

COMPUTER PROGRAMMER ANALYST

Program Outline

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| Major: | COPA |
| Length: | 3 Years |
| Delivery: | 6 Semesters, plus 3 work terms |
| Credential: | Ontario College Advanced Diploma, Co-op |
| Effective: | 2013-2014 |
| Location: | Barrie |
| Start: | Fall (Barrie), Winter (Barrie) |

Description

This program is designed to meet the academic needs of all students, whether a recent secondary school graduate, college or university graduate, or a mature student. As students progress through the three years, the courses they take will help them gain insight and experience in the fields in which they may choose to apply their computer skills after graduation. A structured approach to problem solving, effective oral and written communications, and attention to standards and documentation are stressed throughout. Industry trends and requirements are continually monitored to ensure curriculum remains current and relevant.

Career Opportunities

Graduates with programming interests/skills will be prepared to work independently or as a member of a team to analyze, design, enhance, and maintain application systems, as well as participate in the management of the activities and personnel involved in an application development project in many types of organizations, including government. Graduates may be employed in related areas such as the marketing of computer products, information centers and help desks, business analysis, project management, operating systems support, education, and database design/management/administration.

Program Learning Outcomes

The graduate has reliably demonstrated the ability to:

- communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience;
- interact with others in groups and teams, use critical thinking skills to evaluate and solve problems, communicate confidently in a variety of situations, and demonstrate technological fluency;
- analyze and resolve software-related problems through the application of systematic approaches;
- analyze and define the specifications of a system based on user requirements;
- analyze, design, develop, implement, maintain, and integrate a variety of application programs;
- apply knowledge of the design, modeling, and implementation of a database;
- apply knowledge of connectivity issues to support the development and maintenance of application systems;
- use relevant methodologies to develop applications;
- apply principles of project management;
- participate as an effective individual and member of a team;
- interpret, produce, and present work-related documents and information effectively and accurately;
- identify and implement strategies to improve job performance and promote personal and professional growth;
- show a basic understanding of business concepts;
- utilize effective communication and interpersonal skills;
- employ generic skills for personal and professional growth;
- show an awareness of ethical issues within a multicultural and global business environment;
- describe technologies and techniques that can be used to reduce the impact of computer systems on the environment;
- participate in society as an informed citizen and pursue an enriched professional and personal life through life-long learning.
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- In addition to the skills attained as a Computer Programmer Analyst, students will have reliably consolidated their computing, business, generic, and interpersonal skills through the completion of a major team project.
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- Curriculum objectives are achieved through a combination of lectures, labs, practical assignments, and co-op placements. Program Learning Outcomes are geared towards developing the skills necessary to design, develop, implement and audit computerized information systems, and toward developing initiative and self motivation.

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 program 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 to proceed successfully to their first co-op work experience. 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.georgianc.on.ca/careers/for-students/

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:

Fall Intake - Barrie

| Sem 1 | Sem 2 | Work Term 1 | Sem 3 | Work Term 2 | Sem 4 |
|-------------|-------------|-------------|-----------|-------------|-------------|
| Fall 2013 | Winter 2014 | Summer 2014 | Fall 2014 | Winter 2015 | Summer 2015 |
| ----- | | | | | |
| Work Term 3 | Sem 5 | Sem 6 | | | |
| Fall 2015 | Winter 2016 | Summer 2016 | | | |

Winter Intake - Barrie

| Sem 1 | Sem 2 | Work Term 1 | Sem 3 | Sem 4 | Work Term 2 | Sem 5 |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Winter 2014 | Summer 2014 | Fall 2014 | Winter 2015 | Summer 2015 | Fall 2015 | Winter 2016 |
| ----- | | | | | | |
| Sem 6 | Work Term 3 | | | | | |
| Summer 2016 | Fall 2016 | | | | | |

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.georgianc.on.ca/academics/articulations/>

Admission Requirements:

You must meet ONE of the following requirements to be eligible for admission to these programs:

Secondary school applicants:

- OSS Curriculum: OSSD or equivalent with Grade 12 English (C) or (U) (ENG 4C, ENG 4U); plus any Grade 12 College Mathematics (MAP 4C or MCT 4C), or any Grade 12 U University Mathematics

Non-Secondary school applicants (19 years or older):

- Any credit Communication course and most credit mathematics courses taken at Georgian College
- College preparatory programs including those taken at Georgian College: Business Foundations*
- Equivalent courses in English and mathematics taken through secondary school or Independent Learning Centres (at the general, advanced, college or university level)
- Academic and Career Entrance Certificate (ACE) program with communications and business, apprentice or technical mathematics*
- Mature student testing in English and mathematics that meets the minimum standards for admission (available through most testing services)*
- Ontario High School Equivalency Certificate (GED)
- English, Literature or Communication credit courses and most mathematics credit courses from accredited colleges/universities

Home school applicants:

- Applicants can write the mature student testing in English and mathematics that meets the minimum standards for admission (available through testing services)*

* available from Georgian College. For a complete listing please contact the Office of the Registrar.

