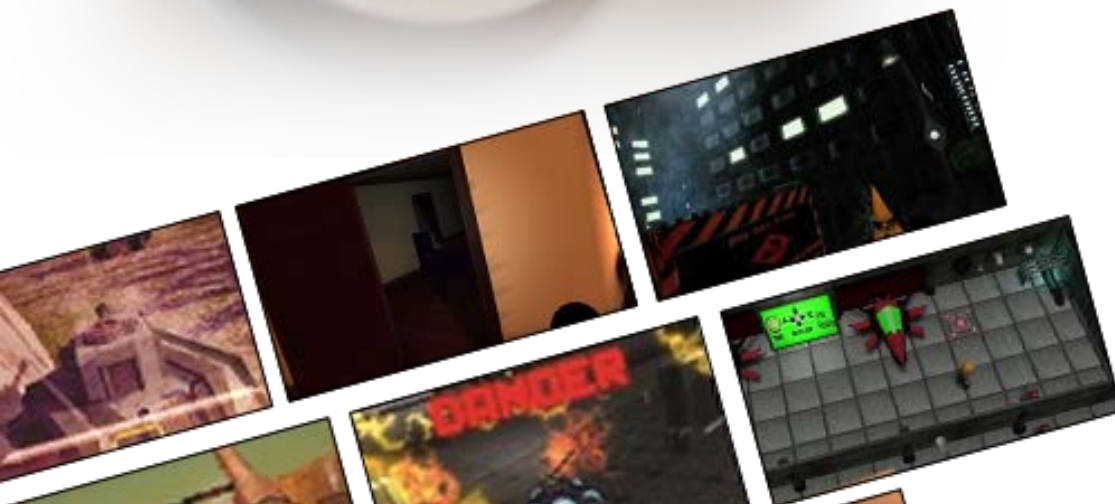




# GAME

Brock University & Niagara College

Program Handbook



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# 1. Welcome

Welcome to the GAME program offered jointly by Brock University and Niagara College. We hope that you will have a stimulating and enjoyable experience as a student in the Game Design (BA) or the Game Programming (BSc) stream.

This handbook is intended to be an additional resource to you as a new student that will hopefully make the transition to our program easier. It is a summary of the most important information and advice relevant to students in the GAME program.

## From the Director of the GAME Program (Michael Winter, Brock University)



Congratulations for being one of the few students accepted into the GAME program. The next few years will be an exciting time in which you will learn a lot about designing and implementing video games. While obtaining new skills and knowledge you will also be a member of

multiple teams during your studies creating thrilling new games. This combination of hands-on learning and theoretical background makes our program unique.

Everybody at Brock University and Niagara College wants you to enjoy your time in the program and to be successful in your studies. Do not hesitate to talk to me about any problem that you might encounter during your time at Brock University and Niagara College. We want to make your experience as good as possible. I wish you all the best, great success during your studies and your professional life afterwards.

Once more, congratulations and enjoy your time.

### From the Director of the Centre for Digital Humanities (David Hutchison, Brock University)



Congratulations on being the first cohort in the GAME program! We are so excited to be offering this special partnership between Brock University and Niagara College. I welcome you on behalf of the Centre for Digital Humanities (CDH), where you will complete a number of your

courses each year of the program. The CDH contributions to the GAME program focus on the academic study of games - developing a broad understanding related to the history of video games, its discourses, underlying aesthetics, and the psychology of various forms of gameplay, to name but a few of the scholarly topics we will cover. Your focus on 'video games' as an academic area of study will broaden and deepen your understanding of games, helping you to make more informed choices when it comes to the design of your own video games. I wish you all the best in the GAME program. Please don't hesitate to reach out and introduce yourself. Building a strong sense of community between students, faculty, staff, and industry partners is another goal of the GAME program.

### From the Chair of Computer Sciences (Ke Qiu, Brock University)

Welcome and congratulations on your acceptance to the GAME program. We are thrilled that you will be joining our unique degree/diploma program in its inaugural year. During your studies, you'll learn new skills to create fun and exciting video games, skills that



include math foundations, the programming, the design and realization of dynamic experiences, the planning and management of production processes. You will also learn many other life skills such as time management. And you will be making many lifelong friends along the way. You are about to begin your journey in this new and exciting program, and I wish you all the best.

### From the Associate Dean of the School of Media Studies (Linda Roote, Niagara College)



On behalf of the faculty and staff of Media Studies, it is a pleasure to welcome you to Niagara College where you will complete half of your game degree/diploma program. You have chosen a very exciting, challenging and rewarding career path. Studying gaming concurrently

at Brock University and Niagara College is about discovery and collaboration; the discovery of methods, processes and approaches, possibilities and potential, and collaborations among students and institutions. The aim of the GAME program is to develop your ability, skill and critical faculties by means of thoughtful study and practical outcomes.

Niagara College's gaming courses have established an exemplary reputation based on their "hands-on" approach to education. Concepts learned in a classroom setting are reinforced by lab activities completed with industry standard computers and software as taught by industry experienced and dedicated faculty.

I wish you success in your studies and an exciting future in the gaming world. If you have questions or need assistance please ask me, or my assistant Chris Green. We are located at office S324 at the Welland Campus.

Welcome again to the exciting world of gaming at Niagara College.

### From the Academic Advisors (Alisa Cunnington and Christine Keith, Brock University)

Welcome and congratulations on being in the GAME program. Alisa Cunnington (BA GAME Design) and Christine Keith (BSc GAME Programming) are your Academic Advisors (please speak with the Advisor assigned to your program; for contact information please refer to Page 10/11).







As Advisors, our role is to assist students in progressing through their degree and overcoming any challenges along the way. The program you are enrolled in is very structured, meaning your courses are pretty much planned and mapped out for you. However, even though the courses are planned out we still strongly encourage GAME students to register early and meet with an Academic Advisor to ensure that your program requirements are met. You are going to hear about the idea of a "cohort" – this means that you are following the structured plan set for you with the group you start with; it is important that any deviation from your academic plan will need to be carefully discussed and approved. We are here to help and can make time to meet with you to discuss any concerns you are having.

