DigiPen
INSTITUTE OF TECHNOLOGY
SINGAPORE

Course Catalog

2016–2017

Notices

Degree Exemption

In accordance with the Degree-Granting Institutions Act Regulations (WAC 250-61-060 (3)), DigiPen Institute of Technology is considered to be an eligible institution exempted from degree authorization requirements by the Washington Student Achievement Council effective November 1, 2012.

Accreditation

DigiPen Institute of Technology is accredited by the Accrediting Commission of Career Schools and Colleges (ACCSC), a recognized accrediting agency by the U.S. Department of Education.

DigiPen Institute of Technology Singapore is also accredited by ACCSC as a branch campus of DigiPen Institute of Technology located in Redmond, Washington.

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 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

For a list of institutions registered with Council for Private Education (CPE) in Singapore, you may refer to the CPE website at *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 for diploma holders from the five local polytechnics to 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 in 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 Engineering with Honours in Systems Engineering (ElectroMechanical Systems)
- Bachelor of Fine Arts in Digital Art and Animation
- Bachelor of Arts in Game Design

DigiPen Institute of Technology Singapore was granted approval by ACCSC for its first joint degree program with Singapore Institute of Technology, Bachelor of Engineering with Honours in Systems Engineering (ElectroMechanical Systems). The first cohort of SEEMS program started in Fall 2015. Reference the SEEMS Course Catalog for more information about this joint degree program.

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 the Ministry of Education.

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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 the Institute* by any person (the "Sender") whether at the request of the Institute or otherwise, become the exclusive property of the Institute unless otherwise agreed to in writing by the Institute, and the Institute shall be under no obligation whatsoever to return the Items to the Sender. At the Institute'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, calendar, and Course Catalog without any prior notice.

The course offerings and requirements of DigiPen Institute of Technology Singapore are under continual examination and revision. The most recent edition of the Course Catalog supersedes any previous edition of the Course Catalog published for the same academic year. 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*.

*Please note that "Institute" and DigiPen (Singapore) refer to "DigiPen Institute of Technology Singapore," "DigiPen" refers to "DigiPen Institute of Technology," and "SIT" refers to "Singapore Institute of Technology" when used in the Course Catalog.

Contact Information

Name of the School (Branch Campus)

DigiPen Institute of Technology Singapore

CONTACT INFORMATION

DigiPen Institute of Technology Singapore
510 Dover Road, #03-01
SIT@SP Building
Singapore 139660
Telephone: (65) 6577 1900
Facsimile: (65) 6577 1908
Email: *singapore@digipen.edu*
Web: *singapore.digipen.edu*

Campus List

MAIN CAMPUS

DigiPen Institute of Technology
9931 Willows Road NE
Redmond, WA 98052
USA
Telephone: (866) 478-5236 or (425) 558-0299
Facsimile: (425) 558-0378
Email: *info@digipen.edu*
Web: *digipen.edu*

BRANCH CAMPUS

DigiPen Institute of Technology Singapore
510 Dover Road, #03-01
SIT@SP Building
Singapore 139660

OTHER CAMPUS

DigiPen Institute of Technology Europe-Bilbao*
Virgen del Puerto 34, Edificio A
48508 Zierbena, Bizkaia, Spain

*DigiPen's Europe-Bilbao campus does not fall within the scope of ACCSC accreditation.

Programs of Study 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

Joint Programs of Study Offered in Collaboration with SIT

Currently, the Institute offers the following joint degree program:
- Bachelor of Engineering with Honours in Systems Engineering (ElectroMechanical Systems)*

*Reference the SEEMS Course Catalog for more information about this joint degree program.

Table of Contents

Academic Calendar

- **September 1, 2016**
  Thursday
  Orientation - First Year Students

- **September 5, 2016**
  Monday
  Classes Begin - Fall Semester

- **September 12, 2016**
  Monday
  Hari Raya Haji*
  No Classes

- **October 29, 2016**
  Saturday
  Deepavali*
  No Classes

- **December 12 - 16, 2016**
  Monday - Friday
  Fall Semester Final Exams

- **December 16, 2016**
  Friday
  Fall Semester Ends

- **December 19, 2016 -January 8, 2017**
  Monday - Sunday
  Winter Break
  No Classes

- **January 2, 2017**
  Monday
  New Year's Day*
  No Classes

- **January 9, 2017**
  Monday
  Classes Begin - Spring Semester

- **January 28 - 30, 2017**
  Saturday - Monday
  Chinese New Year*
  No Classes

- **February 3, 2017**
  Friday
  Founder's Day
  No Classes

- **April, 14, 2017**
  Friday
  Good Friday*
  No Classes

- **April 17 - 21, 2017**
  Monday - Friday
  Spring Semester Final Exams

- **April 21, 2017**
  Friday
  Spring Semester Ends

- **April 22 - May 7, 2017**
  Saturday - Sunday
  Intersession
  No Classes

- **May 8, 2017**
  Monday
  Classes Begin - Summer Semester

- **May 10, 2017**
  Wednesday
  Vesak Day*
  No Classes

- **June 26, 2017**
  Wednesday
  Hari Raya Puasa*
  No Classes

- **August 9, 2017**
  Wednesday
  National Day*
  No Classes

- **August 14 - 18, 2017**
  Monday - Friday
  Summer Semester Final Exams

- **August 18, 2017**
  Friday
  Summer Semester Ends

- **September 1, 2017**
  Friday
  Orientation - Incoming Students

- **September 4, 2017**
  Monday
  Classes Begin - Fall Semester

- **October 19, 2017**
  Thursday
  Deepavali*

- **December 11 - 15, 2017**
  Monday - Friday
  Fall Semester Final Exams

- **December 15, 2017**
  Friday
  Fall Semester Ends

- **December 16 - 31, 2017**
  Saturday - Sunday
  Winter Break
  No Classes

*Singapore Public Holiday
The Institute is closed on all public holidays. If a public holiday falls on a Sunday, the following Monday will be a public holiday. Singapore public holidays that fall during normal intersessions (i.e. Christmas Day) have not been listed. Exam periods and breaks may be subject to change. The laboratory facilities may be closed for a period of two consecutive days per month for maintenance, usually at the last two working days of the month unless otherwise posted.

Deadlines

- **September 12, 2016**
  Monday
  Last day to add courses for Fall semester.

- **September 19, 2016**
  Monday
  Final day to drop courses for Fall semester without academic penalty.

- **September 20, 2016**
  Tuesday
  Last day to submit requests for Independent Study, Special Topics and additional courses not included in tentative course list for Spring semester.

- **October 30, 2016**
  Sunday
  Final day to drop a course for Fall Semester. Withdrawals from the institute on and before this date will receive a 'W' on transcript. Withdrawals after this date will not be processed.

- **November 28, 2016**
  Friday
  Last day to register for Spring 2017 courses. Last day to submit Transfer/Waiver Credit Requests for Spring 2017 Last day to submit requests for Change of Major.

- **January 16, 2017**
  Monday
  Last day to add classes for Spring semester.

- **January 23, 2017**
  Monday
  Final day to drop courses for Spring semester without academic penalty.

- **January 24, 2017**
  Tuesday
  Last day to submit requests for Independent Study, Special Topics and additional courses not included in tentative course list for Summer semester.

- **March 5, 2017**
  Sunday
  Final day to drop a course for Spring Semester. Withdrawals from the institute on and before this date will receive a 'W' on transcript. Withdrawals after this date will not be processed.

- **March 27, 2017**
  Monday
  Last day to register for Summer 2017 courses. Last day to submit Transfer/Waiver Credit Requests for Summer 2017. Last day to submit requests for Change of Major.

- **May 15, 2017**
  Monday
  Last day to add courses for Summer semester.

- **May 22, 2017**
  Monday
  Final day to drop courses for Summer semester without academic penalty.

- **May 23, 2017**
  Tuesday
  Last day to submit requests for Independent Study, Special Topics and additional courses not included in tentative course list for Fall semester.

- **July 2, 2017**
  Sunday
  Final day to drop a course for Summer Semester. Withdrawals from the institute on and before this date will receive a 'W' on transcript. Withdrawals after this date will not be processed.

- **July 31, 2017**
  Monday
  Last day to register for Fall 2017 courses. Last day to submit Transfer/Waiver Credit Requests for Fall 2017. Last day to submit request for Change of Major.

- **September 11, 2017**
  Monday
  Last day to add classes for Fall semester.

- **September 18, 2017**
  Monday
  Final day to drop courses for Fall semester without academic penalty.

- **September 19, 2017**
  Tuesday
  Last day to submit requests for Independent Study, Special Topics and additional courses not included in tentative course list for Spring semester.

- **October 29, 2017**
  Sunday
  Final day to drop a course for Fall Semester. Withdrawals from the institute on and before this date will receive a 'W' on transcript. Withdrawals after this date will not be processed.

- **November 27, 2017**
  Monday
  Last day to register for Spring 2018 courses. Last day to submit Transfer/Waiver Credit Requests for Fall 2018. Last day to submit requests for Change of Major.

Academic Information

Degree Programs
Course Descriptions
Standards of Progress

Bachelor of Science in Computer Science in Real-Time Interactive Simulation

Program Overview

The BS in Computer Science in Real-Time Interactive Simulation degree program aims to produce graduates who are exceptionally competent in the field of digital media, software development, real-time simulations, and game development. Graduates will possess an in-depth understanding of computer science theory and its applications to solving real-world problems in software engineering, including design, implementation, testing, deployment and maintenance of software solutions. They will not only excel as engineers in a team-based environment, but will also be aware of larger, societal impacts of their work, and strive to be ethical practitioners.

Towards achieving the above objectives, upon completion of the BS in Computer Science in Real-Time Simulation degree program, students are expected to achieve the following outcomes:

- Apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- Analyze a problem, and identify and define the computing requirements appropriate to its solutions
- Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- Function effectively on teams to accomplish a common goal
- Understand professional, ethical, legal, security, and social issues and responsibilities
- Communicate effectively with a range of audiences
- Analyze the local and global impact of computing on individuals, organizations, and society
- Recognize the need for, and have an ability to engage in, continuing professional development
- Use current techniques, skills, and tools necessary for computing practice
- Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of tradeoffs involved in design choices
- Apply design and development principles in the construction of software systems of varying complexity

Graduates of this degree program will possess entry-level skills to work in the video games industry, or as computer scientists, or software developer positions in various industries such as digital entertainment, consumer electronics, large-scale software development, and defense. Specific areas of focus include artificial intelligence, computer graphics, database design and development, information systems, multimedia, networking, numerical simulations, physically-based rendering, and real-time interactivity, to name a few.

Potential entry-level position titles for new graduates include: Artificial Intelligence Developer, Computer Graphics Developer, Computer Programmer, Computer Scientist, Gameplay Programmer, Game Engine Developer, Game Engine Programmer, Graphics Programmer, Networking Programmer, Physics Programmer, Software Analyst, Software Developer, Software Development Engineer, Software Development Engineer in Test, Software Engineer, Tools Developer, Tools Programmer, User-Interface Programmer, Web Developer, Web Programmer, and Web Engineer.

Degree Requirements

NUMBER OF CREDITS AND GPA
The BS in Computer Science and Real-Time Interactive Simulation degree program 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 four academic years.

GRADE REQUIREMENTS AND CORE COURSES
Students must receive a grade of "C-" (or 1.7 quality points) or higher in all core courses for the BS in Computer Science in Real-Time Interactive Simulation degree program. (In a non-core course, a grade of "D" [or 1.0 quality points] or higher is considered passing.) The core courses are all those taken to fulfill the GAM, MAT, and CS requirements. PHY 200 and COL 499 are also core courses.