Non-secondary school applicants who are 19 years of age or over by the first day of classes, and who lack the academic entrance qualifications, may be considered for entrance to an appropriate post-secondary diploma or certificate program as mature applicants. Mature applicants must meet all program specific prerequisites including all selection criteria; equivalencies are stated above. Applicants who are unsure whether

they meet admission requirements should contact the Office of the Registrar. In addition, those applying as mature students and having no documentation of Grade 12 education must supply, if required, proof of age, such as a copy of an official birth certificate or driver's licence. Refer to Section 2.5 and 2.6 of the Academic Calendar for further details.

Credit transfer and course exemptions:

Applicants who have taken courses from a recognized and accredited post-secondary institution and/or have relevant life/learning experience may be eligible for credit transfer/course exemptions. Courses/experience must match at least 80% of the learning outcomes of a Georgian College course with a minimum grade of 60% or C achieved in previous coursework; some program exceptions apply (see program outline). For further information please visit the Credit Transfer Centre website: georgiancollege.ca/admissions/credit-transfer/

Graduation Requirements:

- 27 Mandatory Courses
- 2 Communications Courses
- 2 Optional Courses
- 5 General Education Courses
- 3 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.

Mandatory Courses

- BUSI1001 Introduction to Organizational Behaviour
- COMP1002 Web and Internet Fundamentals
- COMP1004 Rapid Application Development
- COMP1006 Introduction to Web Programming
- COMP1008 Introduction to Object Oriented Programming
- COMP1009 The Mainframe Environment
- COMP1011 Advanced Object Oriented Programming
- COMP1030 Programming Fundamentals
- COMP1035 Networking Essentials
- COMP1045 Computer Organization and Architecture

COMP2003 Relational Database
COMP2005 Systems Analysis
COMP2007 Enterprise Computing
COMP2068 Advanced Web Programming
COMP2099 Business Intelligence Tools
COMP3000 Systems Project 1
COMP3002 Advanced Database
COMP3003 Issues in Information Technology
COMP3006 Systems Project 2
COMP3023 Game and Simulation Programming
COMP3024 Business Intelligence and Analysis
COMP3025 Mobile and Pervasive Computing
COMP3026 Application Security Programming
COMP3027 User Experience and Interaction Design
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

COMP1046 Windows System Administration
COMP2018 Linux System Administration
COMP2070 Programming for the Mainframe
COMP2074 Routing Protocols
COMP2076 Switch Configuration
COMP2098 Mainframe Utilities and Tools

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
COOP3001 Computer Programmer Work Term 3

Course Descriptions:

BUSI1001 Introduction to Organizational Behaviour 42.0 Hours

Organizational Behaviour is an introductory course which teaches social science theory as applied to the business world. It provides rich insights about working people in all kinds of organizations and also suggests how people may be motivated to work together more productively.

COMP1002 Web and Internet Fundamentals 42.0 Hours

This course covers HTML, client-side scripting and design issues for the World Wide Web. Students will learn how to use HTML source tags, build websites, manage a website's directories, and publish a website. The creation of web pages that conform to web standards and that use cascading style sheets for presentation will be emphasized. Students will work in groups to build mock commercial, institutional, government or educational websites. More advanced topics, such as bandwidth, aesthetics, human-interface and future developments will also be covered.

COMP1004 Rapid Application Development 42.0 Hours

This course introduces programming techniques supported by a visual rapid application development environment (such as Visual Basic) including forms, controls, user-defined classes and objects. The packages provided by the platform that support visual programming, data files and Graphical User Interfaces (GUI) are studied. The skills learned in this course can be applied to such diverse system capabilities as e-commerce and database manipulation.

COMP1006 Introduction to Web Programming 42.0 Hours

This course is designed to provide the student with foundational programming knowledge and skills for application development on the Internet. The student will learn about the Web as a development platform through the use of popular representative languages (such as PHP). The student will 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 42.0 Hours

In this course, students will learn to program using an object oriented programming language. It is assumed students have already learned to design and outline the logic and structure of a program. Upon that foundation, this course will build skills in creating application programs that use object oriented programming concepts, API classes, and user-defined classes. Throughout the course, proper program documentation using class diagrams and comments will be stressed. Unit tests will be used to verify correctness and ensure program quality.

COMP1009 The Mainframe Environment 42.0 Hours

This course introduces students to the key concepts and principles that are applicable to a variety of mainframe operating systems. Mainframe operating systems will be discussed in relationship to specific hardware architectures and applications. In the lab, user interfaces, tools and utilities, application development, and the runtime

environment will be explored. The emphasis of this course is to 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 will also be discussed.