## 2. Introduction

### Niagara College/Brock University Partnership Overview and the Objectives of GAME

The GAME program is a joint initiative between Brock University and Niagara College that was proposed as a means of integrating study between Brock's Integrated Arts and Science (IASC) and Computer Science (COSC) programs with concurrent study in Niagara College's Game Development (BTGD) program.

The program represents a unique partnership between the two institutions that allows students to earn a Bachelor's degree and an Advanced Diploma in Game Development in the space of four years.

As a student in the GAME program you will experience the diverse conceptual, creative and practical frameworks within which computer games reside and are produced. You will be capable of critical, procedural and technical evaluation of game expressions and their contexts. During your studies you will develop specialized understanding and practical capacities related to the aspects of the domain chosen such as game art, design and/or programming. You will

demonstrate your abilities through critical and methodological analysis as well as through prototyping of games and a portfolio of work produced.

As a student in either the design or the programming pathway of the GAME program, you will benefit from an educational partnership that combines the theoretical with the applied.

This initiative hopes to succeed in placing students and the Niagara Region at the forefront of a rapidly evolving industry that both occupies a significant place within the landscape of contemporary culture as well as being an economic juggernaut, contributing an estimated \$1.7 billion to the Canadian economy alone in 2011.

The partners of the GAME program in the Niagara Region have identified interactive media as being a major driver of the local economy and have worked to create and develop an economic cluster that is focused on retaining and attracting talent, entrepreneurs and content producers right here in Niagara. To this end, the GAME program between Brock University and Niagara College is an essential component aimed at preparing students in the skills necessary for the production of games as a means of supporting the previously mentioned strategy which seeks to transform the Niagara region into a hub of innovation.

## 3. Program Outline

### Program Overview

This unique degree/diploma program pairs aspiring game developers with academic and industry experts. You'll learn new skills about the elements that go into creating fun and compelling video games – creating new games along the way. Benefits of the program include:

- Careers in game design and development
- Collaborative team-based approach
- Small class sizes
- Academic and hands-on experience, using the latest technology
- Located in beautiful Niagara

The GAME program is a partnership between the Centre for Digital Humanities and the Department of Computer Science at Brock University, and the School of Media Studies at Niagara College. Over four years, you'll receive an honours BA or BSc *plus* a three-year advanced diploma in game development.

## Honours Requirements

The BA Game Design and the BSc Game Programming are *Honours Only* programs. As a consequence you have to satisfy the honours requirements throughout your studies, i.e., you have to maintain a minimum 70 percent major average and a 60 percent average in the remaining credits. There is no Pass degree option in GAME.

## Programs

### *Bachelor of Arts - Game Design*

Game Design prepares students to analyze and build games and other interactive media expressions. Students create games on varied platforms and gain fluency in computing and scripting. They will learn the principles and use of industry standard technology for 3D modelling, character design, environment design and animation. Students will integrate narrative, writing, art direction, level and game design.

### *Bachelor of Science - Game Programming*

Game Programming enables students to analyze and build games and to design and create the underlying program structures. Students gain fluency in basic art and technology tools specific to games. They will create games on varied platforms and develop a depth of

knowledge in the concepts that underlie game mechanics involving computer science and related mathematics. Students will engage in practices associated with game programming while also participating fully in the entire game production process.

## Career Opportunities

A BA in Game Design opens the doors to a number of potential career paths in the video game and entertainment industry including:

- Animator
- Concept Artist
- Art Director
- Game Marketer
- Asset Designer

A BSc in Game Programming could lead to exciting opportunities such as

- Game Developer
- Game System Designer
- Gameplay Engineer
- User Interface Developer
- Technical Director



## Computer Recommendations

A number of courses in the GAME program rely heavily on design and visualization software that require high end graphics processing.

Although students will have access to computer labs at both Brock University and Niagara College, space and access times may be limited.

Students wishing to use their own laptop or desktop for course work should note the following minimum operating requirements for running software that students may purchase from 3rd party software dealers, the Brock Bookstore, or through educational resellers such as Studica.

The following requirements specify a *minimum* laptop system suitable for GAME students. Please note that any better system will do the job. The minimum requirements are provided in the following table.

	PC	Mac
Processor	64 bit Intel or AMD Processor	64 bit Intel Processor
RAM	8GB RAM	8GB RAM
Hard Drive	500GB HD Space	500GB HD Space
OS	Windows 7	Windows 7 (Through Bootcamp/Parallels)
GPU	Run the Recommended Hardware Wizard at Autodesk: <a href="http://www.autodesk.com/graphics-hardware">www.autodesk.com/graphics-hardware</a>	Run the Recommended Hardware Wizard at Autodesk: <a href="http://www.autodesk.com/graphics-hardware">www.autodesk.com/graphics-hardware</a>
Accessories	3 Button Mouse or Trackpad	3 Button Mouse

*\*Minimum requirements are based on the system requirements of third party software and may change without warning. Brock University is not responsible for changes in technical requirements and students should confirm these specifications at the time of purchase\**

## 4. Logistical Information

### Registration

The course lists in Part 5 list the course requirements for the GAME programs. Most of the courses in the GAME program are core courses which you are required to take during the corresponding term. Due to the cohort-based nature of the GAME program, you will work in certain courses collaboratively with your peers on game projects.

As a general guideline, make sure that you register for your courses early. This applies in particular to courses that are not exclusive to GAME students. Registering early will guarantee a spot in those courses and you will not run into the problem that one of your mandatory courses is already full.

Registration will be handled exclusively through Brock University, regardless of whether a course is being offered at Niagara College or Brock University. A list of timetables and registration guides for Brock University can be found at:

<https://brocku.ca/registrar/guides-and-timetable>.

Note that courses at Niagara College will appear in the system with the Brock number (see Part 5). If such a

course is part of both streams, then Section 1 (S1) is for Game Design and Section 2 (S2) for Game Programming students. Make sure that you choose the correct section.

### Reading Week

A typical school year at both Niagara College and Brock University features two reading weeks, one in each semester. For students enrolled in the GAME program, the Brock University reading week schedule will be followed.

### Snow Days

Should a class be cancelled due to inclement weather any rescheduling and/or make-up will follow the regulations of the institution hosting the course.

### Student Grade Release

Student marks will be released through the Brock system and can generally be found through the Student Self-Serve portal on the student's my.brocku.ca page. Grades for courses at Niagara College will be added to the student portal once the course marks have been finalized. For obvious reasons this may take a few days.



