



# Catalog Addendum 2013-2014

# NOTICES

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[Updated 2013]

## Registration With Council For Private Education (CPE)

DigiPen Institute of Technology Singapore is registered with the Council for Private Education (CPE).

CPE Registration No.: 200711322H

Registration Period: 21 June 2011 to 20 June 2017

DigiPen Institute of Technology Singapore will be offering the following degree programs in September 2013:

- Bachelor of Science in Computer Science in Real-Time Interactive Simulation
- Bachelor of Science in Computer Science and Game Design
- Bachelor of Fine Arts in Digital Art and Animation
- Bachelor of Arts in Game Design

For a list of institutions registered with Council for Private Education (CPE) in Singapore, you may refer to the CPE website at <http://www.cpe.gov.sg>.

## Collaboration with Singapore Institute of Technology

On March 9, 2010, the Ministry of Education announced that the Singapore Institute of Technology (SIT), a national institute set up to offer additional pathways to diploma holders from the five local polytechnics obtain degrees from overseas higher education institutions, will partner with five international, highly reputable overseas higher education institutions to offer degree programs. DigiPen Institute of Technology Singapore was one of the universities invited to participate in this collaboration.

Under the collaboration, polytechnic graduates with related diplomas can apply through SIT to enroll the following degree programs at DigiPen Institute of Technology Singapore:

- Bachelor of Science in Computer Science in Real-Time Interactive Simulation
- Bachelor of Science in Computer Science and Game Design
- Bachelor of Fine Arts in Digital Art and Animation
- Bachelor of Arts in Game Design

Through this admission pathway, qualified candidates who are Singaporeans and Permanent Residents may enjoy certain credit transfers, and their tuition fees will be subsidized by MOE.

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## Important Notices

All items including, but not limited to, application forms, transcripts, reference letters, resumes, software, and any accompanying documentation or works of art (collectively “the Items”), forwarded to DigiPen by any person (the “Sender”) whether at the request of DigiPen or otherwise, become the exclusive property of DigiPen unless otherwise agreed to in writing by DigiPen, and the Institute\* shall be under no obligation whatsoever to return the Items to the Sender. At DigiPen’s discretion, the Items may be destroyed after being reviewed.

Students’ information and records including but not limited to academic, disciplinary and financial information will be shared with Singapore Institute of Technology on a regular basis.

DigiPen Institute of Technology Singapore Pte Ltd, reserves the right to make changes to the curricula and calendar without any prior notice.

The course offerings and requirements of DigiPen Institute of Technology Singapore are under continual examination and revision. This catalog is not a contract; it merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will not change. The Institute specifically reserves the right to change requirements for any major during any particular year. The individual student assumes full responsibility for compliance with all current academic requirements. Current course offerings may be obtained from the Registrar’s Office. Current major and degree requirements may also be obtained from the Registrar’s Office. For the most current information, visit DigiPen Institute of Technology Singapore’s official course catalog online at [singapore.digipen.edu/degree-programs/course-catalog/](http://singapore.digipen.edu/degree-programs/course-catalog/).

*\*Please note that when “Institute” is used in this book it means “DigiPen Institute of Technology Singapore.”*

## GENERAL INFORMATION

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[Updated 2013]

### Accreditation

DigiPen Institute of Technology is accredited by the Accrediting Commission of Career Schools and Colleges (“ACCSC”, or “the Commission”), an accrediting agency recognized by the United States Department of Education.

Important dates in DigiPen’s accreditation history are as follows:

- 2002: DigiPen was granted initial accreditation by ACCSC, including the approval for the Real Time Interactive Simulation (BS) degree program.
- 2002: DigiPen received ACCSC approval for the Production Animation (BFA) degree program.
- 2003: DigiPen received ACCSC approval for the Computer Engineering (BS) degree program.
- 2005: DigiPen was granted a renewal of accreditation by ACCSC.
- 2006: DigiPen was granted approval for its Master of Science in Computer Science degree program by ACCSC.