ART AND MUSIC
The following courses are required: ART 210, CG 130, and 2 additional credits from the following: ANI 125, ART 400, ART 410, FLM 115, FLM 151, FLM 152, or MUS 115. (Total: 7 credits)

COMPUTER SCIENCE
The following courses are required: CS 100, CS 120, CS 170, 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. (Total: 60 credits)

HUMANITIES AND SOCIAL SCIENCES
The following courses are required: COL 499, 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
The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, MAT 258, and two MAT electives numbered 200 or higher. (Total: 24 credits)

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

PROJECTS
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)

OPEN ELECTIVES
At least eight credits from any courses in any department at DigiPen. (Total: 8 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 degree program: 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 for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	X	4
	CS 100	Computer Environment	X	4
	CS 120	High-level Programming I: The C Programming Language	X	4
	GAM 100	Project Introduction	X	3
	ENG 110	Composition		3
	Semester Total			**18**
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	4
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	COM 150	Interpersonal and Work Communication		3
	Semester Total			**17**
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
	Semester Total			**20**
Semester 4	PHY 250	Waves, Optics, and Thermodynamics		3
	CS 250	Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
	Semester Total			**19**
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 260	Computer Networks I: Interprocess Communication	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
	Semester Total			**20**

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
	CS 350	Advanced Computer Graphics II	X	3
	CS 315	Low-Level Programming	X	3
	Computer Science Elective	Any 200-level or higher CS course not required	X	3
	GAM 350	Project III	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			**21**
Semester 7	ART and MUS Elective	Select one: ANI 125, ART 400, ART 410, FLM 115, FLM 151, FLM 152, or MUS 115		2
	ART 210	Art Appreciation		2
	English Elective	One English elective chosen from any ENG course, ENG 116 and above		3
	Computer Science Elective	Any 200-level or higher CS course not required	X	3
	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	GAM 400	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		2
	Semester Total			**20**
Semester 8	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2
	Computer Science Elective	Any 200-level or higher CS course not required	X	3
	Computer Science Elective	Any 200-level or higher CS course not required	X	3
	GAM 450	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	HSS Elective	One humanities and social science elective from any three-credit HIS, PSY, or SOS courses		3
	Semester Total			**19**
Degree Program Total				**154 minimum**

Note: Please see the previous page for an explanation of core courses.

Bachelor of Science in Computer Science and Game Design

Program Overview

The field of digital entertainment has grown from using small teams of just a handful of developers for an entire game to using large teams of one hundred or more on a single title. This large increase in the size of teams, scope, and investment in digital entertainment titles has naturally resulted in more and more specialization into the roles of engineer, artist, and designer. Despite this increased specialization overall, the digital entertainment industry has also seen a growing demand for a hybrid engineer/designer: someone who has strong programming and mathematics skills, combined with formal training in game design. This type of developer is the bridge between the scientific and creative sides of game development, able to work as an engineer or designer as needed.

Graduates of this program will be trained to write computer programs in core languages such as C and C++, as well as the scripting languages commonly used by all designers. Graduates of this program will be well-versed in programming game logic, user interfaces, artificial intelligence, databases, and design tools. Graduates will also be well versed in game design theory for digital and non-digital games, level design, system design, and behavior design, with their strong foundation in programming and mathematics generally making them strong system and behavior designers. Graduates will have extensive experience testing, iterating, and polishing both digital and non-digital designs, through the completion of many individual projects and multiple team game projects.

Graduates of this degree program will be prepared to enter the video game industry as entry-level Software Engineers and Game Designers. Possible entry-level position titles include Software Engineer, Software Developer, Software Development Engineer, Software Development Engineer in Test, Software Analyst, Computer Programmer, Gameplay Programmer, Artificial Intelligence Programmer, User Interface Programmer, Tools Programmer, Game Scripter, Technical Designer, System Designer, Level Designer, Content Designer, Encounter Designer, and Game Designer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions with titles such as Producer, Program Manager, Technical Program Manager, and Technical Writer. After many years in the industry, graduates may obtain titles such as Lead Engineer, Lead Designer, Technical Director, Creative Director, and Director.

Degree Requirements

NUMBER OF CREDITS & GPA

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

GRADE REQUIREMENTS AND CORE COURSES

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all core courses for the Bachelor of Science in Computer Science and Game Design degree program. (In a non-core course, a grade of "D" [or 1.0 quality points] is considered passing.) The core courses include all courses except open electives.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 180, CS 225, CS 230, CS 251, CS 280, CS 311, CS 330, and CS 380. (Total: 36 credits)

MATHEMATICS

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 258, and either MAT 340 or MAT 364. (Total: 18 credits)

PHYSICS

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

DESIGN

The following courses are required: GAT 110, GAT 120, GAT 210, GAT 211, GAT 240, GAT 250, GAT 251, GAT 315, and GAT 316. Three additional credits must be selected from other courses with the designation GAT that are numbered 200 or higher. (Total: 29 credits)

PROJECTS

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 302, and GAM 352. Ten additional credits must be selected from other courses with the designation GAM that are numbered 375 or higher. (Total: 34 credits)

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COL 499, COM 150, ENG 110, 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: 13 credits)

ART

The following courses are required: ART 105, ART 260, ART 310, CG 102 or CG 201, CG 125 or CG 225. (Total: 15 credits)

OPEN ELECTIVES

At least six credits from any of the courses in any department at DigiPen. (Total: 6 credits)

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the BS in Computer Science and Game Design: COM 150 (3), ENG 110 (3), PSY 101 (3), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), MAT 258 (3), PHY 200 (3), and one Humanities and Social Sciences elective (3), for a total of 30 credits.

Recommended Course Sequence
for the Bachelor of Science in Computer Science and Game Design

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	GAT 120	Game Analysis	X	2
	CS 100	Computer Environment	X	4
	CS 120	High-Level Programming I: The C Programming Language	X	4
	MAT 140	Linear Algebra and Geometry	X	4
	Semester Total			**20**
Semester 2	GAM 150	Project I	X	3
	GAT 210	Game Mechanics I	X	3
	CS 170	High-Level Programming II: The C++ Language	X	4
	CS 230	Game Implementation Techniques	X	3
	MAT 150♯	Calculus and Analytic Geometry I	X	4
	ENG 110	Composition	X	3
	Semester Total			**20**
Semester 3	GAM 200	Project II	X	4
	GAT 211	Game Mechanics II	X	3
	GAT 240	Technology for Designers	X	3
	CS 225	Advanced C/C++	X	3
	MAT 200♯	Calculus and Analytic Geometry II	X	4
	PHY 200	Motion Dynamics	X	3
	Semester Total			**20**
Semester 4	GAM 250	Project II	X	4
	GAT 250	2D Game Design I	X	3
	CS 180	Operating System I,: Man-Machine Interface	X	3
	CS 280	Data Structures	X	3
	ART 105	Art Processes	X	3
	COM 150	Interpersonal and Work Communication	X	3
	Semester Total			**19**
Semester 5	GAM 302	Project III for Designers	X	5
	GAT 251	2D Game Design II	X	3
	CS 251	Introduction to Computer Graphics	X	3
	CS 380	Artificial Intelligence for Games	X	3
	ART 260	Graphic Design, User Experience, and Input	X	3
	PSY 101	Introduction to Psychology	X	3
	Semester Total			**20**
Semester 6	GAM 352	Project III for Designers	X	5
	GAT 315	3D Game Design I	X	3
	MAT 258	Discrete Mathematics	X	3
	CG 102♯	2D Raster Graphics for Designers	X	3
	CG 125♯	Introduction to 3D Production for Designers	X	3
	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	Semester Total			**20**

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 7	GAM 400‡	Project IV	X	5
	GAT 316	3D Game Design II	X	3
	CS 311	Introduction to Databases	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 340 or MAT 364	Probability and Statistics or Combinatorial Game Theory	X	3
	Design Elective	Any three-credit course with the GAT designation numbered 200 or higher	X	3
	Semester Total			**20**
Semester 8	GAM 450‡	Project IV	X	5
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
	HSS Elective	Any three-credit COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS course.	X	3
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			**15**
Degree Program Total				**154 minimum**

*Note: Please see the previous page for an explanation of core courses.

‡Other courses may fulfill this requirement. Reference the Degree Requirements for this program for more information.

Bachelor of Fine Arts in Digital Art and Animation

Program Overview

The Bachelor of Fine Arts in Digital Art and Animation degree program is a four-year undergraduate degree program designed to prepare artists for a career in the entertainment industry. In this program artists are challenged to tell visual stories through games, short films, and narrative illustrations. This begins with a strong foundation in fine arts, animation, film, and digital arts. These topics are applied in cinematic projects and game projects following pipelines adapted from the professional world. An artist may choose to specialize in a specific field through individual projects, team-based projects, and other coursework.

Graduates of the Bachelor of Fine Arts in Digital Arts and Animation degree program have utilized software packages and technical tools common to the industry. In addition, they will have developed strong interpersonal communication skills and critical thinking strategies. These skills are augmented by general education courses ranging from programming and natural sciences to ethics and intellectual property.

Graduates of the program are prepared for the following entry- and intermediate-level positions: 2D Animator, 3D Animator, Character Modeler, Environment and Asset Modeler, Technical Artist, Concept Artist, Illustrator, UI Designer, Rigger, Lighter, Texture Artist, Scene Planner, Compositor, Match-move Artist, Visual Effects Artist, Simulation Artist, Storyboard Artist, Maquette Sculptor, Producer, Project Manager, Web Designer, and Art Instructor.

Degree Requirements

NUMBER OF CREDITS AND GPA
The Bachelor of Fine Arts in Digital Art and Animation degree program requires completion of at least 131 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 REQUIREMENT AND CORE COURSES
Core courses, both required and elective, must be passed with a final grade of "C-" (or 1.7 quality points) or higher. Certain required courses are survey or introductory courses, which include a 3 credit course with the PHY designation, SOS 115, CS 115, COM 250, and LAW 115. They are considered to be non-core courses; therefore credit is given if the course is passed with a grade of "D" (or 1.0 quality points) or higher.

ANIMATION
The following courses are required: ANI 101 and ANI 151. (Total: 6 credits)

ART
The following courses are required: ART 101, ART 115, ART 120, ART 125, ART 130, ART 150, ART 151, ART 200, ART 201, ART 251, ART 300, ART 350, ART 401, and ART 450. (Total: 42 credits)

COMPUTER GRAPHICS
The following courses are required: CG 201, CG 225, CG 275, and CG 300. (Total: 12 credits)

FILM
The following courses are required: FLM 115 and either FLM 201 or FLM 210. (Total: 6 credits)

HUMANITIES AND SOCIAL SCIENCE
The following courses are required: COL 499, COL 230, COM 250, LAW 115, SOS 115, ENG 116, and any ENG elective 150 or higher. (Total: 17 credits)

PROJECTS
The following courses are required: PRJ 101, PRJ 201 or PRJ 202, PRJ 251 or PRJ 252, PRJ 300, PRJ 350 or PRJ 352, PRJ 400 or PRJ 402, and PRJ 450. Please note that internship courses INT 390 and INT 450 may be taken in place of PRJ 400, PRJ 402, and PRJ 450. (Total: 27 credits)

SCIENCE
The following courses are required: CS 115 and any 3 credit course with the PHY designation. (Total: 6 credits)

ELECTIVES
Students must take one open elective, one general education elective, and three designated electives from any of the following 300 level or higher courses: ART, ANI, FLM, or CG. The following courses are excluded: ART 102, ART 126, ART 210, ART 400, CG 102, CG 125, and CG 130. (Total: 15 credits)

NOTE ON GENERAL EDUCATION COURSES
The following courses satisfy the general education requirement for the BFA in Digital Art and Animation: ART 115 (3), ENG 116 (3), any ENG elective 150 level or higher (3), FLM 115 (3), LAW 115 (3), SOS 115 (3), CS 115 (3), COM 250 (3), and any 3 credit course with the PHY designation (3). Additionally, students must take a general education elective (any ENG, LAW, HIS, SOS, PSY, or MAT course) (3). (Total: 30 credits)