COMP1011 Advanced Object Oriented Programming 42.0 Hours

Building on the concepts from Introduction to Object-Oriented Programming, this course introduces techniques that lend themselves to the creation of sophisticated applications. The skills learned in this course can be applied to such diverse system capabilities as e-commerce, database manipulation, and network connectivity. Graphical user interface design and construction will also be covered in detail.

P- COMP1008 Introduction to Object Oriented Programming

COMP1030 Programming Fundamentals 42.0 Hours

In this course the student will gain a broad understanding of modern computer programming. The student will acquire introductory skills in problem analysis, solution design, and program construction. Through practical programming activities, the student will 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. This course provides the student with a fundamental knowledge of networking concepts and technologies. There is a strong emphasis on terminology, protocols, error detection/correction and network security. This course assists in developing the necessary skills to plan and implement small networks across a range of applications.

COMP1045 Computer Organization and Architecture 42.0 Hours

We use computers every day, from small scale embedded systems, to workstation systems to mainframe systems and server farms. This course examines how these machines work. It analyzes the operation of computer hardware and examines the interaction between hardware and software. Through a series of hands-on exercises students will work with the low level operations of a computer, and learn how to program these operations in order to gain insight into the computer's internal workings.

COMP1046 Windows System Administration 42.0 Hours

The Windows operating system is the most widely deployed desktop operating system. This course focuses on the principles of workstation administration by teaching students how to deploy, configure, and troubleshoot a Windows System. By the end of this course students will be expected to demonstrate the ability to manage a Windows computer system.

COMP2003 Relational Database 42.0 Hours

In this course, the student is introduced to the process of creating and managing a relational database using Structured Query Language (SQL) statements. The emphasis of this course is data manipulation and extraction.

COMP2005 Systems Analysis 42.0 Hours

This course covers the analysis of existing business systems for the purpose of enhancing or replacing these systems. The justification for a formalized systems development life cycle is stressed throughout. The Systems Planning and Systems Analysis steps, the first two steps of the Systems Development Life Cycle are applied to a number of cases and assignments.

COMP2007 Enterprise Computing 42.0 Hours

Students will learn about the protocols and applications that make possible the simultaneous and seamless interaction of millions of computers through the internet and enterprise networks. In order to design and implement enterprise class applications, the student will undertake an in depth study of the Java Enterprise Edition application programming interface (Java EE API). To understand the practical aspect of enterprise computing, the student will build a working example of a dynamic, secure web enterprise application. Topics that will be covered include Service Oriented Architecture (SOA) and Service Component Architecture (SCA).

P- COMP1008 Introduction to Object Oriented Programming and P- COMP2003 Relational Database

COMP2018 Linux System Administration 42.0 Hours

The Linux operating system is commonly found powering Internet and network servers. This course explores different ways that Linux can be deployed within an organization. With a strong emphasis on command line administration, students will learn how to manage user accounts, file systems, and processes while gaining hands-on experience installing, configuring, and administering a Linux system.

COMP2068 Advanced Web Programming 42.0 Hours

This course is designed to give students the opportunity to enhance and enrich their skills in Web programming. Students will learn to develop Web applications that use three-tier architecture, session management, object-oriented techniques, and advance database interactions. Concepts such as advanced CSS concepts, rich interactive Web environments, authentication, and security will also be explored.

P- COMP1006 Introduction to Web Programming

COMP2070 Programming for the Mainframe 42.0 Hours

Large-scale mainframe computing continues to dominate in the world of big business and there is no indication that this will change in the foreseeable future. Business simply has too much invested in legacy code. These legacy applications rely heavily on the COBOL programming language. There are literally billions of lines of COBOL code in

existence. This course prepares students to work as applications programmers in the mainframe world by examining this language.

P- COMP1009 The Mainframe Environment

COMP2074 Routing Protocols 42.0 Hours

This course introduces the student to the concept of dynamic routing protocols, describes the classes of dynamic routing protocols, and gives examples of protocols in each class. A student will learn to choose a dynamic routing protocol based upon many considerations; these include the size of the network, the bandwidth of available links, the processing power of the routers, the brands and models of the routers, and the protocols that are used in the network.

COMP2076 Switch Configuration 42.0 Hours

Switched networks are used to interconnect network devices. Students will learn the functions and operation of wired and wireless switches. This course reviews and reinforces the underlying concepts and standards of an Ethernet switched network. Students will develop skills configuring Virtual Local Area Networks (VLANs) as well as gain exposure to common switching protocols.