- 2008: DigiPen was granted approval for its Game Design (BA) and Game Design (BS) degree programs by ACCSC.
- 2010: DigiPen was granted approval for its relocation to its current facility by ACCSC.
- 2010: DigiPen received ACCSC approval which allows DigiPen Institute of Technology Singapore to disclose in its advertising that it is a branch campus of DigiPen Institute of Technology.
- 2011: DigiPen Institute of Technology Singapore was granted accreditation by ACCSC as a branch campus of the main school located in Redmond, Washington, USA.
- 2011: DigiPen was granted approval for its Master of Fine Arts in Digital Arts degree program by ACCSC.
- 2012: DigiPen is granted approval for its Music and Sound Design (BA), and Engineering and Sound Design (BS) degree programs by the ACCSC.

Any person desiring information about the accreditation requirements or the applicability of these requirements to the Institute may contact the ACCSC by mail:

Accrediting Commission of Career Schools and Colleges  
2101 Wilson Boulevard,  
Suite 302, Arlington, VA 22201,  
Telephone: (703) 247-4212.  
Web: [www.accsc.org](http://www.accsc.org).

## Program of Studies Offered

Currently, the Institute offers the following degree programs:

- Bachelor of Science in Computer Science in Real-Time Interactive Simulation
- Bachelor of Science in Computer Science and Game Design
- Bachelor of Fine Arts in Digital Art and Animation
- Bachelor of Arts in Game Design

## About DigiPen Institute of Technology Singapore's Facilities and Equipment

DigiPen Institute of Technology Singapore encompasses over DigiPen Institute of Technology Singapore encompasses over 2,200 square meters with a library, dedicated computer labs for students, and classrooms for lectures and instruction. The classrooms vary in size from lecture halls accommodating up to 70 students to small classrooms accommodating 15 students. The labs also vary in size from those accommodating 64 students to smaller ones seating 14 students.

Weekly student access to the Institute is from 8:00 A.M. to 12:00 A.M., Monday through Saturday, and from 12:00 P.M. to 12:00 A.M. on Sunday. Core office hours for the administrative staff run from 9:00 A.M. to 5:30 P.M., Monday through Friday, with additional hours as needed.

Major equipment items include PC workstations ranging from Core 2 Duo - 3GHz processors with 4GB RAM to Xeon processors with 24GB RAM and Quadro FX graphics cards. These computers are equipped with industry software for 2D and 3D animation production and development tools for game engine creation. All computers are on an internal network and have access to printers, servers, and archival media. The Institute upgrades the computer equipment on a periodic basis. As the student body population grows larger each year, the Institute will acquire additional equipment to accommodate that growth.

## APPLYING TO DIGIPEN INSTITUTE OF TECHNOLOGY SINGAPORE

[Updated 2013]

### Undergraduate Application Process

The admission process is administered by SIT and involves the following steps:

1. Applicant applies and submits online application through SIT's application portal. This application form is available at: <https://adm.singaporetech.edu.sg/sitadmission/>
2. The application received at SIT goes through centralized processing.
3. Applicants are shortlisted for interviews.
4. All applicants are notified about their application status via email or through SIT's online application system, [www.singaporetech.edu.sg](http://www.singaporetech.edu.sg).
5. Successful applicants can accept offer at Joint Acceptance Platform or by completing an acceptance form (as stipulated in the e-offer letter).
6. Applicants who accepted offer will receive a pre-matriculation package via email.
7. Successful applicants will need to complete the pre-matriculation procedure by stipulated deadline.
8. Successful applicants will then matriculate to SIT and collect the SIT Matriculation card.

For more information about the admission process, please visit [www.singaporetech.edu.sg](http://www.singaporetech.edu.sg).

Except where noted, all undergraduate applicants must submit the following for consideration:

1. All application forms: Must be submitted online through SIT's admission portal at [www.singaporetech.edu.sg](http://www.singaporetech.edu.sg).
2. An application fee of \$18 (includes GST) will be payable to SIT. Payments can be made using one of the following methods:
  - Cheque / Bank draft / Money order / Cashier's order made payable to "Singapore Institute of Technology"

Please indicate your Name, I/C No., and application number on the back of the cheque.