Recommended Course Sequence
for the Bachelor of Fine Arts in Digital Art and Animation

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	ANI 101	Animation Basics I	X	3
	ART 101	The Language of Drawing I	X	3
	ART 125	Tone, Color, and Composition I	X	3
	ART 115	Art and Technology	X	3
	ENG 116	Storytelling	X	3
	Semester Total			**15**
Semester 2	ANI 151	Animation Basics II	X	3
	ART 120	Language of Drawing II	X	3
	ART 130	Tone, Color, and Composition II	X	3
	ART 151	Life Drawing I	X	3
	ART 150	Human Anatomy	X	3
	PRJ 101	The Basics of Production	X	3
	Semester Total			**18**
Semester 3	ART 201	Life Drawing II	X	3
	CG 201	Introduction to 2D Computer Graphics	X	3
	CG 225	Introduction to 3D Computer Graphics	X	3
	FLM 115	History of Film and Animation	X	3
	PRJ 201 or PRJ 202	2D Animation Production or Game Art Project I	X	4
	Semester Total			**16**
Semester 4	COL 230	College Success for Artists	X	1
	ART 251	Character Design	X	3
	ART 300	Perspective, Backgrounds, and Layouts	X	3
	ART 350	Storyboards	X	3
	CG 275	Introduction to 3D Animation	X	3
	PRJ 251 or PRJ 252	2D Animation Production or Game Art Project I	X	4
	Semester Total			**17**
Semester 5	DAA Elective	300 level or higher: ART, ANI, FLM, or CG	X	3
	FLM 201 or FLM 210	Cinematography or Cinematography for Visual Effects	X	3
	ART 200	Animal Anatomy	X	3
	CG 300	3D Environment and Level Design	X	3
	PRJ 300	3D Production Pipeline	X	4
	Semester Total			**16**
Semester 6	DAA Elective	300 level or higher: ART, ANI, FLM, or CG	X	3
	DAA Elective	300 level or higher: ART, ANI, FLM, or CG	X	3
	CS 115	Introduction to Scripting and Programming		3
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
	COM 250	Professional Communication		3
	PRJ 350 or PRJ 352	Cinematic Production or Game Art Project II	X	4
	Semester Total			**17**

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 7	ART 401	Conceptual Illustration and Visual Development	X	3
	ART 450	Portfolio	X	3
	PHY Elective	Any 3 credit course with the PHY designation		3
	ENG Elective	Any ENG elective 150 level or higher	X	3
	PRJ 400 or PRJ 402	Cinematic Production or Game Art Project II	X	4
	Semester Total			**16**
Semester 8	General Education Elective	Any ENG, LAW, HIS, SOS, PSY, or MAT elective	X	3
	Open Elective	An elective of the student's choice from any department at DigiPen	X	3
	SOS 115	Media and Ethics: A Social Science Perspective		3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	PRJ 450	Career Preparation	X	4
	Semester Total			**16**
Degree Program Total				**131 minimum**

Note: Please see the previous page for an explanation of core courses.

Bachelor of Arts in Game Design

Program Overview

The field of digital entertainment has moved from an era where designers were self-taught and learned on the job, to one where even entry-level designers are expected to be well-trained with proven design skills, along with an understanding of technology, art, audio, narrative, and psychology. Designing digital entertainment is ultimately about breathing life into every aspect of what would otherwise be lifeless code and static pixels on a screen. Designers must continually place themselves in the heads and hearts of their players, shaping every action, every response, the ebb-and-flow of the game's intensity, and then must skillfully blend the mechanical, spatial, narrative, visual, and aural aspects of the entire experience. This degree program prepares graduates to be modern game designers, capable of working in large teams, communicating and collaborating with other designers, artists, and engineers, and able to create an experience that is greater than the sum of its parts.

Graduates will be extremely 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 through the completion of many individual projects and multiple team game projects. However, modern game designers must have a much greater breadth of knowledge than just design. Graduates will also learn the basics of programming, art, psychology, and writing, along with an introduction to sound design, economics, statistics, and probability. Students can bolster any one of these areas by taking additional courses to emphasize skills in narrative design, world design, character design, visual design, sound design, or psychology.

Graduates of this degree program will be prepared to enter the video game industry as entry-level game designers. Possible entry-level position titles include Game Scripter, Technical Designer, System Designer, Level Designer, Content Designer, Encounter Designer, User Interface Designer, Quest Designer, and Game Designer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions with titles such as Producer, Program Manager, Writer, Technical Writer, Editor, Artist, or Technical Artist. After many years in the industry, graduates may obtain titles such as Lead Designer, Creative Director, and Director.

Degree Requirements

NUMBER OF CREDITS & GPA
The Bachelor of Arts in Game Design degree program requires completion of at least 153 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of fifteen weeks each, or four academic years.

GRADE REQUIREMENTS AND CORE COURSES
Students must receive a grade of "C-" (or 1.7 quality points) or higher in all core courses for the BA in Game Design degree program. (In a non-core course, a grade of "D" [or 1.0 quality points] is considered passing.) The core courses include all courses except open electives.

HUMANITIES AND SOCIAL SCIENCE
The following courses are required: COL 499, COM 150, ENG 110, ENG 120, ECN 100, PSY 101, and PSY 201. Three additional credits must be selected from other courses with the designation COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS. (Total: 22 credits)

ART
The following courses are required: ART 101 or ART 102, ART 125 or ART 126, ART 260, ART 310, CG 102 or CG 201, CG 125 or CG 225, and FLM 151. (Total: 21 credits)

MUSIC
Students must take MUS 115. (Total: 3 credits)

DESIGN
The following courses are required: GAT 110, GAT 120, GAT 210, GAT 211, GAT 212, GAT 240, GAT 250, GAT 251, GAT 315, GAT 316, and GAT 330. Three additional credits must be selected from other courses with the designation GAT. (Total: 35 credits)

PROJECTS
The following courses are required: GAM 100, GAM 152, GAM 205, GAM 255, GAM 302, GAM 352, and MGT 451. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490. (Total: 37 credits)

MATHEMATICS
Students must take MAT 100 or MAT 140, and MAT 105. (Total: 7 credits)

SCIENCE
Students must take PHY 115 or PHY 200. (Total: 3 credits)

COMPUTER SCIENCE
The following courses are required: CS 116, CS 170 or CS 175, and CS 176 or CS 225. A combination of CS 120 and CS 101 or CS 120 and CS 100 can replace CS 116. (Total: 10 credits)

ADVANCED ELECTIVES
Students are required to take nine credits of advanced electives, which must be selected from any courses in any department at DigiPen that are designated as 200 level or higher, other than GAM, GAT, or PRJ courses. (Total: 9 credits)

OPEN ELECTIVES
At least six credits from any courses in any department at DigiPen. (Total: 6 credits)

NOTE ON GENERAL EDUCATION COURSES
The following courses satisfy the general education requirement for the BA in Game Design: COM 150 (3), ENG 110 (3), ENG 120 (3), ECN 100 (3), MAT 100 or MAT 140 (4), MAT 105 (3), PSY 101 (3), PSY 201 (3), PHY 115 or PHY 200 (3), and one Humanities and Social Sciences elective (3), for a total of 31 credits.

Recommended Course Sequence
for the Bachelor of Arts in Game Design

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	CS 116	Introduction to Computer Technology and Programming	X	4
	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	GAT 120	Game Analysis	X	2
	MAT 100	Precalculus with Linear Algebra and Geometry	X	4
	PSY 101	Introduction to Psychology	X	3
	Semester Total			**19**
Semester 2	ART 102	Fundamentals of Visual Expression	X	3
	CS 175	Scripting Languages	X	3
	ENG 110	Composition	X	3
	GAM 152	Project I for Designers	X	3
	GAT 210	Game Mechanics I	X	3
	MAT 105	Introductory Probability and Statistics	X	3
	PHY 115	Introduction to Applied Math and Physics	X	3
	Semester Total			**21**
Semester 3	ART 126	Principles of Composition and Design	X	3
	CS 176	Advanced Scripting	X	3
	GAM 205	Project II for Designers	X	4
	GAT 211	Game Mechanics II	X	3
	GAT 240	Technology for Designers	X	3
	PSY 201	Cognitive Psychology	X	3
	Semester Total			**19**
Semester 4	CG 102	2D Raster Graphics for Designers	X	3
	CG 125	Introduction to 3D Production for Designers	X	3
	COM 150	Interpersonal and Work Communication	X	3
	ENG 120	Research, Reasoning, and Writing	X	3
	GAM 255	Project II for Designers	X	4
	GAT 250	2D Game Design I	X	3
	Semester Total			**19**
Semester 5	ART 260	Graphic Design, User Experience, and Input	X	3
	Advanced Elective	A 200 level or higher elective of the student's choice from any department at DigiPen	X	3
	FLM 151	Visual Language and Film Analysis	X	3
	GAM 302	Project III for Designers	X	5
	GAT 251	2D Game Design II	X	3
	MUS 115	Fundamentals of Music and Sound Design	X	3
	Semester Total			**20**
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	ECN 100	Introduction to Economics	X	3
	Advanced Elective	A 200 level or higher elective of the student's choice from any department at DigiPen	X	3
	GAM 352	Project III for Designers	X	5
	GAT 212	Advanced Game Mechanics	X	3
	GAT 315	3D Game Design I	X	3
	Semester Total			**20**

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 7	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Advanced Elective	A 200 level or higher elective of the student's choice from any department at DigiPen	X	3
	GAM 400	Project IV	X	5
	GAT 316	3D Game Design II	X	3
	GAT 330	Interactive Narrative and Character Creation for Games	X	3
	Semester Total			**17**
Semester 8	Open Elective	An elective of the student's choice from any department at DigiPen		3
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
	GAM 450	Project IV	X	5
	Design Elective	Any three-credit course with the GAT designation	X	3
	MGT 451	Project Management	X	3
	HSS Elective	Any three-credit course from the Department of Humanities and Social Sciences offered at DigiPen	X	3
	Semester Total			**18**
Degree Program Total				**153 minimum**

Note: Please see the previous page for an explanation of core courses.

Minors

To obtain a minor at DigiPen Institute of Technology Singapore, undergraduate students must satisfy criteria set out by the department awarding the minor. The following minors are available:

- Minor in Art
- Minor in English
- Minor in Game Design
- Minor in Mathematics

Art Minor

To earn an Art Minor at DigiPen Institute of Technology Singapore, students must complete a block of 18 credits satisfying the following:

- 3 credits from ART 101 or ART 102
- And 3 credits from ART 125 or ART 126

And 12 additional credits from the following:

- ART 110, ART 115, ART 111, ART 151, ART 201, ART 222, ART 223, ART 226, ART 230. ART 228, ART 251, ART 260, ART 300, ART 310, ART 350
- CG 125 or CG 130,
- CG 201, or CG 102
- CG 225, CG 251, CG 275
- FLM 115, FLM 151, FLM 201
- ANI 101, ANI 151

All credits must be earned with a grade of "C-" (or 1.7 quality points) or better.

English Minor

DigiPen Institute of Technology Singapore's Department of Humanities and Social Sciences offers a diverse array of English courses encompassing literature, expositional writing, and creative writing. The literature courses provide critical inquiry into great writings from our earliest myths and epics to contemporary post-modern works. The writing courses offer students the opportunity to work in the genres of nonfiction, fiction, poetry, screenwriting, graphic storytelling, and video games. The minor in English provides a structured way for students to develop and hone the analytical and creative skills needed to articulate their experience, to support their opinions, and to write compelling stories. Additionally, students who complete the English minor will acquire an understanding of human endeavor as expressed in literature in various forms and historical periods.

