided to students upon commencement of the program.

Graduation Requirements:
28 Mandatory Courses
2 Communications Courses
2 Optional Courses
4 General Education Courses
2 Co-op Work Terms

Graduation Eligibility:

To graduate from this program, the passing weighted average for promotion through each semester, from year to year, and to graduate is 60%. Additionally, a student must attain a minimum of 50% or a letter grade of P (Pass) or S (Satisfactory) in each course in each semester unless otherwise stated on the course outline.

Mandatory Courses

COMP1002   Web and Internet Fundamentals
COMP1006   Introduction to Web Programming using PHP
COMP1008   Introduction to Object Oriented Programming using Java
COMP1009   The Mainframe Environment
COMP1011   Advanced Object Oriented Programming using Java
COMP1030   Programming Fundamentals using Java
COMP1035   Networking Essentials
COMP1045   Internet of Things using Arduino
COMP1073   Client-Side Scripting using JavaScript
COMP1098   .NET Programming using C#
COMP2003   Relational Databases
COMP2005   Systems Analysis
COMP2068   JavaScript Frameworks
COMP2084   Server-Side Scripting using ASP.NET
COMP2099   Business Intelligence Tools
COMP2125   Mobile Development using Swift
COMP3000   Systems Project 1
COMP3002   Advanced Databases
COMP3006   Systems Project 2
COMP3023   Game and Simulation Programming
COMP3024   Business Intelligence and Analysis
COMP3025   Mobile and Pervasive Computing
COMP3026   Application Security Programming
COMP3033   Web Frameworks and APIs
ENTR1002   Introduction to Entrepreneurship
MATH1003   Math for the Computer Industry
MGMT2001   Principles of Management
MGMT2008   Project Management for Information Technology

Communications Courses
To be selected at time of registration from the College list, as determined by testing.

Optional Courses

To be selected from College list

General Education Courses
To be selected from College list

Co-op Work Terms
COOP1005   Computer Programmer Work Term 1
COOP2002   Computer Programmer Work Term 2

Course Descriptions:
COMP1002 Web and Internet Fundamentals   42.0 Hours
In this course, students learn how to use HTML source tags, build websites and publish a website. Students develop web pages that conform to web standards and use cascading style sheets for presentation layer. Students work in groups to build sample commercial, institutional, government or educational websites. Advanced topics, such as bandwidth, aesthetics, human- interface and future developments are also covered.

COMP1006 Introduction to Web Programming using PHP   42.0 Hours
In this course, students develop foundational programming knowledge and skills for application development on the Internet. The students learn about the web as a development platform through the use of the popular language PHP. Students learn to plan, design, construct, and integrate basic server-side components of modern web applications including databases and scripts.

COMP1008 Introduction to Object Oriented Programming using Java   42.0 Hours
In this course, students learn to program using an object oriented programming language. Students build skills in creating programs that use the object-oriented programming methodology, API classes, and user-defined classes. Throughout the course, proper program documentation using class diagrams and code comments are stressed. Unit testing is also introduced help students learn to ensure program quality. P- COMP1030 Programming Fundamentals using Java

COMP1009 The Mainframe Environment   42.0 Hours
In this course, students are introduced to the key concepts and principles that are applicable to a variety of mainframe operating systems. Mainframe operating systems are discussed in relationship to specific hardware architectures and applications. In the lab, user interfaces, tools and utilities, application development, and the runtime environment are explored. Students develop an understanding of the complex relationships required in a mainframe operating system to support user processes. The impact of the use of mainframe systems in reducing power consumption in data centers are discussed.

COMP1011 Advanced Object Oriented Programming using Java   42.0 Hours
Building on the concepts from Introduction to Object-Oriented Programming, students
utilize techniques that enable the creation of more sophisticated and complex
applications. Students explore deeper applications for the Java programming languages,
such as mobile applications and Graphical User Interface (GUI) design and construction.
P- COMP1008 Introduction to Object Oriented Programming using Java

COMP1030 Programming Fundamentals using Java   42.0 Hours
In this course, students gain a broad understanding of modern computer programming.
Students acquire introductory skills in problem analysis, solution design, and program
construction. Through practical programming activities, students gain an appreciation of
the nature and history of computer programming.

COMP1035 Networking Essentials   42.0 Hours
Network systems interconnect computer related resources, services and users. Students
gain fundamental knowledge of networking concepts and technologies. There is a strong
emphasis on terminology, protocols, error detection/correction and network security.
Students develop the necessary skills to plan and implement small networks across a
range of applications.