You will need to mail the cheque/ money order / cashier order/ bank draft to:

Singapore Institute of Technology  
EFG Bank Building  
25 North Bridge Road, #02-00  
Singapore 179104  
(Finance Department)

- NETs through the Admissions Office at 25 North Bridge Road, #02-00, EFG Bank Building.
  - Internet Banking Payment for DBS/POSB customers.
  - Online payment via eNETs.
3. Educational Records: Original documents must be presented to the Institute or to SIT for verification. As an alternative, documents may be certified by an official school representative or other authorized notary and sent directly to the Institute by the school or notary in a sealed envelope. Transcripts issued in a language other than English must be accompanied by literal translations completed by a recognized translating organization.
- Junior Colleges in Singapore (or other students who have sat for the Singapore-Cambridge GCE "A" Level exams):
    - Certified true copy of GCE "O" Level exam results or certificate.
    - Certified true copy of Junior College transcripts showing the grades for all courses taken by the student.
    - Certified true copy of Junior College diploma/certificate.
    - Certified true copy of GCE "A" Level exam results or certificate.
  - Any of Singapore's five Polytechnics:
    - Certified true copy of GCE "O" Level exam results or certificate.
    - Certified true copy of Polytechnic transcripts showing the grades for all courses taken by the student.
    - Certified true copy of Polytechnic diploma.
  - Any of Singapore's International Schools/ schools outside of Singapore:
    - Certified true copy of all transcripts showing the grades for all courses taken by the student.
    - Certified true copy of diploma showing proof of completion of high school level education sufficient for entrance to university.
- Certified true copy of foreign educational credentials (e.g., Malaysia STPM, UEC, India Standard XII-CBSE, ISCE, Indonesia SMA UAN, Vietnam High School Graduation Certificate, etc.) demonstrating that the applicant has completed high school education.
- Applicants who do not fall under any of the above categories, please contact the Office of Admissions at DigiPen Institute of Technology Singapore at [admissions.sg@digipen.edu](mailto:admissions.sg@digipen.edu).
4. Personal statement: To be completed within SIT's online application portal
  5. Letters of recommendation (Optional): Two letters of recommendation from individuals familiar with your academic background and/or work ethic, i.e. instructor, guidance counselor, employer. Recommendation letters from family members will not be considered.
  6. Official scores for the Test of English as a Foreign Language (TOEFL): This score is needed if English is not the Applicant's first language. This requirement can be waived if the Applicant has proof of completing at least four years of his or her most recent education at an institution in which English is the primary language of instruction. The Institute's TOEFL code is: 1493. Please see the section on Proof of Proficiency in the English Language for additional information.
  7. Other official documentation (when applicable): This includes, but is not limited to, SAT scores, proof of legal permanent residency in Singapore, certified transcripts from all institutions of tertiary education (e.g., university transcripts), proof of citizenship in Singapore (e.g. I/C, passport, etc.) and photocopies of the personal particulars.
  8. Official scores for the SAT 1 (recommended for RTIS and BSGD applicants only): The Institute's SAT code: 5473. Applicants who fail to register for SAT 1 may be required to sit for a written Math Assessment conducted by the Institute. Please see the Math & Science Requirements & Recommendations for Bachelor of Science Applicants section for details.
  9. Art portfolio: This is only required of applicants to the Digital Art and Animation (BFA) degree program. Please see the BFA Art Portfolio section for complete details about this important component of the application.
  10. Personal Game History: This is only required of applicants to the Game Design (BA or BS) programs. Please see the Personal Game History section for more details.
  11. Character analysis. This is only required of applicants to the Game Design (BA or BS) programs. Please see the Character or World Analysis section for more details.
  12. Card or Dice Game: This is only required of applicants to the Game Design (BA or BS) programs. Please see the Card or Dice Game section for more details.

13. Optional application components for Game Design applicants:

- BAGD applicants: art portfolio or sketches of level designs.
- BSGD applicants: sketches of level designs, photos of landscapes and urban environments that inspire you, drawings or sketches made by the applicant.

Applicants should not submit electronic games or modifications as the Office of Admissions will not install any of these.

### Personal Game History for Applicants to Game Design Programs

Applicants specifically interested in the BS in Computer Science and Game Design or BA in Game Design programs must submit a Personal Game History with their application.

- The Personal Game History is a list of all the games you have ever played. Start with video games and list all the ones you can remember. Follow that with a list of all the non-video games you have ever played. List everything you can think of, whether you liked those games or not (it is okay if the list is very long). Finally, list the names of any original games you have created yourself (of any kind). In parenthesis after each game listed, write a short description of what you have done with that game (played it a little, played it a lot, played it professionally, made modifications to it, made levels for it, etc.). For any games you created, describe the type of game and the most interesting thing about it. Below is a sample of the required format, with some sample games and comments listed. Follow this format exactly (including the headers, capitalization, parenthesis, etc.).