To earn an English minor, students must complete a minimum of 18 credits in ENG courses with a "C-" (or 1.7 quality points) or better. Except for ENG 450, all ENG courses count toward the English minor. Students must also take at least one upper-division ENG course numbered 300 or above.

Math Minor

To earn a math minor at DigiPen Institute of Technology Singapore, a student must complete a block of 27 credits satisfying the following:

- The courses are taken from MAT 140 or higher.
- PHY 300 may substitute for one of the MAT courses.
- Six credits must be numbered 300 or higher.

- At least nine credits in this subject area must be taken at DigiPen.
- All credits must be earned with a grade of "C-" (or 1.7 quality points) or higher.

Course Listings

Some courses listed as alternate prerequisites are not offered at every DigiPen campus. Please contact the Registrar's Office for more details.

Department of Animation and Production

Animation Courses

ANI 101 **Animation Basics I** (3 cr.)
Prerequisite(s): None

This course introduces the principles of animation through a variety of animation techniques. Topics include motion research and analysis, effective timing, spacing, volume control, stagecraft, and choreography. Weekly screenings of classic animation are held, followed by in-class critiques.

ANI 125 **Acting for Animation** (3 cr.)
Prerequisite(s): None

An animator's ability to express attitude, thought, and emotion through a character's body language is a fundamental skill necessary for success. Therefore, this course focuses on presenting tools and techniques for translating thoughts and feelings into specific gestures and actions. The course introduces students to the history of acting in theater, animation, and film. Students explore the basic fundamentals and differences of acting for the stage, film, and animation through a series of acting exercises and problems. Special emphasis is given to classical method acting.

ANI 151 **Animation Basics II** (3 cr.)
Prerequisite(s): ANI 101

This course explores concepts and techniques of traditional animation. Motion and posing is explored through character development, which includes the expression of personality, mood, thought, and attitude. Emphasis is placed on the refinement of drawings, subtlety of movement, and creativity.

ANI 201 **Stop Motion Animation** (3 cr.)
Prerequisite(s): ANI 151

A variety of stop-motion methods will be explored in this course. Topics include object animation, clay animation, and armature-building techniques.

ANI 300 **3D Character Animation I** (3 cr.)
Prerequisite(s): ANI 151, CG 275

This course explores 3D character animation techniques of performance, physicality, and weight using basic rigs provided by the instructor. Special attention is given to thumbnailing key poses, video research, and stagecraft.

ANI 350 **3D Character Animation II** (3 cr.)
Prerequisite(s): ANI 300

This 3D animation course explores acting through the medium of the human voice, including narration, expressive reading, diction, lip-synchronization techniques, and vocal refinement.

ANI 399 **Special Topics in Animation** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it's offered. It is for the purpose of offering a new or specialized course of interest to the faculty or students that is not covered by the courses in the current catalog.

ANI 400 **Cinematic Animation** (3 cr.)
Prerequisite(s): ANI 350, ART 401, MUS 115

This course is a culmination of the student's ability to use animation as a storytelling medium. It also provides an opportunity for the student to demonstrate his or her personal artistic growth. Each student works to complete a short piece of cinematic animation. Working independently or in small groups with the instructor's approval, students may use either 2D or 3D tools.

ANI 450 **Advanced Animation Portfolio** (3 cr.)
Prerequisite(s): ANI 350, CG 300, PRJ 350

This course requires students to further extend their portfolio work, principally polishing and refining elements that will align them well for current industry needs. With a generous selection of assignment opportunities to be explored, students will gain advanced instruction on more focused acting, physicality and creature animation. This course will provide students with an ideal opportunity to improve an area of their portfolio work that will better represent animated body mechanics and acting skills.

Film Courses

FLM 115 **History of Film and Animation** (3 cr.)
Prerequisite(s): None

This course examines the more than 100-year history of film and animation. Beginning with the scientific and technical advances that made these media technologies possible, students explore every major movement and genre as well as their impact on society. The course gives students critical vocabulary required for explaining story, animation and cinematic techniques.

FLM 151 **Visual Language and Film Analysis** (3 cr.)
Prerequisite(s): None

Animation is ultimately film making, and animators should learn from the many classics on how to effectively bring various film production elements together. Students review several films and study how the relationships between scripts, cameras, lighting, sets, production design, sound, acting, costumes, props, directing, and production lead to successful visual stories. They also examine the fundamental theories underlying visual storytelling. Understanding the creative processes utilized by these influential filmmakers provides insight into how students may improve their own animations.

FLM 201 **Cinematography** (3 cr.)
Prerequisite(s): FLM 115

This course explores camera composition, lighting, and editing techniques through a series of cinematic projects. Topics include 2D and 3D camera moves, film and script analysis, storytelling conventions, choreography, and staging.

FLM 210 **Cinematography For Visual Effects** (3 cr.)
Prerequisite(s): FLM 115

This course focuses on the technical aspects of cinematography and still photography. This includes understanding how images are captured and processed, camera functionality, computer graphics theory, and image analysis.

FLM 215 **Visual Effects Analysis and Process** (3 cr.)
Prerequisite(s): FLM 151

This course explores the history of visual effects in film and how the craft has developed in terms of technology and processes. Students also examine the fundamental production pipeline for the planning and execution of visual effects.

FLM 250 **Digital Post-Production** (3 cr.)
Prerequisite(s): FLM 151

The last step of any animation project involves the assembly of various production elements ranging from rendered files to sound effects. This is also the stage where the visual effects artists add the effects seen in today's movies. This course teaches the fundamental skills these artists use in post-production. Effective editing skills are the primary outcome of the course. Students will also cover the planning, execution, and addition of special effects to animation.

FLM 350 **Compositing I** (3 cr.)
Prerequisite(s): FLM 210, FLM 215, CG 201

This course introduces students to two key areas of compositing -- image preparation (e.g., rotoscoping, blue/green screen, masks, wire removal) and compositing software (layer-based, node-based). Students apply this knowledge to basic 2D compositing, as well as motion tracking and color correction.

FLM 360 **Compositing II** (3 cr.)
Prerequisite(s): FLM 350, CG 275

This advanced compositing course focuses on the integration of 3D elements into live action footage. Concepts covered include image stabilization, lighting, green screen setup and shooting, match moving, camera tracking, and body tracking.

FLM 399 **Special Topics in Film** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

Internship Courses

INT 390 **Internship I** (5 cr.)
Prerequisite(s): Permission of Instructor required.

An internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what she or he is learning throughout the experience. It is usually a professional activity under general supervision of an experienced professional and in a job situation, which places a high degree of responsibility on the student. Internships are well structured along the Internship Guidelines available in the Administration Office.

INT 450 **Internship II** (5 cr.)
Prerequisite(s): None

An internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what she or he is learning throughout the experience. It is usually a professional activity under general supervision of an experienced professional and in a job situation, which places a high degree of responsibility on the student. Internships are well structured along the Internship Guidelines available in the Administration Office. Permission of Instructor required.

Music Courses

MUS 115 **Fundamentals of Music and Sound Design** (3 cr.)
Prerequisite(s): None
This course was previously called FLM 275. Credit may be received for MUS 115 or for FLM 275, but not for both.

This course offers an introduction to the fundamentals of music and sound design, and an overview of the production of music and sound for animation, film, and video games. Topics

include music notation, key, meter, rhythm, melody, harmony, texture, tempo, genre and form; historical musical styles; dialog and timing; and digital audio production methods and techniques.

Projects Courses

PRJ 101 **The Basics of Production** (3 cr.)
Prerequisite(s): ANI 101, ART 101, ART 125

This course investigates production pipelines adopted by schools and companies. Topics include career opportunities, best practices and methodologies, efficient workflows, and basic navigation of common industry software. Projects range from small individual assignments to a limited team-based project within a game engine.

PRJ 201 **2D Animation Production** (4 cr.)
Prerequisite(s): ANI 151, ART 120, ART 130, PRJ 101

This course is the first semester of a two-semester traditional animation project. Work is completed in small teams with a special emphasis on physicality. Additional topics include research, visual development, and production pipeline management.

PRJ 202 **Game Art Project I** (4 cr.)
Prerequisite(s): ANI 151, ART 120, ART 130, PRJ 101

This course is the first semester of a two-semester project that focuses on the creation of a simple real-time game or simulation with 2D graphics. Artists work on cross-discipline teams of three or more members. Topics include visual design, game art pipeline, essential development practices, fundamentals of team dynamics, and task prioritization methods.

PRJ 251 **2D Animation Production** (4 cr.)
Prerequisite(s): PRJ 201

This course is the second semester of a two-semester traditional animation project. Work is completed in small teams with a special emphasis on production quality. Topics include cleanup, scanning, coloring, raster and vector-based software, and production pipeline management.

PRJ 252 **Game Art Project I** (4 cr.)
Prerequisite(s): CG 201, PRJ 202

This course is the second semester of a two-semester project and focuses on the creation of a simple real-time game or simulation with 2D graphics. Topics include art polish, visual consistency, formal playtesting, game pacing, and game balance.

PRJ 300 **3D Production Pipeline** (4 cr.)
Prerequisite(s): PRJ 251 or PRJ 252, CG 275

This course introduces a limited 3D production pipeline through a one-semester individual project. A range of artistic disciplines will be covered, including modeling, texturing, rendering, rigging, and animation. Storyboards and designs for characters, environments, and assets are provided.

PRJ 350 **Cinematic Production** (4 cr.)
Prerequisite(s): PRJ 300, ART 300, CG 300, ENG 116, ART 350

This course is the first semester of a two-semester sequence on the production of a short 2D or 3D film. The course focuses on concept, pre-production, and asset creation in a team environment. Topics include effective presentations, managing scope, and team dynamics.

PRJ 352 **Game Art Project II** (4 cr.)
Prerequisite(s): ART 300, CG 300, PRJ 300, ENG 116, ART 350

This course is the first semester of a two-semester team production of a game. Topics include advanced art pipeline, game engine rendering, visual consistency, and advanced testing techniques.

PRJ 400 **Cinematic Production** (4 cr.)
Prerequisite(s): ART 350, PRJ 350, ENG 116

This course is the second semester of a two-semester sequence on the production of a short 2D or 3D film. With pre-production completed, the sequence continues with final animation, rendering, and post-production. Commercial art direction, quality control, production deadlines, team dynamics, and technical challenges are addressed.

PRJ 402 **Game Art Project II** (4 cr.)
Prerequisite(s): PRJ 352

This course is the second semester of a two-semester team production of a game. Topics include advanced art pipeline, game engine rendering, visual appeal and consistency, user interface design, animation polish, and advanced testing techniques.

PRJ 450 **Career Preparation** (4 cr.)
Prerequisite(s): PRJ 400 or PRJ 402 or INT 390

This course focuses on building portfolios and reels in preparation for the professional world. Emphasis is placed on professional practices, methodologies, and presentation.

Department of Computer Science

Computer Science Courses

CS 100 **Computer Environment** (4 cr.)
Prerequisite(s): None

This course provides students with a detailed examination of the fundamental elements on which computers are based. Topics covered include number systems, representation of numbers in computation, basic electricity, electric circuits, digital systems, logic circuits, data representations, digital memory, computer architecture, and operating systems. Operational code and assembly languages are discussed, examined, and used in either a microprocessor or microcontroller environment, such as a personal computer or an autonomous car.

CS 115 **Introduction to Scripting and Programming** (3 cr.)
Prerequisite(s): None
Credit may be received for CS 115 or for CS 120, but not for both.

This class introduces programming environments to students who are not experienced programmers. This course covers simple logic, programming flow, and the use of variables. It introduces students to the history of programming and the basic vocabulary of the programming industry. The course culminates in a series of hands-on exercises using this knowledge to solve problems. At his or her discretion, the instructor may cover special topics in programming or scripting.