## Academic Advising

Academic advising for students enrolled in the GAME program will be facilitated primarily through Brock University. For students pursuing a BA in Game Design, your academic advisor is Alisa Cunnington ([acunnington@brocku.ca](mailto:acunnington@brocku.ca)). For students pursuing a BSc in Game Programming, your academic advisor is Christine Keith ([ckeith@brocku.ca](mailto:ckeith@brocku.ca)).

## Exams

Due to the differences in semester composition between Niagara College and Brock University, the course and exam schedule will vary between the two institutions. At Brock University, you will have 12 weeks of classes followed by a two week exam period. At Niagara College, exams (and final projects), are generally incorporated into the program's full 14 week semester schedule. Your Niagara College GAME courses will continue during Brock's exam period.

## Public Transit Information

### *General Information*

Bus service from Brock University to Niagara College for the GAME program will be handled by Welland transit's

Brock Link. A full schedule of arrival and departure times can be found at:

<http://welland.ca/transit/wellandstcatharines.asp>.

Bus passes will be administered by Brock University and the Brock University Student's Union. On average, the transit time between Brock University and Niagara College's Welland campus is about 30 minutes, weather and traffic permitting. Full service (7:27AM to 10:15PM) operates Monday to Friday. On weekends and during reading week, service is reduced to between 7:27AM and 7:25PM with some exceptions such as during exam week. There is no service during public Holidays.

### *Route Information*

#### From Niagara College

Right onto First Ave.; Left onto Woodlawn.; Left onto Niagara St.; Continue North on Merrittville Highway; Left onto St. David's Rd. into University; Stop located at Schmon Tower.

#### From Brock University

Right onto Merrittville Highway; Continue South on Niagara St.; Right onto Quaker Rd.; Left onto First Ave.; Right into Niagara College

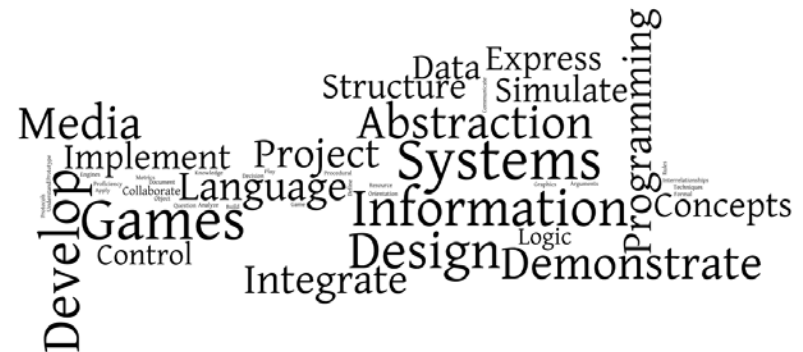


BA Game Design / Advanced Diploma Game Development	
Courses offered at Brock University	Courses offered at Niagara College
<b>Year 1 Fall Term</b>	
APCO 1P00 – Introduction to Media Computation	BTGD9810/1P10 – Digital Graphics for Gaming I
CPCF 1F25 – Media and Culture: Texts and Practices	BTGD9811/1P11 – Fundamental 3D and Multimedia Technologies
IASC 1P04 – New Media and Games	
<b>Year 1 Winter Term</b>	
CPCF 1F25 – Media and Culture: Texts and Practices	BTGD9820/1P20 – Digital Graphics for Gaming II
IASC 1P05 – Games, Genres, Aesthetics	BTGD9822/1P22 – Game Engine Fundamentals
IASC 1P06 – History and Future of Storytelling	
<b>Year 2 Fall Term</b>	
IASC 2P04 – Ludology	BTGD9831/2P31 – Environment Design
VISA 2P99 – Introduction to Sound Design	BTGD9833/2P33 – Database Essentials
	BTGD9835/2P35 – Game Design and Development I
<b>Year 2 Winter Term</b>	
IASC 2P05 – Game Design Paradigms	BTGD9841/2P41 – Character Modelling and Animation
VISA 2P97 – Digital Video Art	BTGD9844/2P44 – Project Management
	BTGD9845/2P45 – Game Design and Development II
<b>Year 3 Fall Term</b>	
APCO 1P50 – Integrity and Literacy in the Information Age	BTGD9855/3P55 – Game Production I
COMM 2P90 – Computer-Mediated Communication or STAC 3P14 – Dramatic Creation for Contemporary Cultural Practice	
IASC 3F91 – Innovations in Advanced Digital Media	
IASC 3P04 – Immersion and Simulation	
<b>Year 3 Winter Term</b>	
COMM 2P91 – Social Media: Reading and Writing in New Spaces or VISA 3P10 – Expanded Video Process and Production	BTGD9864/3P64 – The Game Industry Business
IASC 3F91 – Innovations in Advanced Digital Media	BTGD9865/3P65 – Game Production II
IASC 3P06 – Game Criticism	

Year 4	
IASC 4P02 – Video Game Research and Development	
IASC 4F03 – Team-based Practicum in Game Design and Production	
<b>Select 2 credits from:</b> IASC 3P95 – Internship in Interactive Media IASC 3P99 – Directed Project VISA 3F96 – Interdisciplinary Workshop DART 3F61— Design: Theatrical Design DART 3P92 – Scriptwriting	
<b>Select 1.5 credits from:</b> IASC 3P98 – Directed Studies COMM 3P26 – Social and Cultural Aspects of Digital Gaming COMM 3P90 – Advanced Topics in Digital Culture EDUC 4P62 – Video Games in the Classroom COMM 3P92 – Technology and Culture STAC 3P97 – Appropriation in Arts and Culture STAC 3P98 – Reporting Arts and Culture STAC 4P72 – High and Low Art: Intersections, Exchanges and Flows	

## BSc Game Programming / Advanced Diploma Game Development

The courses in the BSc Game Programming / Advanced Diploma Game Development stream are listed from Year 1 to Year 4 below. The following word cloud provides an overview of the main topics covered in this stream.