#### VIDEO GAMES

Halo (Played it a lot.)  
Doom (Played it a lot, made levels for it.)  
Farmville (Played it a little.)

#### NON-VIDEO GAMES

Dungeons and Dragons (Played it a lot, created new classes, ran several campaigns.)  
Spades (Played it a lot.)  
Chess (Played it a little.)

#### ORIGINAL GAMES

Rhino Wars (A simple animal-based trading card game I made for my friends.)

### Character Analysis for Game Design Applicants

Applicants specifically interested in the BS in Computer Science and Game Design or BA in Game Design programs must submit a Character Analysis essay with their application.

- Choose one of the character images at <https://singapore.digipen.edu/admissions/admission-requirements/game-design-essays/character->

*analysis/*, to analyze. Once you have made your choice, please write a two-page essay about this image. You must create a background story for the character. For example, you might explain how this character became a warrior or a scientist or whatever profession you see it doing. What led the character to select this profession? How do others react to the character? Additionally, you will need to provide a complete and concise overview of the character, including the following items:

- Name, home (or culture), and class/status
- Characteristics, skills, talents, or powers
- Type of game (strategy, first-person shooter, arcade, etc.) you see them in.
- Character motivation: what pushes them on a challenge or adventure?
- Fighting style, if any.
- Other relevant attributes.

BS in Computer Science and Game Design or BA in Game Design applicants are being asked to do this so that we may evaluate their ability to think creatively and to communicate their ideas. Please keep in mind that this should be written as an essay rather than simply a list of details. Be sure to explain how details in the image led you to make your conclusions about the character. For the Character Analysis, you may expand on the items listed above; at a minimum, however, you must address those listed. Additional instructions about the Character Analysis essays may be posted along with the images from which they are selected and analyzed.

### Card or Dice Game for Game Design Applicants

Applicants specifically interested in the BS in Computer Science and Game Design or BA in Game Design programs must submit a Card or Dice Game written as an essay with their application.

- The rules for this game must use only normal six-sided dice and/or a normal deck of traditional playing cards – no other physical components are allowed (other than scratch paper for keeping score, if needed). Do not send dice or cards with your application, we will use our own when evaluating your game. After creating these rules, you must test your game with other players (more than once) and describe the results in detail (including whether the results were good, bad, or mixed). The rules themselves should be at least one-third and at most two-thirds of this submission, with the rest being the play-testing description (which must come after the rules). The rules should, of course, be updated based on the results of your play-testing. The total length must be between 800 and 1200 words. The rules and play-testing description must be clear and well-organized, using proper grammar, and have perfect spelling.

# STANDARDS OF PROGRESS

[Updated 2013]

## Semester Credit Hour

The semester credit hour is the basic unit of credit awarded at the Institute. The academic value of each course is stated in semester credits. DigiPen defines a semester credit hour as follows:

### Students Who Began in the 2011 Cohort or Earlier

Milestone – Undergraduate	Minimum GPA Requirement
<b>Up to 50% of program</b> 77 attempted credits* for RTIS, or BSGD 73 attempted credits for BAGD 72 attempted credits for BFA	1.8 or better cumulative GPA
<b>Over 50% of program</b> 78-153 attempted credits for RTIS, or BSGD 74-146 attempted credits for BAGD 73-143 attempted credits for BFA	2.0 or better cumulative GPA
<b>100% of program</b> 154 earned credits or greater for RTIS, or BSGD 147 earned credits or greater for BAGD 144 earned credits or greater for BFA	2.0 or better cumulative GPA

### Students in Cohorts that Began in 2011 or Later

Milestone – Undergraduate	Minimum GPA Requirement
<b>Up to 50% of program</b> 77 attempted credits* for RTIS, or BSGD 73 attempted credits for BAGD 73 attempted credits for BFA	1.8 or better cumulative GPA
<b>Over 50% of program</b> 78-153 attempted credits for RTIS, or BSGD 74-146 attempted credits for BAGD 74-144 attempted credits for BFA	2.0 or better cumulative GPA
<b>100% of program</b> 154 earned credits or greater for RTIS, or BSGD 147 earned credits or greater for BAGD 145 earned credits or greater for BFA	2.0 or better cumulative GPA

\* An attempted credit is defined as any credit that is awarded a final letter grade (“A” to “F”). Credits earning a “W” or “I” are not considered attempted credits.