CS 116 **Introduction to Computer Technology and Programming** (4 cr.)
Prerequisite(s): None

This class introduces programming environments to students who are not enrolled in a science degree program at DigiPen. The course provides students with an introductory overview of the fundamental elements on which computers are based, including basic computer hardware systems, operations, and structures. An introduction to basic programming includes simple logic, programming flow, loops, variables, and arrays. Conditionals, evaluations, and other control structures are also included. The instructor may cover special topics in programming or scripting and may focus on currently popular scripting languages in the video game industry.

CS 120 **High-level Programming I: The C Programming Language** (4 cr.)
Prerequisite(s): None

This course serves as a foundation for all high-level programming courses and projects by introducing control

flow through statement grouping, decision making, case selection, and procedure iteration as well as basic data types. Additionally, this course addresses the lexical convention, syntax notation, and semantics of the C programming language.

CS 170 **High-level Programming II: The C++ Programming Language** (4 cr.)
Prerequisite(s): CS 120

This course introduces the C++ language with particular emphasis on its object-oriented features. Topics include stylistic and usage differences between C and C++, namespaces, function and operator overloading, classes, inheritance, templates, and fundamental STL components.

CS 175 **Scripting Languages** (3 cr.)
Prerequisite(s): CS 120 or CS 116

This course covers the concepts and implementation strategies for using high-level scripting languages in game development. Students will focus on object-oriented programming, high-level English-like structure, speed of development, and ease of use. The course includes a survey of commercial languages, as well as proprietary scripting languages from industry applications. Students will examine the process of conceptualizing a syntax for a game-based scripting language and examine how such a language is compiled and interpreted by a game engine. Using the syntax they have created, they will create a number of scripts that could be used in a game. Additionally, the class will cover such relevant topics as data-driven technology, modular coding, function calls, and procedures.

CS 176 **Advanced Scripting** (3 cr.)
Prerequisite(s): CS 170 or CS 175

This course presents game implementation techniques and game architecture in a scripting language environment. Students investigate concepts of game architecture, such as game-system component separation and game flow while learning about essential elements such as the game state manager, input/output handler, and frame rate controller. Students learn how to create several different types of classic games in a variety of scripting languages most commonly used for professional games, learning the specific syntax and approaches of each language in the process. As part of their implementation, students learn how to use the specific graphics, audio interface, physics and math APIs found in the scripting environments used. Students survey concepts in space partitioning, particle systems, map editors and other elements so that they are capable of creating working prototypes of 2D games.

CS 180 **Operating Systems I: Man-Machine Interface** (3 cr.)
Prerequisite(s): CS 100 or CS 101, CS 170

This course presents an overview of modern operating systems as implemented on personal computers. It presents

an overview of what an operating system is and does, with emphasis on the following topics: organization and design, process management, threading, interprocess communication, process synchronization, and memory management.

CS 185 **C++ for Designers** (3 cr.)
Prerequisite(s): CS 176
Credit may be received for CS 170 or CS 185, but not for both.

This course introduces the C++ language with particular emphasis on its object-oriented features. Topics covered include differences between scripting languages and C++, data types, namespaces, classes, inheritance, polymorphism, templates, and fundamental STL components.

CS 200 **Computer Graphics I** (3 cr.)
Prerequisite(s): MAT 140, CS 170

This course presents fundamental mathematical elements, data structures, and algorithms useful for animating and viewing 2D primitives. The course aims to fulfill two objectives. The first objective is to provide students with a sufficient mathematical and algorithmic background to design and implement 2D graphics applications. The second objective is to prepare students with the knowledge required for writing 3D graphics applications. The first half of the course deals with scan-conversion algorithms for rasterizing 2D primitives such as lines, circles, ellipses, triangles, and arbitrary polygons. The second half of the course is concerned with the viewing and animation of these 2D primitives. The course covers topics such as interpolation techniques, transformations, culling, clipping, animation techniques, and the 2D viewing pipeline.

CS 211 **Introduction to Databases** (3 cr.)
Prerequisite(s): CS 170

This course provides a broad overview of database systems. It presents the fundamentals, practices, and applications of computer databases. Topics include database architectures, data modeling, design schemes, transaction processing, and database implementation.

CS 212 **Advanced Databases** (3 cr.)
Prerequisite(s): CS 211

This course will cover advanced database topics with particular emphasis on the large-scale database systems used by modern applications. Data mining and data warehousing will be explored with emphasis on search and analysis. Non-relational databases will also be covered in detail.

CS 225 **Advanced C/C++** (3 cr.)
Prerequisite(s): CS 170

This course builds on the foundation created in the first two high-level programming courses (CS 120/170). It presents advanced topics of the C/C++ programming language

in greater detail. Such topics include advanced pointer manipulation, utilizing multi-dimensional arrays, complex declarations, and standard library functions. Advanced C++ topics include class and function templates, operator overloading, multiple inheritance, runtime type information, the standard template library, and performance issues.

CS 230 **Game Implementation Techniques** (3 cr.)
Prerequisite(s): CS 120
Concurrent Course(s): CS 170

This presents game implementation techniques and engine architecture. Students investigate foundational concepts of game architecture, such as game-system component separation and game flow, while learning about essential elements such as the game state manager, input/ output handler, and frame rate controller. CS 230 introduces Windows programming, state machines, and collision detection algorithms, which students will integrate into their own remakes of classic games. As part of their implementation, students create and expand their own collision, vector, and matrix libraries, enabling them to incorporate basic physics engines. Students survey concepts in space partitioning, particle systems, map editors, and other elements as a bridge to more advanced concepts in implementation techniques and engine architecture.

CS 245 **Introduction to Interactive Sound Synthesis** (3 cr.)
Prerequisite(s): MAT 140 or MAT 100, CS 170, CS 180, PHY 200

This course explores dynamic sound synthesis, 3D-directional auditory effects, and sonic ambience to real-time simulations and video games. The subjects include mixing audio and modulating dry recorded sounds using wave table synthesis. Students learn how to create collision sounds using additive synthesis, wind effects using subtractive synthesis, natural sounds using granular synthesis and physical modeling, ambiences using layering and spectral filtering, 3D spatialized surround sound panning, inter-aural time difference, inter-aural intensity difference, and Head Related Transforms (HRTFS). Students also study algorithms and techniques for real-time multi-threaded programming and synthesized sound integration for game engines.

CS 246 **Advanced Sound Synthesis** (3 cr.)
Prerequisite(s): CS 245

This course covers the basic building blocks that go into making a sound engine. Topics may include: audio file formats, sound card architecture, low level sound APIs, high level sound APIs, streaming audio, mixing, digital filters and effects, 3D audio, audio spectra and the Fast Fourier Transform.

CS 250 **Computer Graphics II** (3 cr.)
Prerequisite(s): CS 200

This course examines the mathematical elements and algorithms used in the design and development of real-time

3D computer graphics applications, such as games, cockpit simulators, and architectural walk-throughs. 3D computer graphics involve drawing pictures of 3D objects, usually on a 2D screen. This process of generating a 2D image of a 3D graphics application can be described as a series of distinct operations performed on a set of input data. Each operation generates results for the successive one. This process is called the graphics rendering pipeline, and it is the core of real-time computer graphics. The graphics pipeline can be conceptualized as consisting of three stages: application, transformation, and rasterization. The course begins by introducing the 3D graphics pipeline. The application stage is examined from the viewpoint of the representation, modeling, and animation of 3D objects. Topics include user interaction, camera animation techniques, simulation of dynamic objects, and collision detection techniques. Next, the course examines the process of mapping 3D graphic objects from model-space to viewport coordinates. The transformation stage implements this process. Finally, the conversion of a geometric primitive in viewport coordinates into a 2D image is studied. The rasterization stage implements this final process.

CS 251 **Introduction to Computer Graphics** (3 cr.)
Prerequisite(s): CS 170

This course provides a high-level overview of 3D computer graphics. It is intended for game designers and artists to enable them to understand the fundamental components of graphics engine and their applications in real-time simulation and video game software. Course topics include graphics pipeline architecture, 3D transformation operations, viewing and projection, lighting and shading models, surface detail techniques, shadow algorithms, hidden object culling and removal techniques, 3D object modeling, and animation and physically-based motion control. The popular graphics programming languages (GDI plus, OpenGL, DirectX) and shader programming are also discussed in the course.

CS 260 **Computer Networks I: Interprocess Communication** (3 cr.)
Prerequisite(s): CS 180, CS 225

This course introduces the hierarchical network communication in a distributed computing environment. Course topics cover network technologies, architecture, and protocols. The curriculum gives specific emphasis to the TCP/IP stack and in making students familiar with writing portable socket based software. It prepares students for programming multi-player games in later semesters.

CS 261 **Computer Networks II** (3 cr.)
Prerequisite(s): CS 260

This class extends the TCP/IP protocols studied in CS 260 to wireless devices. This course goes further in depth into some topics covered in the introductory networks course, as well as additional subjects of interest. Topics include TCP/IP related protocols, (such as NAT, WAP, and DNS), physical media access, (such as aloha, OFDM, and WIDEBAND), wireless standards and protocols and network security. The curriculum covers additional topics based on the state of the industry.

CS 280 **Data Structures** (3 cr.)
Prerequisite(s): CS 225

This course introduces the classical abstract data types (ADT) in computer science. ADTs provide the hierarchical views of data organization used in programming. Among the topics covered are the algorithms and primitives of the data structures for arrays, linked lists, stacks, queues, trees, hash tables, and graphs. In addition, the course provides an introduction to algorithm complexity and notation.

CS 300 **Advanced Computer Graphics I** (3 cr.)
Prerequisite(s): CS 250

This course introduces students to algorithms that are essential to creating photorealistic images in interactive simulations. Topics covered include an overview of modern GPU (graphics processor unit) architecture and the common graphics APIs used, including OpenGL and DirectX. Rendering techniques covered include texturing, illumination models, transparency, shading algorithms, mapping techniques (bump mapping, environment/reflection mapping, etc.), and shadows. Students learn how to implement all algorithms by using vertex and pixel shaders.

CS 311 **Introduction to Databases** (3 cr.)
Prerequisite(s): CS 170

This course provides students with a broad overview of database systems. It presents the fundamentals, practices, and applications of computer databases. Topics include database architectures, data modeling, design schemes, relational algebra, query languages, transaction processing, and database implementation. Students will explore massively multiplayer online games (MMOG) to examine a case study of database design and implementation.

CS 312 **Advanced Databases** (3 cr.)
Prerequisite(s): CS 311

This course will cover advanced database topics with particular emphasis on the large scale database systems used by modern applications. Data mining and data warehousing will also be explored with emphasis on search and analysis. Non-relational databases will also be covered in detail. Students will examine case studies of real-world companies and the techniques they use to manage vast quantities of ever-growing data.

CS 315 **Low-level Programming** (3 cr.)
Prerequisite(s): CS 120, CS 180, CS 100

This course introduces students to modern microprocessor architectures using x86 series for case studies. In this course, students are expected to write both assembly language programs and to use assembly language to optimize various C/C++ programs. Topics may include pipelining, superscalar/VLIW machines, register-renaming, out-of-order execution, multi-core architecture, caches, multicore-cache coherency,

x86 instruction set architecture, application binary interfaces, Flynn's taxonomy, and Streaming SIMD extensions.

CS 325 **User Interface and User Experience Design** (3 cr.)
Prerequisite(s): CS 280

This course presents fundamental topics in the field of human-computer interface design. Topics covered in the course will help students understand human capabilities, design principles, prototyping techniques and evaluation methods for human-computer interfaces, with special emphasis on natural user interfaces. The course will guide the students towards an implementation of a novel user interaction.