COMP1045 Internet of Things using Arduino   42.0 Hours
The Internet of Things helps bridge the physical and digital worlds and the ability to
collect real-time data from the environment. Attributes such as temperature, humidity,
light, position and movement of objects can easily be captured and transmitted over the
Internet to centralized databases. Students learn how to connect, program, and build
projects that leverage the Internet of Things technologies to remotely monitor objects,
as well as build web-enabled "Smart" appliances that can be remotely controlled over
the Internet.

COMP1073 Client-Side Scripting using JavaScript   42.0 Hours
In this course, students are introduced to client-side scripting to implement interactive
behaviour within the browser environment. Standard client-side scripting syntax,
operations, conditional statements, loops, functions, methods, and objects are
examined. Students focus on the manipulation of the standard Document Object Model
(DOM). Students modify the structure (HTML) and appearance (CSS) of valid web pages
and/or interfaces for the purposes of improving the user experience.
P- COMP1002 Web and Internet Fundamentals

COMP1098 .NET Programming using C#   42.0 Hours
The Microsoft .NET framework is a comprehensive programming model for developing
applications. Students apply the .NET framework to create desktop applications.
Students learn how to build Graphical User Interface (GUI) applications using the .NET
framework, as well as how to handle errors and manage runtime events.

COMP2003 Relational Databases   42.0 Hours
Relational databases are the most common method of organization information. In this course, the student is introduced to the process of designing, creating and managing a relational database using Structured Query Language (SQL) statements. Methods of data insertion, manipulation and extraction are emphasized.

COMP2005 Systems Analysis   42.0 Hours
In this course, students engage in a practical approach to systems analysis and design. By stepping through the Systems Development Life Cycle (SDLC) throughout the course, students learn several tools and techniques used in the analysis of business information systems. Key concepts include analysis of requirements, data and process modelling, business concepts, waterfall and agile approaches to requirements gathering as it pertains to systems implementation.

COMP2068 JavaScript Frameworks   42.0 Hours
In this course, students learn to enhance and enrich their web programming skills using the JavaScript programming language. Students learn to develop Web applications that use three-tier architecture, session management, object-oriented techniques, and advanced database interactions. Students develop web applications utilizing concepts such as Model-View-Controller (MVC), authentication, security and an introduction to web Application Programming Interfaces (APIs).
P- COMP1006 Introduction to Web Programming using PHP or P- COMP1101 Dynamic Websites with AMP (ODE)

COMP2084 Server-Side Scripting using ASP.NET   42.0 Hours
Students in this course learn how to design and develop creating web sites that can create, read, update, and delete (CRUD) data from a database. Students use web concepts, Object-Oriented Programming (OOP), relational database principles, and other server-side scripting to create web-based, data-driven applications.

COMP2099 Business Intelligence Tools   42.0 Hours
Students are introduced to Business Intelligence (BI) and the benefits of BI to an organization. Student gain skills in tools used for extracting data from sources of various formats, manipulating this data, combining with other data, and producing and saving meaningful output for management in various formats. A combination of different software products are used to develop applications. Students gain some basic skills in business analysis.
P- COMP2003 Relational Databases

COMP2125 Mobile Development using Swift   42.0 Hours
Swift is an open-source programming language developed by Apple. Students in this course learn how to design, develop, and publish applications for mobile devices using the Swift programming language. Students learn the fundamentals of the Swift

language, the principles of human interface, and how to upload applications to the mobile applications store.
P- COMP1008 Introduction to Object Oriented Programming using Java

COMP3000 Systems Project 1   42.0 Hours
This is the first of two courses where students participate in a system study leading to the computerization of a small system. Completion of this course requires successful participation in a group project in the project planning, analysis, description, and recommendation for change in an actual business situation. Students use and expand upon many of the skills to which they have been exposed over their first four semesters.
P- COMP2055 Systems Analysis and Design and P- MGMT2008 Project Management for Information Technology

COMP3002 Advanced Databases   42.0 Hours
Students in this course apply the Structured Query Language (SQL) at an advanced level with emphasis on real world applications. Students create complex model diagrams and definitions, and stored procedures and triggers to extend the functionality of their data stores. Additional topics such as transaction processing, referential integrity and alternative database systems are explored.
P- COMP2003 Relational Databases

COMP3006 Systems Project 2   42.0 Hours
Students, independently or in a suitable small team with other students in the course, develop and implement a complete computer system to satisfy some real need. In completing this course, students use many of the skills they have gained over the past five semesters.
P- COMP3000 Systems Project 1