## Process for Grievances and Appeals

### Concerns over Academic Standing

Students who would like to file an appeal against a decision regarding their academic standing in a particular course should discuss the matter with their instructor. If a satisfactory resolution is unattainable, students may file an appeal with the head of the department for that course. If the resultant solution is still unsatisfactory, then students may file an appeal with the Dean of Faculty. Students may appeal grades and review exams no later than two weeks after final grades are published. Academic records will be kept indefinitely.

## Transcripts

If a student’s financial obligation is not fulfilled, the Institute is authorized to do the following until the owed monies are paid: withhold the release of the student’s academic records or any information based upon the records, and withhold the issue of the student’s transcripts. Students who have any questions regarding this matter should contact the Registrar’s Office at +65 6577 1900.

To request an official transcript, students should complete a transcript request form (available online or from the Administration office) and either mail or fax it to the Registrar’s Office. Requests are usually processed within five to seven business days. Unofficial grade reports can be viewed or printed anytime using the Student Record System (SRS) online.

*[Updated 2013]*

### Program Overview

The electronic and digital entertainment industry is one of the fastest growing and most exciting career choices of the future. The video game, movie, and military industries are only a few of those that demand well-trained, enthusiastic programmers, designers, artists, and managers. DigiPen Institute of Technology is a key provider of these individuals, and the Bachelor of Science in Computer Science in Real-Time Interactive Simulation (RTIS) prepares programmers for these industries. Designed and developed by industry experts and DigiPen faculty, the Institute's four-year RTIS program is a computer science degree that is highly focused on the technical area of graphics and simulations. Participants in the RTIS program specialize in the skills and tools necessary to create real-time simulations of real-life events and imaginary situations.

The RTIS program offers extensive training in mathematics and physics as a foundation for the various topics presented in general computer science and computer graphics. Throughout the degree program, RTIS students participate in several team-based projects. These substantial projects are designed to give students concrete experiences in which they apply the theoretical knowledge gained from their courses. Forming the cornerstone of the program, these projects exemplify many of the skills necessary in the video game industry today: teamwork, design, implementation, follow through, and business knowledge, among others. RTIS students gain the experience of designing, programming, and testing a variety of simulations and games, including text-based, scrolling, simulation, and 2D and 3D games.

Students in this degree program work both individually and collaboratively to learn the fundamentals of game design, production, and programming. Additionally, they write game design documents and technical design documents, learn how to schedule tools and techniques, and participate in the full production of several games. These game-oriented productions are a perfect media to present complicated subjects in a format agreeable to students. These productions:

- Are graphics-oriented simulations, including 2D and 3D simulations.
- Can realistically reproduce or simulate natural phenomena and real-life events. Flight simulators are excellent examples of such simulations.
- Are highly interactive, requiring an elaborate and efficient graphical user interface (GUI). The development of a GUI requires the management of windows, menus, dialog boxes, and hardware resources including keyboards, mice, and display monitors.
- React in real time. The implementation of such simulations requires a thorough knowledge of computer hardware and computer languages.

- Are story-based simulations requiring a plot in which game objects must interact intelligently with each other. Therefore, in order to make games challenging and interesting, students must design and implement good artificial intelligence algorithms, which serve as the cognitive processes for the computer-controlled game objects.
- Could be designed for either a single-player or multi-player environment. The development of the latter requires the understanding of subjects such as computer networks, TCP/IP, and Internet programming.
- Are excellent examples of large and complex productions. Teamwork is essential to the successful completion of such productions. Therefore, students are divided into teams and are rigorously trained in object-oriented programming languages, paradigms, and software engineering techniques and practices.

Graduates of this program will gain the skills required to successfully pursue entry-level careers in the rapidly growing world of computer technologies in general, and computer graphics and simulations in particular. This degree prepares students to work in the computer and video game industry as intermediate-level programmers in graphics, artificial intelligence, networking, or general programming; beginning designers; or engineering tool staff members. Some of the job titles that graduates of this program may aspire to are Solutions Architect, Compatibility/Playability Design Engineer, Game Analyst, Quality Assurance Engineer, Quality Assurance Supervisor, Computer or Software Programmer, Software Engineer, Game Programmer, Engine and Tools Programmer, Game Graphics Programmer, Artificial Intelligence Programmer, Audio Programmer, Web Programmer, or Software/Lead Design Engineer.