CS 330 **Algorithm Analysis** (3 cr.)
Prerequisite(s): MAT 200 or MAT 230, CS 225, CS 280

This course provides students with an introduction to the analysis of algorithms, specifically proving their correctness and making a statement about their efficiency. Topic for discussion may include loop invariants, strong mathematical induction and recursion, asymptotic notation, recurrence relations, and generating functions. Students examine examples of algorithm analysis from searching and sorting algorithms.

CS 350 **Advanced Computer Graphics II** (3 cr.)
Prerequisite(s): CS 300

This course deals with the efficient representation and processing of complex 3D scenes in order to avoid bottlenecks in the use of the CPU and the GPU. Specific topics include a variety of spatial data structures (binary space-partitioning trees, octrees, kd-trees, and grid data structures), several object-culling methods (occlusion, viewport, and portal), and finally the construction and uses of bouding volumes and their hierarchies for collision detection and related geometric operations.

CS 355 **Parallel Programming** (3 cr.)
Prerequisite(s): CS 330

This course presents an introduction to multi-threaded and distributed programming. The course covers some classical problems and synchronization mechanisms, as well as modern libraries that support parallel programming. The course also covers distributed programming models and applications to video-game programming.

CS 365 **Software Engineering** (3 cr.)
Prerequisite(s): CS 225

This course covers a wide range of topics in software engineering from the practical standpoint. It encompasses project management issues as well as technical development principles and methods. Topics include system architecture, security, methodologies and notation, UML, object oriented analysis and design, requirements analysis, implementation, verification, validation, maintenance, and software engineering standards. Risk management and iterative design receive special emphasis. Student teams apply acquired knowledge to a substantial project.

CS 370 **Computer Imaging** (3 cr.)
Prerequisite(s): CS 280

The course introduces students to computer imaging where image analysis and image processing are unified to provide a useful paradigm for both computer vision and image processing applications. Students use C++ to implement different algorithms introduced in the course. Upon completion of this course, students are expected to have gained a general understanding of the fundamentals of digital image processing and computer vision. They also have achieved a familiarity with the current analytical tools that are used in computer imaging applications and the ability to design and develop basic algorithms to solve computer-imaging problems.

CS 375 **Compilers and Interpreters** (3 cr.)
Prerequisite(s): CS 330, MAT 258

This course presents fundamental topics in the field of compiler construction. Topics covered in the course will help students understand and implement a compiler for a high-level programming language. The course will guide the students towards an in-depth understanding of compilation techniques and runtime implementation for a modern programming language.

CS 380 **Artificial Intelligence for Games** (3 cr.)
Prerequisite(s): CS 280

This course introduces students to a wide range of concepts and practical algorithms that are commonly used to solve game AI problems. Case studies from real games are used to illustrate the concepts. Students have a chance to work with and implement core game AI algorithms. Topics covered includes the game AI programmer mindset, AI architecture (state machines, rule-based systems, goal-based systems, trigger systems, smart terrain, scripting, message passing, and debugging AI), movement, pathfinding, emergent behavior, agent awareness, agent cooperation, terrain analysis, planning, and learning/adaptation.

CS 381 **Introduction to Artificial Intelligence** (3 cr.)
Prerequisite(s): CS 330, MAT 258

This course covers fundamental areas of Artificial Intelligence, including various search algorithms, game playing, constraint satisfaction problems, propositional and first-order logic, and planning. The course will also explore practical skills relevant to implementation of AI techniques, practices, and design solutions.

CS 385 **Machine Learning** (3 cr.)
Prerequisite(s): CS 381

This course introduces a wide range of machine learning techniques. The topics include early machine learning algorithms like genetic algorithms, classifier systems, neural network, and various clustering algorithms. Then the course explores probabilistic algorithms like Bayesian networks, hidden Markov models, and Monte Carlo methods.

CS 388 **Introduction to Portable Game System Development** (3 cr.)
Prerequisite(s): CS 250, GAM 250

This course introduces students to portable game systems programming and development, which is different from PC programming and development due to the embedded structure of the machine. Students work with a very limited amount of memory and CPU power. To overcome the system's memory limitations, several graphics techniques are used, such as tile based game objects and backgrounds using color palettes. As for the CPU limitations, fixed point decimal is used instead of float numbers, along with asynchronous operations. Several portable game system specific topics, such as managing multiple graphics engines simultaneously and handling the touch pad are discussed.

CS 391 **Code Analysis and Optimization** (3 cr.)
Prerequisite(s): CS 280, CS 315

This course focuses on understanding the details for the computer, complier, and language, specifically how to apply these towards practical problem of solving crashes and performance issues. The emphasis is not only on knowing what and why, but also about taking that knowledge and creating useful tools and techniques for solving these programs.

CS 399 **Special Topics in Computer Science** (3 cr.)
Prerequisite(s): None
Permission of instructor required.

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

CS 420 **Graphics File Format and Data Compression Techniques** (3 cr.)
Prerequisite(s): CS 250, CS 280

This course covers data compression techniques for still images and multimedia. Students learn the theory behind data compression and how it is used in specific formats. Methods covered include run-length encoding, Huffman coding, dictionary compression, transforms, and wavelet methods. Students learn these techniques by examining various popular graphic file formats such as BMP, JPEG, DXTn, and MPEG.

CS 460 **Advanced Animation and Modeling** (3 cr.)
Prerequisite(s): CS 300, MAT 300, CG 130

3D animation and modeling play significant roles in computer simulation and video game software. Game developers need to have a comprehensive understanding of these techniques. This course introduces algorithms for specifying and generating motion for graphical objects. It addresses practical issues, surveys accessible techniques, and provides straightforward implementations for controlling 3D moving entities with different characteristics. The class covers two broad categories. Students will first learn an interpolation-based technique, which allows programmers to fill in the details of the motion or shape once the animator specifies certain basic information, such as key frames, paths, coordinate grids, or destination geometry. Then they learn a behavior-based technique, which generates motion that satisfies a set of rules, such as kinematics, physics, or other constraints.

Department of Digital Arts

Computer Graphics Courses

CG 102 **2D Raster Graphics for Designers** (3 cr.)
Prerequisite(s): ART 102 or ART 105
Concurrent Course(s): CG 125

This course introduces the software and basic interface customization options and strategies in 2D raster graphics. Interface organization strategies, system components, bit depth, resolution, memory management, and output strategies are covered. The course also explores techniques and critical thinking skills for digital painting.

CG 125 **Introduction to 3D Production for Designers** (3 cr.)
Prerequisite(s): ART 102 or ART 105
Concurrent Course(s): CG 102

This course introduces the software and production process behind creating 3D digital art. The course covers interface organization options and strategies in 3D graphics, equipment options, and production elements. It also introduces techniques for texture mapping, modeling, rigging, lighting, cameras, and animation. The course culminates in a series of applied problems in 3D production techniques and their solutions.

CG 130 **3D Computer Animation Production I** (3 cr.)
Prerequisite(s): None

This course introduces students to the basic theories and techniques of 3D computer animation. The curriculum emphasizes standard 3D modeling techniques, including polygonal and spline modeling, texture map creation and application, keyframing, and animating through forward kinematics and inverse kinematics.

CG 135 **3D Computer Animation Production II** (3 cr.)
Prerequisite(s): CG 130

This course builds on the fundamentals taught in CG 130. Students learn about key framing, special effects, final rendering, and recording.

CG 201 **Introduction to 2D Computer Graphics** (3 cr.)
Prerequisite(s): ANI 151, ART 120, ART 130

This course introduces 2D computer graphics software and practices for digital painting and production. Topics include transition from traditional to digital art, photo editing and manipulation, material studies, critical thinking skills and techniques, conceptualization, and illustration.

CG 225 **Introduction to 3D Computer Graphics** (3 cr.)
Prerequisite(s): ANI 101, ART 120, ART 130

This course introduces students to 3D software and practices for production. Topics include organization strategies, modeling, unwrapping, texture mapping, rigging, lighting, and cameras.

CG 251 **2D Vector Graphics and Animation** (3 cr.)
Prerequisite(s): CG 201

This course examines the principles and practices of 2D vector graphics and animation. It introduces students to industry standard software, output options, and production strategies for using vector graphics in both graphic design and animation. The course gives special consideration to critical thinking and refinement strategies when modifying vector images. Students examine methods of using vector-based tools for creating web and broadcast animation, and the course concludes with a series of applied problems in 2D vector animation.

CG 275 **Introduction to 3D Animation** (3 cr.)
Prerequisite(s): ANI 151, CG 225

This course explores and exercises the concepts and techniques of 3D animation through a series of assignments applied to characters. The course emphasizes character development in the expression of personality, mood, thought, and attitude through motion and posing.

CG 300 **3D Environment and Level Design** (3 cr.)
Prerequisite(s): CG 275

This course introduces students to the principles of 3D environment design. Theatrical sets, architectural simulations, and level design are considered. In order to provide students with a broader skill set, this course also presents the "mechanics" of how to use other 3D animation software, with an emphasis on the unique strengths of the package. Students explore the comparative strengths of different software packages and the impact that this has on workflow.

The course emphasizes critical thinking skills and strategies for tool selection.

CG 301 **3D Environment Design for Games** (3 cr.)
Prerequisite(s): ART 310, CG 102, CG 125

This course provides game design students with an understanding of the design and production process of environments for 3D games. It introduces the principles of 3D environment creation and provides a functional working knowledge of modeling, texturing and lighting skills within the framework of a 3D modeling package to create believable and well-designed environments. Student work is implemented into a game engine.

CG 303 **Hard Surface Modeling and Texturing** (3 cr.)
Prerequisite(s): CG 275

Building on the knowledge and skills for modeling taught in CG 275, this course focuses on the process for optimized modeling and texturing of non-organic scene elements including architecture, props, and vehicles. Students are also introduced to digital sculpting for hard surface models.

CG 305 **Digital Sculpture** (3 cr.)
Prerequisite(s): CG 275

This course introduces an array of digital modeling, sculpting, and painting techniques with a set of industry standard 3D and 2D tools. After a series of exercises, students learn the tools and work flow of digital sculpting and enhance their knowledge of anatomy. As part of this class, students create a highly finished 3D character that is fully designed, modeled, posted, sculpted and textured. They also demonstrate knowledge of environmental sculpting.

CG 310 **Game Team Art Production I** (3 cr.)
Prerequisite(s): CG 275

This course consists of the production of art for a game team. Students devise a production schedule at the beginning of the course. Evaluation of the art production comes from a faculty member who oversees the production milestones.

CG 311 **Game Team Art Production II** (3 cr.)
Prerequisite(s): CG 310

This course is a continuation of CG 310, consisting of the production of art for a game team. Students devise a production schedule at the beginning of the course. Evaluation of the art production comes from a faculty member who oversees the production milestones.

CG 315 **Texturing for 3D** (3 cr.)
Prerequisite(s): CG 201, CG 275

This class focuses on how to generate efficient and accurate texture maps. Students explore techniques for generating

landscape, architectural, objects, and character based textures. Topics include: clamped textures, tileable textures, advanced methods for generating normal maps, z-depth, displacement, and emissive type textures. Students will explore UV mapping, unwrapping, multi-layered shaders, animated texturing methods, use of photo reference, manipulation, compositing and other techniques to create complex textures.

CG 330 **Hair and Cloth Simulation** (3 cr.)
Prerequisite(s): CG 275

This course focuses on concepts and tools for the construction and simulation of hair and clothing models in 3D animation. Students explore techniques for generating models suitable for simulation, and the complexities inherent in simulating their behavior in the context of animation. Topics may include: evaluating and interpreting reference material, using a simulator, using parameters to control behavior, UV parameter assignment and texturing, detailing a model, fixing simulation problems, and shading and lighting as it pertains to their models.