BSc Game Programming / Advanced Diploma Game Development	
Courses offered at Brock University	Courses offered at Niagara College
<b>Year 1 Fall Term</b>	
COSC 1P02 – Introduction to Computer Science	BTGD9811/1P11 – Fundamental 3D and Multimedia Technologies
CPCF 1F25 – Media and Culture: Texts and Practices	
IASC 1P04 – New Media and Games	
MATH 1P66 – Mathematical Reasoning	
<b>Year 1 Winter Term</b>	
CPCF 1F25 – Media and Culture: Texts and Practices	BTGD9822/1P22 – Game Engine Fundamentals
COSC 1P03 – Introduction to Data Structures	
IASC 1P05 – Games, Genres, Aesthetics	
MATH 1P67 – Mathematics for Computer Science	
<b>Year 2 Fall Term</b>	
COSC 2P03 – Advanced Data Structures	BTGD9831/2P31 – Environment Design
IASC 2P04 – Ludology	BTGD9833/2P33 – Database Essentials
	BTGD9835/2P35 – Game Design and Development I
<b>Year 2 Winter Term</b>	
COSC 2P13 – Computer Systems	BTDG9844/2P44 – Project Management
IASC 2P05 – Game Design Paradigms	BTGD9845/2P45 – Game Design and Development II
PHYS 1P21 – Mechanics and Introduction to Relativity	
<b>Year 3 Fall Term</b>	
APCO 1P50 – Integrity and Literacy in the Information Age	BTGD9855/3P55 – Game Production I
COSC 2P05 – Programming Languages	
COSC 3P71 – Introduction to Artificial Intelligence	
IASC 3P04 – Immersion and Simulation	
<b>Year 3 Winter Term</b>	
IASC 3P06 – Game Criticism	BTGD9864/3P64 – The Game Industry Business
MATH 1P12 – Applied Linear Algebra	BTGD9865/3P65 – Game Production II
	BGTD9866/3P66 – Graphics Programming Fundamentals

Year 4	
IASC 4P02 – Video Game Research and Development	BTGD9876/4P76 – Network Game Programming
IASC 4F03 – Team-based Practicum in Game Design and Production	BTGD9877/4P77 – Mobile Game Development
<b>Select 1 credit from:</b> COSC 3P91 – Advanced Object-Oriented Programming COSC 3P94 – Introduction to Human Computer Interaction COSC 3P98 – Computer Graphics	
<b>One COSC credit 3(alpha)90 or above</b>	
MATH 1P97 – Calculus With Applications <b>or</b> MATH 1P98 – Practical Statistics	

## Course Descriptions

- **APCO 1P00 (BU) - Introduction to Media Computation**

Programming by example, encoding and manipulating pictures (such as grayscale and colour replacement), pixel manipulation (such as red eye and mirroring), designing and debugging, text manipulation with HTML, file processing, automatic generation and manipulation of web pages, and sound processing (such as encoding, volume manipulation and splicing).

- **APCO 1P50 (BU) - Integrity and Literacy in the Information Age**

An examination of the issues in use of information technology including historic and

social perspectives; legal, ethical and moral issues; intellectual property, licensing and copyright; privacy and freedom of expression; professional conduct and information literacy.

- **BTGD 9810/1P10 (NC) - Digital Graphics for Gaming I**

An introductory course in Computer Graphic Imaging and Visual Design within the Adobe workflow. The course is geared specifically towards the Gaming, Animation and Illustration Industries with Photoshop being the primary software used in this class in conjunction with a Wacom tablet. Students will explore Art & Design fundamentals such as Color, Composition, Line weight, Form, and Perspective and will produce original artwork, layouts, concepts, roughs and

compositions consistent with the expectations of the gaming industry.

- **BTGD 9811/1P11 (NC) - Fundamental 3D and Multimedia Technologies**

This course introduces the fundamentals of 3D animation for markets such as games, architecture, visualization and web. Industry standard software will be used in this course and topics covered include the navigation of software interface, low and high poly 3D modeling, creating materials, lighting and rendering, key framing and path animation.

- **BTGD 9820/1P20 (NC) - Digital Graphics for Gaming II**

During this course students will continue to develop their knowledge in Computer Graphic Imaging and Visual Design. Students will build on the foundation of traditional Design and Illustration theory that was applied to the Adobe Photoshop work flow in Digital Graphics for Gaming I course. They will continue to grow and expand their capabilities as artists through the exploration of other industry leading software packages. This will include transferring previously learned processes from Photoshop to vector based production in Illustrator. It will also involve applying painting and sculpting fundamentals to 3 dimensional meshes in Mudbox. As students

examine these programs and hone their skills, they will be expected to produce concept art and construct game assets for a number of industry related projects. This course will culminate with placing the created digital graphics and models into the Unity 3D game engine.

- **BTGD 9822/1P22 (NC) - Game Engine Fundamentals**

In this course, the fundamental skills required for the development of a 2D game will be studied by students. It will require examining many industry related techniques in the areas of graphic production, animation, and interactive scripting, and how they relate in a production pipeline utilizing a game engine. Keeping in mind the continuously changing landscape of game development, students will develop a set of core skills that can be applied to other engines and production environments. Learning tools for this course may include the Adobe suite, Unity game engine and C# gaming scripts.

- **BTGD9831/2P31 (NC) - Environment Design**

During this course students will develop the skills necessary for designing and building expansive 3D game environments. Students will be expected to combine traditional level and map development theory with the design and graphic techniques required to bring them to life in a modern game

engine. This course will examine industry leading techniques and software for generating terrains, architectural structures and the props and vegetation needed to populate them. It will also build on texturing, lighting and particle techniques that are available for enhancing the atmosphere and game play experience from a first person point of view. This will also include an exploration of mechanical animation techniques, sound effects, and the production of GUI elements and will utilize software such as Unity Pro, 3DS max, Mudbox, Photoshop & audio editing software.

- **BTGD9833/2P33 (NC) - Database Essentials**

To prepare students for today's work environment, this course will provide in depth instruction on relational database design strategies as well as fundamental Structured Query Language (SQL) syntax. By the end of the course, students will be able to design, create, and maintain a relational database.

- **BTGD9835/2P35 (NC) - Game Design and Development I**

This course explores game design and development aspects utilizing a game engine in conjunction with scripting. Design elements of various game genres are explored with emphasis

on using the game engine to further the students' understanding of game design techniques. The scripting, and graphics concepts introduced are practiced in this WYSIWYG environment. Students will use the game development environment to complete several micro-game projects.