Rather than attempt to provide a broad, general education, this degree program is an intensive educational experience in a specialized and highly technical area, and it prepares students for a career in several rapidly expanding industries. Staff and faculty are prepared to guide students desiring more general education course work about supplementary opportunities available through other institutions.

## Degree Requirements

### Number of Credits and GPA

The RTIS requires completion of at least 154 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or a total of 4 academic years.

### Grade Requirements and Core Courses

Students must receive a grade of "C-" or higher in all core courses for the RTIS major. (In a non-core course, a grade of "D" or higher is considered passing.) The core courses are all those taken to fulfill the GAM, MAT, and CS requirements as described below. PHY 200 is also a core course.

### Art Requirements

Students are required to take ART 210, CG 130 and 2 additional credits from the following: ANI 125, ART 400, FLM 115, FLM 151, FLM 152, FLM 275, or ART 410. (Total: 7 credits)

### Computer Science Requirements

The following courses are required: CS 102, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 200, CS 225, CS 230, CS 250, CS 260, CS 280, CS 300, CS 315, CS 330, CS 350, and CS 365. Students must select four more courses (12 credits) numbered higher than 200 or PHY 350. (Total: 60 credits)

### Humanities and Social Sciences Requirements

Required courses are COL 101, ENG 110 and COM 150. Five additional ENG credits are required from ENG 116 and above. Students must take an additional three credits in HIS, PSY, or SOS. (Total: 15 credits)

### Mathematics Requirements

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, MAT 258, MAT 300, and one MAT elective numbered higher than 300, or MAT 256. (Total: 24 credits)

### Physics Requirements

The following courses are required: PHY 200 and PHY 250. (Total: 6 credits)

### Projects Requirements

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 300, GAM 350, GAM 400, and GAM 450. (Total: 34 credits)

### Note on General Education Courses

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation: ART 210 (2), ART elective (2), COM 150 (3), ENG 110 (3), ENG electives numbered ENG 116 or higher (5), a social science elective in HIS, PSY, or SOS (3), MAT 150 or MAT 180 (4), MAT 250 (3), PHY 200 (3), and PHY 250 (3), for a total of 31 credits.



## Recommended Course Sequence Chart (RTIS)

Semester	Course	Course Title	Core*	Credits
Semester 1	MAT 140	Linear Algebra and Geometry	X	4
	CS 102	Computer Environment	X	4
	CS 120	High-Level Programming I – The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	ENG 110	Composition		3
	COL 101	College Life and Academic Skills		1
			<b>Semester Total</b>	<b>19</b>
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	CS 170	High-Level Programming II – The C++ Programming Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	COM 150	Interpersonal and Work Communication		3
			<b>Semester Total</b>	<b>17</b>
Semester 3	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	CS 180	Operating System I, Man-Machine Interface	X	3
	CS 200	Computer Graphics I	X	3
	CS 225	Advanced C/C++	X	3
	GAM 200	Project II	X	4
	PHY 200	Motion Dynamics	X	3
			<b>Semester Total</b>	<b>20</b>
Semester 4	PHY 250	Waves, Optics, and Aerodynamics		3
	CS 250	Computer Graphics II	X	3
	CS 260	Computer Networks I, Interprocess Communication	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
			<b>Semester Total</b>	<b>19</b>

Semester	Course	Course Title	Core*	Credits
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 315	Low-Level Programming	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 258	Discrete Mathematics	X	3
	CG 130	3D Computer Animation Production I		3
	GAM 300	Project III	X	5
	<b>Semester Total</b>			
Semester 6	MAT 300	Curves and Surfaces	X	3
	CS 350	Advanced Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	GAM 350	Project III	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	<b>Semester Total</b>			
Semester 7	Art Elective	Select one: ANI 125, ART 400, FLM 115, FLM 151, FLM 152, FLM 275, or ART 410		2-3
	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	GAM 400	Project IV	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	ART 210	Art Appreciation		2
<b>Semester Total</b>				<b>20-23</b>
Semester 8	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	GAM 450	Project IV	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	HSS Elective	One humanities & social science elective from any three-credit HIS, PSY or SOS courses		3
	<b>Semester Total</b>			
<b>Degree Total</b>				<b>154 minimum</b>

\*Note: Please see the Degree Requirements for an explanation of core courses.