COMP2098 Mainframe Utilities and Tools 42.0 Hours

This course introduces the student to utilities and tools that are used to support, monitor, and maintain the operations in a mainframe environment. The student will develop skills in using various programs and modules used by system operators, administrators, and programmers to support the mainframe components, subsystems, and workloads. Topics such as user management and security will also be explored.

COMP2099 Business Intelligence Tools 42.0 Hours

The student will be introduced to Business Intelligence (BI) and the benefits of BI to an organization. The student will 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 will be used to develop applications. The student will gain some basic skills in business analysis. This course is designed for students with a background in structured programming, SQL, and HTML.

COMP3000 Systems Project 1 42.0 Hours

This is the first of two courses where the student will participate in a system study leading to the computerization of a small system. Completion of this course will require successful participation in a group project in the project planning, analysis, description, and recommendation for change in an actual business situation. Students will use and expand upon many of the skills to which they have been exposed over their first 4 semesters.

P- COMP2055 Systems Analysis and Design

COMP3002 Advanced Database 42.0 Hours

The Structured Query Language, SQL, is used at an advanced level with emphasis on real world commercial SQLs. A relational database is created and maintained using SQL and SQL procedural language.

P- COMP2003 Relational Database or P- COMP2064 Database Fundamentals (ODE)

COMP3003 Issues in Information Technology 42.0 Hours

This course examines some of the current and emerging issues facing Information Technology (IT) professionals, and is intended for senior-level Computer Studies students. Issues and technology will be explored through programming and/or research projects.

P- COMP1008 Introduction to Object Oriented Programming

COMP3006 Systems Project 2 42.0 Hours

Each student, alone or in a suitable small team with other students in the course, develops and implements a complete computer system to satisfy some real need. In completing this course, students use many of the skills to which they have been exposed over the past five semesters.

COMP3023 Game and Simulation Programming 42.0 Hours

Building on programming skills obtained in previous courses, the student will learn techniques and gain experience developing with tools used for game and simulation programming. The student will develop two-dimensional and three-dimensional graphics environments to be 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 will be explored.

COMP3024 Business Intelligence and Analysis 42.0 Hours

In this course, the student will 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. The student will 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 will be explored.

COMP3025 Mobile and Pervasive Computing 42.0 Hours

This course introduces the student to the ubiquitous computing model of human-computer interaction. The student will explore the current state of devices and objects used in pervasive computing. To understand the future of ubiquitous computing, the student will research projects underway in labs at educational institutions, government organizations, and corporations. The student will also develop an application for a mobile or pervasive computing device.

COMP3026 Application Security Programming 42.0 Hours

In this course, the student will explore how systems are exploited and compromised. Vulnerabilities of various platforms and systems, such as web applications, database servers, and mobile devices, will be studied. The student will learn how to design, develop, and deploy applications that are protected from and resilient to attacks.

COMP3027 User Experience and Interaction Design 42.0 Hours

This course introduces the student to the principles, processes, and techniques of Human-Computer Interaction (HCI). The student will gain an understanding of and develop skills in effective interaction design. The parts of design life cycle will be studied in depth: initial information gathering, iterative design, and testing. The student will learn how to organize a user experience group, develop prototypes, and conduct usability tests.

COOP1005 Computer Programmer Work Term 1 560.0 Hours

Co-operative Education is a mandatory component of all Co-op programs at Georgian College. Students are required to attend and participate in their scheduled semester co-op classes CPHR0001 (12 sessions) in order to proceed successfully to their first co-op work experience.

COOP2002 Computer Programmer Work Term 2 560.0 Hours

After completion of co-op work experience 1, students are required to attend a scheduled debriefing session. This session will be scheduled in the first month for all returning co-op students and is intended to prepare students for work term 2. This session will also allow the student to validate and submit supporting documentation for work term 1 credit. This must be achieved before proceeding to co-op work experience 2.

P- COOP1005 Computer Programmer Work Term 1

COOP3001 Computer Programmer Work Term 3 560.0 Hours

After completion of co-op work experience 2, students are required to attend a scheduled debriefing session. This session will be scheduled in the first month for all returning co-op students and is intended to prepare students for work term 3. This session will also allow students to validate and submit supporting documentation for Work Term 2 credit. Upon completion of work experience 3 students will be invited to a final co-op debriefing session. This session is intended to prepare students for graduate job search and allow the student to validate and submit supporting documentation for work term 3 credit.

P- COOP2002 Computer Programmer Work Term 2

MATH1003 Math for the Computer Industry 42.0 Hours

This course provides students with 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

This course provides you with an introduction to the various philosophies, roles and functions of management. In addition it will cover on going changes in business that have a direct effect on the role of management.

MGMT2008 Project Management for Information Technology 42.0 Hours

This course introduces the fundamental principles necessary for successful management of Information Technology (IT) projects. Project planning, management and control techniques will be discussed and the application of computers in project management will be 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.