- **BTGD 9841/2P41 (NC) - Character Modelling and Animation**

This course will walk through all the necessary steps in the process of taking a character from sketch to game engine. This course will utilize leading modelling, lighting, and texturing techniques from the gaming industry as well as many advanced skills desired in the film, architectural and pre-visualization fields. This course covers low and hi poly modelling techniques, the application of texture maps, and methods of rigging, binding and animating characters. This course will culminate with your fully realized character coming to life in the Unity game engine. Software packages in this course may include Unity, 3DS max, Mudbox, Photoshop & Motionbuilder.

- **BTDG 9844/2P44 (NC) - Project Management**

This course is targeted towards conducting team based project work in an effective and professional manner. After completing this

course, students will be able to apply the following set of general project management skills within a variety of contexts: client relationship and communications management, team and leadership development, product and service quality promotion, time management, and project documentation. Course work will be centered on a common class project and/or case studies.

- **BTGD 9845/2P45 (NC) - Game Design and Development II**

In this course students are placed into mini teams to collectively build on their previous game development skills. Student teams will add more advanced animations, particle effects, and lighting techniques to realize a higher level of realism. By managing input devices, animated models, game mechanics, terrain influences and audio sound effects, the students will create more engaging player game experiences.

- **BTGD 9855/3P55 (NC) - Game Production I**

In this course, students will be assigned to a game development production team. Student teams will work closely to conceive, design, document and prototype a new game concept. The end result of term work will be a fully realized and documented game design,

accompanied with relevant prototypes and a detailed production schedule. Student teams will move to production in the Game Production II course.

- **BTGD 9864/3P64 (NC) - The Game Industry Business**

This course is designed to provide students with a comprehensive understanding of the computer/video gaming business and how to successfully market themselves within it. Major topics include the business environment, planning and organizing a software development/gaming business, preparing a business plan, funding approaches, development contracts, hardware/software procurement, techniques involved in producing game marketing trailers, developing online companies, and the preparation and marketing of digital portfolios.

- **BTGD 9865/3P65 (NC) - Game Production II**

In this course students will transform their proposed game project, developed in the Game Production I course, into reality. Following the established Game Design and Detailed Production Schedule documents, students will engage in full video game production activities. Student teams will demonstrate functionality requirements at regular intervals throughout the course utilizing presentations, walkthroughs and playable demos

resulting in a cohesive, polished and fully functional game.

- **BGTD 9866/3P66 (BU) - Graphics Programming Fundamentals**

This course is designed to establish a fundamental understanding of video game graphics programming through the examination of both two and three dimension space. Students will be introduced to standard graphics techniques such as: texture and sprite manipulation, transformations, scaling, rotations, 3D rendering and texture mapping. A standard computer graphics API will be used for programming assignments.

- **BTGD 9876/4P76 (NC) - Network Game Programming**

Some of the most powerful features of computer use are the ability to access network resources and communicate with others. This course provides you the opportunity to implement cabled and wireless computer networks through the installation and configuration of connection devices, communications protocols, peer and client/server services, and additional web and server services supporting networked gaming environments.

- **BTGD 9877/4P77 (NC) - Mobile Game Development**  
This course covers a mix of important conceptual knowledge and practical programming skills for developing mobile device applications. A key goal for this course is to make students better software developers and to prepare them for developing new and innovative mobile products.
- **COMM 2P90 (BU) - Computer Mediate Communication**  
Exploration of the nature of computer-mediated communication (CMC) and its role in social, educational and interpersonal contexts. Introduction to technology and methodologies essential to explore the potential of CMC.
- **COMM 2P91 (BU) - Social Media: Reading and Writing in New Spaces**  
Exploration of the theory, philosophy and politics of Social Media as a communicative mode. Topics include critical theory in a Social Media context, changing perceptions of reader narrative and Social Media compared with other electronic textuality.



- **COMM 3P26 (BU) - Social Political Aspects of Digital Gaming**  
Critical investigation of digital gaming, particularly of the interrelationships among past and present games, culture and media.
- **COMM 3P90 (BU) - Advanced Topics in Digital Culture**  
Explorations of topics such as virtual communities, cyber-identity/identities and cyber-spirituality.
- **COMM 3P92 (BU) - Technology and Culture**  
Exploration of mutually productive relations among cultural practices and technologies, using historical and contemporary examples.
- **COSC 1P02 (BU) - Introduction to Computer Science**  
Students will explore the foundations of Computer Science and computer programming in a high-level language (normally Java). Topics include computer fundamentals, representation of information, problem solving and software development, programming language syntax and semantics, methods, input/output, control structures and data types.
- **COSC 1P03 (BU) - Introduction to Data Structures**  
Students will study programming and problem solving in a high-level programming language

(normally Java). The course will cover data structures including arrays and linked-lists, modularity, abstraction and abstract data types including stacks, queues and lists. Students will also be introduced to searching and sorting, recursion, algorithm analysis and object-orientation.

- **COSC 2P03 (BU) - Advanced Data Structures**  
Implementation and use of advanced data structures including trees, graphs, hash tables and advanced list structures, sorting and searching, recursion and traversals. Analysis of algorithms.
- **COSC 2P05 (BU) - Programming Languages**  
The fundamental concepts of programming languages including syntax, semantics, program translation, virtual machines, control, data types, multi-threading, exception handling and abstraction mechanisms will be explored by students in this course. Students will be introduced to programming paradigms including imperative, applicative, logic and object-oriented.
- **COSC 2P13 (BU) - Computer Systems**  
An examination of operating systems and networking. Covered in this course are resource

sharing including file, processor, I/O and memory management, concurrency, including: context switching, interprocess communication, and synchronization, protection and security including encryption and distributed systems and networking including: ISO model and packet routing.