# GAME DESIGN DEGREE PROGRAMS

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[Updated 2013]

## Overview

The designers of digital entertainment fill a unique role that combines art, technology, innovation, storytelling, history, psychology, and many other disciplines. This multidisciplinary program leads to one of two degrees: the Bachelor of Science in Computer Science and Game Design (BSGD) and the Bachelor of Arts in Game Design (BAGD). At DigiPen, both of these degree programs are designed to educate students to become game developers with the skills necessary to design levels, games, systems, and characters. In addition, the BSGD prepares students to become technical designers with the skills necessary to program games, behaviors, and user interfaces. On the other hand, the BAGD prepares students to become artistic designers with the skills necessary to create interesting stories, worlds, environments, and visuals. Students graduating with either degree will be prepared to begin working in the computer software and video games industries.

Students in the Game Design degree programs learn how to apply the software, tools, and processes used in this industry to challenging problems that practitioners in the field regularly encounter. They learn communication skills, both written and verbal, and practice those skills through presentations, proposals, and design documents. Like other DigiPen degree programs, students in the Game Design degree programs participate in several team-based projects. These projects are designed to give students concrete experiences in which they apply the theoretical knowledge gained from their other courses and emphasize teamwork, accountability, commitment, and testing. Game Design students gain the experience of designing, building, testing, and polishing a variety of games, including dice games, card games, board games, role-playing games, digital and non-digital simulations, 2D digital games, and 3D digital games.

# BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND GAME DESIGN

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[Updated 2013]

## Program Overview

This degree program prepares graduates to design and build interactive digital entertainment. Graduates will be well versed in game design theory for digital and non-digital games, level design, system design, and behavior design. Graduates will have extensive experience testing, iterating, and polishing both digital and non-digital designs. Graduates will also be familiar with the tools commonly used in the industry by designers, artists, producers, and programmers, including level editors, drawing software, modeling software, scheduling tools, compilers, and databases. This interdisciplinary degree also provides a foundation in mathematics and the humanities.

The game industry requires designers to be versatile and skilled in more than just design. Technical designers must be able to implement designs, so the BSGD program stresses the importance of being able to write computer programs in core languages such as C and C++, as well as the scripting languages commonly used by technical designers. Graduates will be well versed in programming game logic, user interfaces, artificial intelligence, databases, and design tools.

Graduates of this degree program will be prepared to work in the video game industry as entry-level programmers, artificial intelligence programmers, user interface programmers, tools programmers, scripters, level designers, system designers, and game designers. Some of the job titles that graduates of this program may aspire to are Computer or Software Programmer, Software Engineer, Gameplay Programmer, Artificial Intelligence Programmer, User Interface Programmer, Tools Programmer, Game Scripter, Level Designer, System Designer, Content Designer, Technical Designer, Game Designer, Design Director, and Creative Director.

## Degree Requirements

### Number of Credits and GPA

The Bachelor of Science in Computer Science and Game Design (BSGD) requires completion of at least 154 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or four academic years.

### Grade Requirements and Core Courses

Students must receive a grade of "C-" or higher in all core courses for the Bachelor of Science in Computer Science and Game Design. (In a non-core course, a grade of "D" is considered passing.) The core courses are defined as follows: all courses taken to fulfill the Projects, Mathematics, Computer Science, and Physics requirements, PSY 101, ENG 110, ENG 120.

### Art Requirements

The following courses are required: ART 101 or ART 102,

ART 125 or ART 126, ART 260, ART 310, CG 102 or CG 201, and CG 125 or CG 225. (Total: 18 credits)

### **Computer Science Requirements**

The following courses are required: CS 101 or CS 102, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS230, CS 251, CS 280, CS 311, CS 330, and CS 380. (Total: 33 credits)

### **Electives Requirements**

At least five credits from any courses in any departments at DigiPen. (Total: 5 credits)

### **Humanities and Social Science Requirements**

The following courses are required: COL 101, COM 150, ENG 110, ENG 120, and PSY 101. Three additional credits must be selected from other courses with the designation COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS. (Total: 16 credits)

### **Mathematics Requirements**

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 258, and MAT 364. (Total: 18 credits)

### **Physics Requirements**

One course is required: PHY 200. (Total: 3 credits)

### **Projects Requirements**

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 302, GAM 352, GAT 110, GAT 210, GAT 211, GAT 212, GAT 240, GAT 250, GAT 251, GAT 315, and GAT 316. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490. (Total: 61 credits)

### **Note on General Education Courses**

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science and Game Design: COM 150 (3), ENG 110 (3), ENG 120 (3), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), MAT 258 (3), PHY 200 (3), PSY 101 (3), and one Humanities and Social Sciences elective (3), for a total of 33 credits.