COMP3023 Game and Simulation Programming   42.0 Hours
Building on programming skills obtained in previous courses, the students learn techniques and gain experience developing with tools used for game and simulation programming. Students develop two-dimensional and three-dimensional graphics environments that can used for presenting data and creating virtual spaces. The use of game and simulation applications in various fields such as health, entertainment, environmental studies, and education are explored.
P- COMP1011 Advanced Object Oriented Programming using Java

COMP3024 Business Intelligence and Analysis   42.0 Hours
In this course, students learn how Business Intelligence (BI) can be used to help organizations and companies leverage the enormous amount of data that these institutions collect on a daily basis. The consolidation, organization, and presentation of data can lead to improved business decision-making. Students gain BI skills that can be used to transform information into knowledge through the analysis, consolidation, and

organization of data. Topics such as data warehousing, requirements, and data mining are explored.
P- COMP2099 Business Intelligence Tools

COMP3025 Mobile and Pervasive Computing   42.0 Hours
Students are introduced to the ubiquitous computing model of human-computer interaction. Students learn how to develop functional, yet user-friendly mobile applications for a variety of form factors such as phone, tablet and wearables, with a strong focus on applying best design principles from the human interface guidelines.
P- COMP1011 Advanced Object Oriented Programming using Java

COMP3026 Application Security Programming   42.0 Hours
In this course, students explore how systems are exploited and compromised. Vulnerabilities of various platforms and systems, such as web applications, database servers, and mobile devices, are reviewed. Students learn how to design, develop, and deploy applications that are protected from and resilient to different types of attacks.
P- COMP1011 Advanced Object Oriented Programming using Java

COMP3033 Web Frameworks and APIs   42.0 Hours
A web framework is designed to support and expedite the development of web applications. Application Programming Interfaces (APIs) describe how different software components interact with each other. Utilizing web frameworks, students are able to efficiently and easily build larger and more complex web applications. Through the use of API, students learn how to build web applications that interact with other web systems to accomplish task such as exchanging data with external systems, manage authentication, or interface with social platforms.
P- COMP2068 JavaScript Frameworks

COOP1005 Computer Programmer Work Term 1   560.0 Hours
Co-operative Education provides students with the skills to conduct a college supported self-directed job search in their chosen field of study. Students obtain a co-op work experience with an employer for a period of 14 weeks. All students are responsible to submit a work term record for approval prior to starting work, and a work term report indicating achievement of specific learning outcomes during their first co-op work term. Georgian College follows the Co-operative Education guidelines set out by the Canadian Association for Co-operative Education (CAFCE) and Education at Work Ontario (EWO) by supporting the learning outcomes designed for each program.

COOP2002 Computer Programmer Work Term 2   560.0 Hours
Building on previous co-op experience, students continue to gain valuable experience and develop knowledge and skills related to their program. Students gain experience with a variety of technical functions in the workplace. Students returning to their previous employer are asked to seek new/more in depth responsibilities so that enhancement of program specific learning outcomes be achieved.

P- COOP1005 Computer Programmer Work Term 1

ENTR1002 Introduction to Entrepreneurship   42.0 Hours
This course is designed to help students evaluate the business skills and commitment necessary to successfully operate an entrepreneurial venture and review the challenges and rewards of entrepreneurship. Students will learn about themselves, their decisions, and their goals to determine how entrepreneurship can play a role in their lives. Students will also be introduced to entrepreneurship from an economic perspective and the concepts of environmentally sustainable practices and social entrepreneurship.

MATH1003 Math for the Computer Industry   42.0 Hours
In this course, students learn the practical knowledge and skills in the use of mathematics in relation to computers. Alternate number bases, set theory, logic, and Boolean algebra are the foundation of this course. In addition, students use basic statistical concepts to understand challenges in information technology.

MGMT2001 Principles of Management   42.0 Hours
Students are provided with an introduction to the various philosophies, roles and functions of management. In addition, students examine on going changes in business that have a direct effect on the role of management.

MGMT2008 Project Management for Information Technology   42.0 Hours
Students in this course are introduced the fundamental principles necessary for successful management of Information Technology (IT) projects. Project planning, management and control techniques are discussed and the application of computers in project management are studied.

Course Description Legend
P = Prerequisite; C = Concurrent prerequisite; CO= Corequisite

Information contained in College documents respecting programs is correct at the time of publication. Academic content of programs and courses is revised on an ongoing basis to ensure relevance to changing educational objectives and employment market needs. The college reserves the right to add or delete programs, options, courses, timetables or campus locations subject to sufficient enrolment, and the availability of courses.