- **COSC 3P71 (BU) - Introduction to Artificial Intelligence**  
Historic and philosophical foundations of AI; knowledge representation and reasoning; problem spaces; blind and heuristic search; adversarial search in game playing; machine learning; social and ethical considerations will be taught in this course.
- **COSC 3P91 (BU) - Advanced Object Oriented Programming**  
Topics may include graphical user interfaces, animation, sound, music, networking, parallelism, client-server and XML using game design as an example. Object-oriented program design including UML and design patterns and introduction to advanced Java APIs are provided by this course.
- **COSC 3P94 (BU) - Introduction to Human Computer Interaction**  
Human factors in the design and support of computing systems and design methodologies such as GOMS, TAGs and Task Analysis are explored by students in this course. The class will also cover design principles relating to various interaction paradigms.
- **COSC 3P98 (BU) - Computer Graphics**  
Topics include 2-D and 3-D graphics, curve and surface fitting, light and colour models, real time interfaces, animation and hardware issues. Students enrolled in the class are assumed to have knowledge of C language programming.
- **CPCF 1F25 (BU) - Media and Culture: Texts and Practices**  
A survey course in the fields of communication, popular culture and film. Students will examine the relationships between texts, images and socio-cultural practices.
- **DART 3F61 (BU) - Design: Theatrical Design**  
An introduction to research techniques and practice of design for the theatre.

- **DART 3P92 (BU) - Scriptwriting**  
Students will study the theory and practice of writing with action, character and dialogue.
- **EDUC 4P62 (BU) - Video Games in the Classroom**  
Research and current issues related to the integration of video games and other interactive new media technologies into the elementary and secondary school instructional program.
- **IASC 1P04 (BU) - New Media and Games**  
Information, knowledge and expression in interactive and networked media environments are explored in this course along with the technologies and socio-political infrastructures that make such media possible. The historical development of and precedents for interactive media as well as concepts in poetics, hypertextuality, hypermediacy, remediation, social relations and play are also examined by students.
- **IASC 1P05 (BU) - Games, Genres, Aesthetics**  
Students will explore the diverse ways in which meaning is created in games. The history of games and key concepts in game studies addressing formalisms, platforms, communities and player experience are also examined with consideration to the games industry and studio development.
- **IASC 1P06 (BU) - History and Future of Storytelling**  
The history of storytelling from the earliest oral traditions to contemporary forms of digital expression will be studied in this course. Storytelling's cultural roots in fairytales, legends and myths through to film, video games and interactive fiction will be examined by students and elements of a narrative, structure, character, conflict, and dramatic arc will be touched on as well along with concepts and practices in rhetoric, storyboarding, and presentation.
- **IASC 2P04 (BU) - Ludology**  
The study of nature, psychology and the characteristics of play. Students will explore theories related to fun, play and games including improvisation, competition, exploration, role-playing, sports and thrill-seeking. Formal and informal games, goals, rules, decisions, interaction, rewards and penalties, and psychological triggers and responses will also be examined along with an analysis of gameplay, player experience, engagement, mechanics, design and usability.
- **IASC 2P05 (BU) - Game Design Paradigms**  
This course will cover the conceptual and practical frameworks for the design of games as systems. Consideration of the formal structures

of games and a focus on world building and narrative, goals and experience, balance, consistency, and meaningful decision making are examined in this class. Simple game prototyping, testing and documentation are also explored by students.

- **IASC 3F91 (BU) - Innovations in Advanced Digital Media**

An introduction to advanced interactive media concepts and visualization technologies. Students will learn about design and workflow issues and integration of visual effects and 3D animations with live action media. May include motion capture, 3D and 2D animation, HD, 2K and 4K live action video and 3D graphics software.

- **IASC 3P04 (BU) - Immersion and Simulation**

Study of cognitive, perceptual and imaginative processes that produce a sense of total engrossment in a digital environment. Students will explore modelling and simulation of the appearance and behaviours of a world.

- **IASC 3P06 (BU) - Game Criticism**

Students will learn about critical methods from literary, film and cultural contexts, informed by the emerging canon of game criticism, and its application to games as expressive and cultural

artifacts. Discourse analysis focusing on game genres, perspective, hardware platforms, computational frameworks, gameplay affordances, narratives, ludology and the process of meaning making are also explored.

- **IASC 3P95 (BU) - Internship in Interactive Media**  
Part-time internship in a business related to interactive media or the gaming industry.

- **IASC 3P98 (BU) - Directed Studies**

Program of study through research and readings designed in consultation with the faculty member directing the course.

- **IASC 3P99 (BU) - Directed Project**

Students will work on an interactive media project with directed readings designed in consultation with the faculty member directing the course.

- **IASC 4F03 (BU) - Team-based Practicum in Game Design and Production**

Planning and production of a collaborative game project.

- **IASC 4P02 (BU) - Video Game Research and Development**

Directed program of readings and research related to the theoretical and practical aspects of game design/development as applied to each student's individual contributions to a team-based project. Best practices in the preparation of design and technical documentation.

- **MATH 1P12 (BU) - Applied Linear Algebra**

Students will become familiar with systems of linear equations with applications. Matrix algebra. Determinants, vector geometry in  $\mathbb{R}^2$  and  $\mathbb{R}^3$  dot product, norm and projections, cross product, lines and planes, complex numbers, euclidean n-space and linear transformations from  $\mathbb{R}^n$  to  $\mathbb{R}^m$  are examples of concepts covered by this course. The class focuses on applications of linear algebra to sciences and integrated use of a computer algebra system.

- **MATH 1P66 (BU) - Mathematical Reasoning**

Introduction to mathematical abstraction, logic and proofs including mathematical induction.

- **MATH 1P67 (BU) - Mathematics for Computer Science**

Students will study the development and analysis of algorithms, complexity of algorithms,

recursion solving recurrence relations and relations and functions.

- **MATH 1P97 (BU) - Calculus with Application**

This calculus course covers, amongst other concepts, lines, polynomials, logarithms and exponential functions; two-sided limits; rates of change using derivatives; max and min of functions using derivatives; higher derivatives and concavity; area under a curve using integrals; optimization of functions of two variables using partial derivatives; growth and decay using differential equations; applications to many different disciplines; use of computer algebra systems.

- **MATH 1P98 (BU) - Practical Statistics**

A statistics course that explores descriptive statistics; probability of events; counting rules; discrete and continuous probability distributions: binomial, Poisson and normal distributions; Central Limit Theorem; confidence intervals and hypothesis testing; analysis of variance; contingency tables and correlation and regression. There is an emphasis on real-world applications throughout. The course makes use of statistical computer software such as IBM SPSS.