## Recommended Course Sequence Chart (BSGD)

Semester	Course	Course Title	Core*	Credits
Semester 1	CS 101	Introduction to Computer Environment	X	1
	CS 120	High-Level Programming I – The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	ENG 110	Composition	X	3
	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	MAT 140	Linear Algebra and Geometry	X	4
	PSY 101	Introduction to Psychology	X	3
			<b>Semester Total</b>	<b>21</b>
Semester 2	COL 101	College Life and Academic Skills		1
	CS 170	High-Level Programming II – The C ++ Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	ENG 120	Research, Reasoning, and Writing	X	3
	GAM 150	Project I	X	3
	GAT 210	Game Mechanics I	X	3
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
			<b>Semester Total</b>	<b>21</b>
Semester 3	CS 225	Advanced C/C++	X	3
	CS 180	Operating System I, Man-Machine Interface	X	3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	PHY 200	Motion Dynamics	X	3
	GAT 211	Game Mechanics II	X	3
	GAM 200	Project II	X	4
			<b>Semester Total</b>	<b>20</b>
Semester 4	CS 280	Data Structures	X	3
	COM 150	Interpersonal and Work Communication		3
	ART 102	Fundamentals of Visual Expression		3
	GAT 212	Advanced Game Mechanics	X	3
	GAT 240	Technology for Designers	X	3
	GAM 250	Project II	X	4
			<b>Semester Total</b>	<b>19</b>

Semester	Course	Course Title	Core*	Credits
Semester 5	CS 380	Artificial Intelligence for Games	X	3
	CS 251	Introduction to Computer Graphics	X	3
	ART 126	Principles of Composition and Design		3
	ART 260	Graphic Design, User Experience, and Input		3
	GAT 250	2D Game Design I	X	3
	GAM 302	Project for Game Designers	X	5
	<b>Semester Total</b>			
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I		3
	CG 125	Introduction to 3D Production for Designers		3
	CG 102	2D Raster and Vector Graphics for Designers		3
	GAT 251	2D Game Design II	X	3
	GAM 352	Project for Game Designers	X	5
	MAT 258	Discrete Mathematics	X	3
	<b>Semester Total</b>			
Semester 7	CS 330	Algorithm Analysis	X	3
	GAT 315	3D Game Design I	X	3
	Elective	An elective of the student's choice from any department at DigiPen		3
	CS 311	Introduction to Databases	X	3
	MAT 364	Combinatorial Game Theory	X	3
	GAM 400	Project IV	X	5
	<b>Semester Total</b>			
Semester 8	GAT 316	3D Game Design II	X	3
	Elective	An elective of the student's choice from any department at DigiPen		2-3
	HSS Elective	Any three-credit COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS course.		3
	GAM 450	Project IV	X	5
	<b>Semester Total</b>			
<b>Degree Total</b>				<b>154 minimum</b>

*\*Note: Please see the Degree Requirements for an explanation of core courses.*

# Course Descriptions for the Academic Year 2013-2014

## DEPARTMENT OF GAME SOFTWARE DESIGN AND PRODUCTION

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*[Updated 2013]*

### Game Projects Courses

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#### **GAM 300 Project III (5 Cr.)**

Prerequisite(s): CS 200, CS 260, CS 280, GAM 250, & PHY 200

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This project is divided into two semesters and focuses on the creation of an advanced real-time game or simulation with hardware-accelerated graphics. RTIS students work together on teams of three to five members and implement technical features, such as networking, artificial intelligence, and physics. All projects must be written with a core of C++ code and cannot use middleware, such as pre-existing physics engines, networking engines, etc. Additional topics may include advanced software architecture, 3D art pipelines, building content tools, and advanced team dynamics.



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