CG 350 **Graphics for Games** (3 cr.)
Prerequisite(s): CG 300

This course examines the unique problems of creating graphics for games, and it teaches effective production techniques for addressing these issues.

CG 360 **Lighting and Rendering** (3 cr.)
Prerequisite(s): FLM 201 or FLM 210, CG 275

CG artists must develop strong lighting skills. This course looks at the subject through the world of film cinematography and covers the process of lighting both interior and exterior virtual environments. At the technical and artistic levels, students explore rendering techniques and strategies that efficiently produce a more convincing result.

CG 375 **Character Rigging** (3 cr.)
Prerequisite(s): CG 275

This courses exposes students to rigging techniques. All students will share models and texture sets and work on learning industry best practices for professional grade character rigs.

CG 376 **Advanced Character Rigging** (3 cr.)
Prerequisite(s): CG 375

This course focuses on advanced rigging techniques. Topics may include biped rigs, quadruped rigs, and scripting.

CG 399 **Special Topics in Computer Graphics** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty or students that is not covered by the courses in the current catalog.

CG 400 **Advanced 3D Modeling Techniques** (3 cr.)
Prerequisite(s): CG 275

This course focuses on the design and production of highly detailed models for use in feature and broadcast animation. Students use a best-of-breed approach to define their tool set, with particular emphasis placed on organization and structure. Additional emphasis is placed on generating layered digital intermediate files for use in a model-composite workflow in a desktop production environment. Lectures also cover environment and character design research as relevant to detail modeling, presented in a framework of industry-standard geometries and methods. Students also explore advanced material creation using a global illumination-capable rendering engine, incorporating advanced texture creation techniques.

CG 403 **Advanced Environment Creation** (3 cr.)
Prerequisite(s): CG 300, CG 303

This course focuses on the building techniques and theories behind 3D environment creation, including environment design, lighting, texturing, shading, and rendering.

CG 405 **Advanced Character Creation** (3 cr.)
Prerequisite(s): CG 305

This course focuses on the building techniques and theories behind 3D biped or quadruped character creation, including anatomy, design, lighting, shading, and rendering.

CG 410 **Effects Animation** (3 cr.)
Prerequisite(s): CG 360, FLM 360

This course explores the technical and creative elements required to rig and animate effects. Topics include animating particle effects, fluids, soft and rigid body dynamics. Students are required to integrate the various effects into a live action shot.

Department of Fine Arts

Art Courses

ART 101 **The Language of Drawing I** (3 cr.)
Prerequisite(s): None
Credit may be received for either ART 101 or ART 102, not both.

This course explores the nature of drawing as a language skill and the use of drawing by production artists and animators. Topics include applied drawing goals, critical thinking skills, and best practices in drawing practice, drill, and play. Design principles, reference research, and the design process are applied to a series of practical problems. This course also explores drawing materials, drawing strategy, drawing sequence, and linear drawing methodology, practice, and theory.

ART 102 **Fundamentals of Visual Expression** (3 cr.)
Prerequisite(s): None
Credit may be received for either ART 101 or ART 102, not both.

Students will be introduced to simple drawing techniques, constructed linear perspective, visual design methodology, and drawing vocabulary through lectures, studio assignments, and simple projects.

ART 105 **Art Processes** (3 cr.)
Prerequisite(s): None

This course provides a basic working knowledge of the processes used in making art. Topics include the origins and techniques involving drawing, tone, color, composition and artistic process as well as a simple overview of art history.

ART 110 **Fundamentals of Visual Communication and Design Process** (3 cr.)
Prerequisite(s): None

Beginning with the physiology of perception, this course explores the simple building blocks of visual communications and how the viewer understands and responds to shapes, symbols and images. The foundational skills of design process and problem solving methodologies are explored to develop the student's visual problem solving skills.

ART 115 **Art and Technology** (3 cr.)
Prerequisite(s): None

This course provides an overview of art history from Paleolithic times through the modern day. The course examines classical art materials and methods and traces the technological advances of society and art. It considers the interplay between art and technology and how they have historically impacted society.

ART 120 **Language of Drawing II** (3 cr.)
Prerequisite(s): ART 101

This course introduces construction drawing as a method to create the sensation of depth and volume in art. Particular attention is paid to planar- and value-based strategies to add a convincing sense of legitimacy and consistency in 2D art and animation.

ART 125 **Tone, Color and Composition I** (3 cr.)
Prerequisite(s): None
Credit maybe received for either ART 125 or ART 126, not both.

This course introduces various methods for activating the picture plane, manipulating the viewer's visual experience, and visually communicating complex ideas and moods. These methods are reinforced through the study and application of light, darkness, value, color-harmony systems, and compositional strategies.

ART 126 **Principles of Composition and Design** (3 cr.)
Prerequisite(s): ART 101 or ART 102
Credit may be received for ART 125 or ART 126, but not for both.

This course continues to build on students' abilities to draw by exploring techniques for producing finished drawing, quick explanatory sketches, and rapid visualizations. Methods for use of tone and color to convey mood and atmosphere are covered. Basic graphic design and typography are taught with particular emphasis on interface design. Classical forms of compositional organization, such as symmetry, asymmetry, golden mean and figure ground relationships are also explored.

ART 130 **Tone, Color, and Composition II** (3 cr.)
Prerequisite(s): ART 125

This course builds upon the theories, techniques, and practices introduced in ART 125 while introducing the concepts of analysis and extrapolation in the creation of a visual reference library for implementation in subsequent coursework.

ART 150 **Human Anatomy** (3 cr.)
Prerequisite(s): ART 101
Concurrent Course(s): ART 151

This course explores the skeletal and muscular structures of the human body. Skeletal and muscular forms are identified from both live models and anatomical references. Topics include terminology, structural arrangement, and kinetic function. The course gives special emphasis to adapting this knowledge to the needs of artists and animators.

ART 151 **Life Drawing I** (3 cr.)
Prerequisite(s): ART 101

This course introduces the challenges of drawing the human form and applying lessons in anatomy to the figure. Life drawing for animation is examined in this course by studying the skeletal structure, muscle form, gesture, and emotion when drawing a live model.

ART 200 **Animal Anatomy** (3 cr.)
Prerequisite(s): ART 150

This course introduces the major skeletal and muscular structures of animals. Topics include terminology, structural arrangement, and kinetic function. The course also considers standard locomotion cycles and the relationship between humans and various animals. This course gives special emphasis to adapting this knowledge to the needs of artists and animators.

ART 201 **Life Drawing II** (3 cr.)
Prerequisite(s): ART 125, ART 151

This course emphasizes drawing the human form from a structural perspective. Strategies for visualizing anatomy are explored. These include identifying bony landmarks and constructing the form through primitives and value. Additional topics include drawing the clothed figure and foreshortening.

ART 210 **Art Appreciation** (2 cr.)
Prerequisite(s): None

This introduction to art provides students with a better understanding of the artistic influences upon our modern culture. Along with the history of art, students study the meanings, purposes, styles, elements, and principles of art and the various media used to create works of art. In helping students gain basic awareness, knowledge, and enjoyment of the visual arts, the course provides the groundwork for further personal study in the arts. In turn, this influences the development of their creativity.

ART 225 **3D Design and Sculpture** (3 cr.)
Prerequisite(s): ART 201

This course introduces students to the principles of 3D design using both traditional and digital tools. Students become acquainted with additive, subtractive, and cast sculpture. They consider the basic concepts of architectural space, interior design, landscape design, surface interplay with light, lofted forms, and skinning systems. Students use modern polymer clays and build an animation maquette.

ART 226 **Gesture Drawing for Animation** (3 cr.)
Prerequisite(s): ART 110 or ART 150, ART 101, ART 151

In this class, the student is provided with significant time in front of live moving models. The main purpose of drawing moving models is to describe what the model is doing as opposed to what the form of the model is. All aspects of the drawing, including form, line, silhouette, details and most importantly, line of action, concentration on communicating visually what the model is doing and/or thinking. The course focuses on weight, depth, balance, tension, rhythm and flow.

ART 230 **Painting** (3 cr.)
Prerequisite(s): ART 125

This course explores ideas and various techniques related to painting. The use of color and the representation of space is emphasized. Students explore masterworks, studio painting, and painting en plein aire. Technical and social problems related to painting are explored using portraiture, still life, and environment/landscape. A portable field easel and appropriate painting supplies will be required. The course will culminate in a group show of student projects.

ART 234 **Survey of Sequential Art** (3 cr.)
Prerequisite(s): ART 125, ART 151

In this course, students will learn to explore and to exploit the power of sequential images as a medium to craft stories beyond storyboarding, photography, and film. Through the formats of the graphic novel and related forms, students will tackle problems of character and events; their solutions will be limited only by their imaginations. The course will begin with a historical overview of sequential art and will then examine storytelling through pictures, focusing on clarity and emotional impact. Students will examine contemporary styles and conventions and will be required to draw from previous art experiences, while honing their skills in drawing, perspective, design, color, typography, writing, editing, and acting. Demonstrations of multimedia techniques and computer technology relative to this field will also be introduced.

ART 251 **Character Design** (3 cr.)
Prerequisite(s): ART 201, CG 201

This course introduces the traditions of character design and the basic structural strategies for creating animated characters. The course explores simplification gradients relative to human, animal, and inanimate object-based characters. It also considers issues of costume, personality, and story interaction. The course emphasizes professional applications, techniques, and standards of quality. The work completed in this course may serve as pre-production design for PRJ 300, PRJ 350, or ANI 300.

ART 260 **Graphic Design, User Experience and Input** (3 cr.)
Prerequisite(s): None

Students explore elements of visual design and apply them to computer user interfaces. They analyze various types of sensory interfaces and improve their skills in creating representations of information valuable to a system user. Additionally, emphasis is be placed on the overall enjoyment of the user experience, plus consideration towards relating the user experience to the theme of the game or system.

Students learn how to use various industry-standard languages related to prototype interfaces.

ART 300 **Perspective, Backgrounds and Layouts** (3 cr.)
Prerequisite(s): ART 201, CG 201

This course explores the animation pre-production skills of background and layout art. It emphasizes professional applications, techniques, and standards of quality. Students are guided through classical depth cue and perspective systems as they apply this knowledge to the creation of animation backgrounds and layouts. Additionally, students explore means of using drawing to create elements such as camera lens illusions, architectural space, theatrical sets, game visual design, matte painting, and surface texture.

ART 301 **Concept Art Resources** (3 cr.)
Prerequisite(s): ART 251, CG 201, CG 275

This course builds upon all art disciplines, primarily 2D related skills, to prepare students for positions requiring the creation of concept art. Emphasis is placed on the importance of balancing speed of content generation with quality, as this is one of the most pressing and relevant challenges in this field. With this mindset, students are challenged to evaluate and understand new forms of character and environment generation. Both theory and technique are heavily stressed during this course, with the final tangible outcome being multiple portfolio pieces that demonstrate the individual's abilities and unique style/interests.

ART 310 **Architectural Spaces, Design, and Lighting I** (3 cr.)
Prerequisite(s): None

This course introduces students to the aesthetics and principles of 2D (floor plans and elevations) and 3D environment design. A survey of architectural styles from throughout the world is blended with concepts, such as emotion, mood, lighting, shadows, aesthetics, and more. The course emphasizes learning the architectural vocabulary as well as the aesthetics of environmental and game-level design. Texturing, spatial design, negative space, dramatic lighting, and other concepts that affect not only the psychology of level design but also gameplay principles are covered. Students participate in numerous field trips to local examples of architecture in order to gain an understanding of architectural spaces and the field's vocabulary.

ART 350 **Storyboards** (3 cr.)
Prerequisite(s): ENG 116, ART 201, FLM 115

This course explores the animation pre-production skills of storyboard art. Emphasis is placed on storytelling and cinematography to create both production and presentation storyboards. Drawing is applied as a means to create story-flow, character development, mood, time, and place.