- **PHYS 1P21 (BU) - Mechanics and Introduction to Relativity**  
Kinematics, Newton's laws and their applications to equilibrium and dynamics; special relativity are covered in this course.
- **STAC 3P14 (NC) - Dramatic Creation for Contemporary Cultural Practice**  
Students will study the components of a dramatic story. This course will teach students about understanding character, dramatic action, structure, direction, improvisation, tempo, rhythm, voice and body potential.
- **STAC 3P97 (BU) - Appropriation in Arts and Culture**  
Students will study authorship and appropriation in visual and literary culture. Topics include the historical development of the notions of the artist, copyright and plagiarism, quotation, parody and intertextuality, the role of found objects, collage and montage, and the significance of digital technologies. Historical and contemporary examples from a wide range of media will be used.
- **STAC 3P98 (BU) - Reporting Arts and Culture**  
Students will explore that contexts, genres, conventions and practices of arts journalism in Canada. The course will involve critical reading of selected texts in arts journalism; practical experience researching and writing arts news, reviews, features, and publicity for print and electronic media.
- **STAC 4P72 (BU) - High and Low Art: Intersections, Exchanges and Flows**  
The exchange between high art and entertainment, considering intertextuality and cultural appropriation; the changing role of museums and community-based arts; and the migration of values and tastes between market-driven and not-for-profit cultural outcomes will be explored in this course.
- **VISA 2P97 (BU) - Digital Video Art**  
Concepts of basic videography and its applications within conceptual and aesthetic studio practice are studied by students through explorations in camera work, composition and lighting; digital video and audio editing, special effects, composing, text and titling, and DV output. The course will also cover critical analysis of recent and contemporary film and video practices
- **VISA 2P99 (BU) - Introduction to Sound Design**  
Approaches to the conceptualization and production of sound recording, notation, field-



recording, foley arts, soundtrack production, experimental music and performance, and contemporary sound art are studied by students.

- **VISA 3F96 (BU) - Interdisciplinary Workshop**  
An advanced studio workshop in interdisciplinary studio practices, including video, performance, audio and conceptual art, interventions and other time-based or experimental media. Projects involve collaboration and investigation of alternatives for public dissemination of artworks.
- **VISA 3P10 (BU) - Expanded Video Process and Production**  
Studies in practical and conceptual strategies in moving image production using digital video capture, other time-based media and emerging technologies. Students will learn about contextualization in contemporary discourses, script, location, directing actors, sequence, production design, planning and process, editing and effects.

## 6. Learning Outcomes

The Undergraduate Degree Level Expectations (UDLEs) below are grouped into six major areas. These are the general expectations for every undergraduate student at Brock University.

Following the UDLEs we have listed the program outcomes for the two streams BA Game Design / Advanced Diploma Game Development and the BSc Game Programming / Advanced Diploma Game Development of the GAME program. Each course will address some of the program outcomes in addition to course specific outcomes.

It is important that you familiarize yourself with the program outcomes of your stream and how they are related to the UDLEs of Brock University. They can serve as milestones during your studies.

### Brock University UDLEs

A Graduate of Brock University will be able to demonstrate

#### 1. A Depth and Breadth of Knowledge of:

- General knowledge of key concepts

- Broad understanding of major fields
- Ability to gather and interpret information
- Detailed knowledge in an area of the discipline
- Critical thinking and analytical skills
- Apply learning from outside discipline

## 2. Knowledge of Methodologies

- Apply methods of inquiry to:
  - Evaluate different approaches
  - Use these methods to devise and sustain arguments or solve problems

## 3. Application of Knowledge

- Review, present and interpret information in order to:
  - Develop lines of argument
  - Make sound arguments
- Use technologies to:
  - Analyze information
  - Evaluate the appropriateness of approaches to solving problems
  - Propose solutions
  - Make use of scholarly sources

## 4. Communication Skills

- Communicate accurately and reliably, orally and in writing to a range of audiences.

## 5. Awareness of Limits of Knowledge

- Understand limits to own knowledge and how this might influence their analyses and interpretation

## 6. Autonomy and Professional Capacity

- Qualities and transferrable skills for further use:
  - Exercise of personal responsibility
  - Working effectively with others
  - Ability to identify and address own personal needs
  - Behaviour consistent with academic integrity and social responsibility

## GAME Program Outcomes - BA Game Design / Advanced Diploma Game Development

At the end of this program, the successful student will be able to:

- Define and analyze the essential characteristics of play, games and narrative
- Differentiate among game genres, game purposes and design methods

- Examine and generalize from theory and discourse related to games and other media
- Relate historical and contemporary notions of games and related media
- Assess social and cultural impacts of games and other interactive media
- Understand economic and business dimensions of games
- Demonstrate detailed knowledge of formal concepts, production methods and tools related to digital imaging, multimedia, interface design, 3D modeling, animation, cinematics and cutscenes, visual effects, sound design, level design and scripting
- Apply critical thinking in the analysis of conceptual and creative frameworks in computing, the arts and media
- Select optimal research sources and methods with which to examine and analyze games of all types, and place these within social, cultural and creative frameworks
- Interpret game, play and narrative structures and patterns as well as their uses and effects
- Integrate diverse concepts for the purpose of devising new forms of expression.
- Evaluate production methods, processes and strategies
- Choose game design strategies and patterns based on an analysis of past and present practices
- Devise unique game concepts, narratives, design patterns, mechanics and dynamics relevant to varied purposes and audiences
- Apply diverse prototyping methods
- Test and evaluate game concepts and mechanics
- Contribute to the creation of games on varied platforms through competent use of appropriate arts and technologies
- Select and apply effective pre-production and production methods (narration, design, asset creation, assembly) and software tools
- Articulate complex ideas, arguments, and concepts in oral presentations and in writing reports including game treatments and comprehensive design documentation
- Produce informed and inspired creative expression in the diverse framework of games
- Experiment with, test and evaluate of concepts in games in relation to other disciplines and practices to discover its capacities and limitations
- Recognize that games are rapidly transformed in unpredictable ways
- Maintain commitment to research and inquiry in support of independent learning to expand new knowledge in a constantly evolving field and collaboratively within a team in a variety of roles
- Define work commitments and meet production deadlines

- Interact respectfully with peers
- Provide leadership in areas of individual specialization
- Reflect upon the results of practice to generate insights into future conceptual and technical options and their iterations
- Adhere to the spirit of professional codes of conduct, (such as IGDA) with respect to legal, ethical, societal, environmental, health, safety, legal and cultural issues

### GAME Program Outcomes - BSc Game Programming / Advanced Diploma Game Development

At the end of this program, the successful student will be able to:

- Define and analyze the essential characteristics of play, games and narrative
- Differentiate among game genres, game purposes and design methods
- Examine and generalize from theory and discourse related to games and other media
- Relate historical and contemporary notions of games and related media
- Assess social and cultural impacts of games and other interactive media
- Understand economic and business dimensions of games
- Demonstrate fluency with basic concepts, production methods and tools related to digital imaging, multimedia, 3D modeling, animation, level design and scripting
- Demonstrate detailed knowledge of algorithms, data structures, organization & architecture, databases, mathematics, operating systems, networking, programming languages, social & professional issues and software engineering to the development of games
- Select appropriate research sources and methods for the examination and analysis of games of within social, cultural and creative frameworks
- Analyze and solve problems in design and mobilization of game assets using varied computational approaches
- Design, implement, test and maintain game software for open-ended problems with evaluation based on predefined criteria considering safety, economic, cultural and societal issues
- Identify and apply appropriate resources including techniques and computing tools
- Apply diverse prototyping methods - Test and debug game mechanics
- Contribute to the creation of games on varied platforms through programming and implementation

- of 2D and 3D game engines, engineering of intelligent and graphics systems
- Articulate complex ideas, arguments, and concepts in oral presentations and in writing reports including comprehensive technical specifications and documentation
  - Produce well-structured and documented programming for games
  - Experiment with, test and evaluate of concepts in game programming in relation to other disciplines and practices to discover its capacities and limitations
  - Recognize that games and related computational methods are rapidly transformed in unpredictable ways
  - Maintain commitment to research and inquiry in support of independent learning to expand new knowledge in a constantly evolving field
  - Work independently and collaboratively within a team in a variety of roles
  - Define work commitments and meet production deadlines
  - Interact respectfully with peers
  - Provide leadership in areas of individual specialization
  - Reflect upon the results of practice to generate insights into future conceptual and technical options and their iterations
- Adhere to the spirit of professional codes of conduct, (such as IGDA, CIPS, ACM) with respect to legal, ethical, societal, environmental, health, safety, legal and cultural issues

## 7. Facilities

### Brock University Design Studio (BUDS)

The Brock University Design Studio (BUDS) provides students across Brock with course-based opportunities to practice and hone their knowledge and skills within a real-world, collaborative, project-based production studio context that incorporates a service-learning orientation.

Modeled on the principles of project-based learning, BUDS serves as the vehicle through which interdisciplinary teams of students – leveraging a diverse array of instructional design, digital tool, and subject content expertise – collaborate on interactive design projects that are sponsored by community partners.

The studio is located in the MacKenzie Chown complex and serves as a workshop for students enrolled in programs within the IASC.

### Computer Science Department (BU) Labs

Computer Science students have access to three computer laboratories within the MacKenzie Chown complex:

- J301, Dell Optiplex, 3.4 GHz Intel Pentium D processors, 17" LCD flat panel displays, Windows/Linux (dual boot).
- J310, Dell Optiplex, 3.0 GHz Intel Core 2 Duo processors, 19" LCD flat panel displays, Windows/Linux (dual boot).
- J327, Robotics and APCO 2P01 Personal Computers and Network lab.
- D205, Dell Optiplex, 3.33 GHz Intel Core i5 quad core processors, 19" LCD flat panel displays, Windows/Linux (dual boot).

These labs are connected to a 16 core Linux Server and power points for laptops have been installed in designated sections within each of the labs. Wireless access is provided by the University in all buildings to support laptop connectivity.

The second level of J-Block also contains two general access computer labs maintained by Brock's Information and Technology Services as well as a few lecture and seminar rooms.

### Centre for Digital Humanities (BU) Labs

The main lab of the Centre for Digital Humanities is located in Thistle TH269H. It is a fully equipped workspace for GAME and IASC students. The lab is



equipped with high end Dell workstations and students have access to the lab provided that the Centre for Digital Humanities is open and no class has booked the lab for use.

### School of Media (NC) Labs

Niagara College provides two state-of-the-art gaming labs fully equipped with high end gaming computers and a suite of software used throughout the gaming industry. The program also has a media viewing room with three widescreen monitors to display game development progress with faculty and clients in a multiscreen interactive environment. Small class sizes enhance the experience in using leading industry art production and software development tools.

### Generator at One

The CDH and Niagara College partner with The Generator at One in downtown St. Catharines to enable students to work with industry professionals in internships and structured courses that provide access to a world-class media production studio. Students all have access to a sophisticated Motion Capturing System. Workflow is integrated between the green screen/motion capture studio, audio and visual effects suite, 3D scanning and printing, data centre and theatre.

## 8. Extracurricular

### Computer Science Club

Students enrolled in the GAME program may be interested in joining the Brock University Computer Science Club. The Computer Science Club is an organization of students dedicated to providing Brock students with an informational and social network of individuals interested in computer science. The club seeks to promote knowledge of, and interest in, computer science as well as allowing those interested in computer science to talk to each other and develop their skills in an expanding and in demand field.

The club has an office located at MCJ330 where members get together, a library of computer science books available to members, and regularly scheduled events for both fun and educational purposes.

Information about the Computer Science Club can be found on their website at:

<http://www.brockcsc.ca/>.

### Youth University

Youth University at Brock is non-profit department within Brock University which organizes summer camp



initiatives aimed at nurturing independence, developing social skills and helping children to cultivate curiosity through exploration, education and discovery.

The initiative offers children and teens from grades 2 to 11 a variety of fun and informative summer workshops in which to learn and develop their skills and social connections and employs a number of Brock students over the summer.

Students enrolled in the GAME program may be interested in assisting Youth University with programs such as their junior and senior game development workshops as a way of contributing to the community, developing and demonstrating their skills, networking with other instructors and students and building their résumés through a unique experience at Youth University.

Students can find more information about Youth University at:

<http://www.brocku.ca/youth-university>.