ART 360 **Architectural Spaces, Design, and Lighting II: Period Styles** (3 cr.)
Prerequisite(s): ART 310, CG 301

This class builds on the foundational skills and knowledge from Architectural Spaces, Design, and Lighting I (ART 310), covering more period styles. Additionally, students have opportunities to do more hands-on creation of art, models, and textures relative to various periods. Students participate in a variety of field trips in order to research and analyze architectural styles and then to build them in the computer lab.

ART 399 **Special Topics in Art** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty or students that is not covered by the courses in the current catalog.

ART 400 **Drawing Fundamentals** (2 cr.)
Prerequisite(s): None

The development of strong drawing skills is of extreme importance since they are essential tools for expressing ideas, particularly during the pre-production stages of an animation project. Therefore, this course presents the basic elements of drawing and graphic design in order to improve the student's practical ability to draw with skill and imagination. It covers methods of observing, describing, and organizing forms using various mediums, such as pencil, charcoal, and color pencils.

ART 401 **Conceptual Illustration and Visual Development** (3 cr.)
Prerequisite(s): ART 300

This course explores the animation pre-production skills of conceptual illustration and visual development. Students apply their knowledge of drawing, storytelling, and composition to create speculative drawings for animation. They review compositional systems, design process, and illustration techniques. Additionally, students explore means of using drawing to visually explore story and character ideas from both existing and original story materials. They also consider adaptation, stylization, and visual variety. The course emphasizes professional applications, techniques, and standards of quality. The work completed in this course serves as pre-production design for PRJ 300, PRJ 350, or ANI 300.

ART 405 **Matte Painting** (3 cr.)
Prerequisite(s): ART 401

This course takes the student through the process of designing and painting (traditionally, digitally or both) backgrounds that can be seamlessly integrated with live action footage, animation, and games.

ART 410 **Mechanical Drawing** (3 cr.)
Prerequisite(s): None

Traditional and digital skills in drafting are key components of an engineering career. This course introduces students to the basic skills of mechanical drafting including layout and formatting conventions, typographic traditions, and classical drafting tool usage. Students apply these skills to actual problems in traditional mechanical drafting. They are then exposed to modern digital tools in mechanical drafting. The course explores subjects, such as interface conventions, usage strategies and output options. Students work with a CAD program and complete a variety of exercises designed to establish foundational skills. The course pays special attention to addressing how professionals use these skills in production and prototyping.

ART 450 **Portfolio** (3 cr.)
Prerequisite(s): PRJ 350 or PRJ 352

This course explores elements of personal branding and professional portfolio development. Emphasis is placed on visual continuity in the creation of traditional and digital art portfolios, web sites, demo reels, and promotional items. The course also covers strategies for job interviews, contract negotiations, understanding business documents, and exhibiting at trade shows.

Department of Game Software Design and Production

Game Projects Courses

GAM 100 **Project Introduction** (3 cr.)
Prerequisite(s): None

This class presents an overview of the way the game development industry works and a history of game development. It exposes students to the positions and job responsibilities that each member of a game development team has, along with the industry requirements for concept pitches, design documents and schedules. It also introduces sprite animation, object motion, and input processing, which students use in the creation of a game of their own design.

GAM 150 **Project I** (3 cr.)
Prerequisite(s): GAM 100, CS 120
Credit may be received for either GAM 150 or GAM 152, not both.

This project focuses on the creation of a simple game or simulation. Students work together on teams of three or four members. All projects must be written entirely in C (C++ is not allowed) and cannot use external libraries or middleware of any kind (except those provided by the instructor). Topics include effective team communication, planning,

documentation, debugging, source control, testing, and iterative software development techniques.

GAM 152 **Project I for Designers** (3 cr.)
Prerequisite(s): CS 116 or CS 120, GAM 100
Credit may be received for either GAM 150 or GAM 152, not both.

This project focuses on the creation of a simple game or simulation. Students work together on teams of three or four members. All projects are created using a scripting language in a rapid development environment. Topics include effective team communication, planning, documentation, debugging, source control, testing, and iterative software development techniques.

GAM 200 **Project II** (4 cr.)
Prerequisite(s): CS 170, GAM 150, MAT 140, CS 230
Credit may be received for either GAM 200 or GAM 205, not both.

This project is divided into two semesters and focuses on the creation of a simple real-time game or simulation with 2D graphics (3D games are not allowed). Students work together on teams of three or four members to implement technical features, such as audio effects, music playback, pattern movement, simple artificial intelligence, same-machine multiplayer (networking is not allowed), particle systems, scrolling, and simple physics. All projects must be written with a core of C++ code and cannot use middleware such as preexisting physics engines, networking engines, etc. Additional topics may include basic software architecture, essential development practices, fundamentals of team dynamics, and task prioritization methods.

GAM 205 **Project II for Designers** (4 cr.)
Prerequisite(s): GAM 152, CS 175, MAT 100
Credit may be received for either GAM 200 or GAM 205, not both.

This project is divided into two semesters and focuses on the creation of a simple real-time game or simulation with 2D graphics (3D games are not allowed). Students will either work in teams made up only of BAGD students or with students from GAM 200. BAGD-only teams can use commercial game engines, middleware, or other libraries that teams with GAM 200 students cannot. Additional topics may include basic software architecture, essential development practices, fundamentals of team dynamics, and task prioritization methods.

GAM 250 **Project II** (4 cr.)
Prerequisite(s): CS 225, GAM 200
Credit may be received for either GAM 250 or for GAM 255, but not for both.

In this class, students work to complete and polish the projects they began in GAM 200. Additional topics may include intermediate software architecture, advanced

debugging techniques, bug tracking, formal playtesting, game pacing, and game balance.

GAM 255 **Project II for Designers** (4 cr.)
Prerequisite(s): GAM 205, CS 176
Credit may be received for either GAM 250 or GAM 255, not both.

In this class, students work to complete and polish the projects they began in GAM 205. Additional topics may include intermediate software architecture, advanced debugging techniques, bug tracking, formal playtesting, game pacing, and game balance.

GAM 300 **Project III** (5 cr.)
Prerequisite(s): CS 200 or CS 251, CS 260 or CS 245 or CS 365, CS 280, GAM 250, PHY 200
Credit may be received for either GAM 300 or GAM 302, not both.

This project is divided into two semesters and focuses on the creation of an advanced real-time game or simulation with hardware-accelerated graphics. BSCS in 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.

GAM 302 **Project III for Designers** (5 cr.)
Prerequisite(s): GAM 250 or GAM 255, CS 176 or CS 280, PHY 115 or PHY 200, GAT 250
Credit may be received for either GAM 300 or GAM 302, not both.

This project is divided into two semesters and focuses on the design of an advanced real-time game or simulation. Students work in teams either made up only of designers or with students from GAM 300. Designer-only teams can use commercial game engines, middleware, or other libraries that teams with GAM 300 students cannot. Additional topics may include online portfolios, effective presentations, managing scope, and advanced team dynamics.

GAM 350 **Project III** (5 cr.)
Prerequisite(s): GAM 300
Credit may be received for either GAM 350 or GAM 352, not both.

In this class, students work to complete the projects they began in GAM 300. Additional topics may include large project software architecture, advanced testing techniques, internships, and an introduction to resumes and interviews.

GAM 352 **Project III for Designers** (5 cr.)
Prerequisite(s): GAM 302
Credit may be received for either GAM 350 or GAM 352, not both.

In this class, students work to complete the projects they began in GAM 302. Additional topics may include large project design, advanced testing techniques, internships, and an introduction to resumes and interviews.

GAM 375 **Advanced Project** (5 cr.)
Prerequisite(s): GAM 350, GAM 352

In this course, individual students work to create a highly polished advanced technology demonstration or design project. With instructor approval, students could instead polish an exceptional project from a previous class to a higher standard. Topics may include advanced user interfaces and controls, advanced special effects, advanced behaviors, and creating effective demonstrations.

GAM 390 **Internship I** (5 cr.)
Prerequisite(s): GAM 250 or GAT 251

An internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what she or he is learning throughout the experience. It is usually a professional activity under general supervision of an experienced professional and in a job situation, which places a high degree of responsibility on the student. Internships are structured along the Internship Guidelines available in the Administration Office.

GAM 400 **Project IV** (5 cr.)
Prerequisite(s): CS 250 or GAT 251, GAM 350 or GAM 352, GAM 390 or GAM 490

This project is divided into two semesters and focuses on the creation of an innovative game, simulation, or demo. Students may use current software and hardware technologies with instructor approval, such as web technologies, gaming consoles, mobile devices, commercial physics engines, commercial game engines, hands-free input devices, etc. These technologies can be used to implement technical features, such as 3D animation, advanced lighting and rendering, advanced 3D physics, high-performance networking, and advanced AI algorithms. Innovation can also come from the design, visuals, and/or audio components of the project. Students work independently or in teams, as appropriate to the scope of their project. Additional topics may include advanced interviewing techniques and writing effective resumes.

GAM 450 **Project IV** (5 cr.)
Prerequisite(s): GAM 400 or GAM 390 or GAM 490

In this class, students work to complete the projects they began in GAM 400. Additional topics may include working in the industry, personal networking, and career strategies.

GAM 490 **Internship II** (5 cr.)
Prerequisite(s): GAM 250 or GAT 251

An internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what she or he is learning throughout the experience. It is usually a professional activity under general supervision of an experienced professional and in a job situation, which places a high degree of responsibility on the student. Internships are structured along the Internship Guidelines available in the Administration Office.

Game Design and Development Courses

GAT 110 **Game History** (3 cr.)
Prerequisite(s): None

This course covers the history of games from the very first games of ancient civilizations, to traditional tabletop games, to classic video games from the 20th century. Topics may include how the core mechanics of even the oldest games are still present in video games today, how games can be categorized by their core mechanics, and how social forces and technology drive changes in the games we play. Students are required to play, analyze, and modify a wide variety of games as the primary coursework of this class.

GAT 120 **Game Analysis** (2 cr.)
Prerequisite(s): None

This course focuses on learning the fundamental design principles of digital games through repeated examination of existing games. Students will be taught how to analyze and reverse-engineer the designs of major works in gaming history, then will analyze a variety of games themselves. Topics may include game mechanics, actions, controls, rewards, punishment, intensity curves, teaching the player, visual aesthetics, and aural aesthetics.

GAT 210 **Game Mechanics I** (3 cr.)
Prerequisite(s): GAT 110, GAT 120

In this course, students start building a foundational knowledge of game mechanics by creating, analyzing, and testing non-digital dice, card, and board games of their own design. Topics may include randomness, game state, hidden information, position, designing to a specification, writing rules, and playtesting.

GAT 211 **Game Mechanics II** (3 cr.)
Prerequisite(s): GAT 210

This course focuses on how to create the maps, characters, and combat systems needed for combat-oriented games. Students work to create a large variety of maps, create new character types for existing games, convert specific video games into tabletop games, and build a tabletop combat-oriented game of their own design. Topics may include map

types and layouts, movement, visibility, force composition, character statistics and roles, melee combat, ranged combat, damage, armor and health.

GAT 212 **Advanced Game Mechanics** (3 cr.)
Prerequisite(s): GAT 211

This course focuses on the design of non-digital role-playing games and a variety of non-digital simulation games. Students work to create an original small role-playing game, a simulation game of their choice, and an additional non-digital game of any kind. Topics may include skill systems, character advancement, equipment variety, realistic combat, strategic simulations, supply systems, economic simulations, vehicle simulations, and sport simulations.

GAT 240 **Technology for Designers** (3 cr.)
Prerequisite(s): CS 170 or CS 175, MAT 100 or MAT 140

This course is a survey of the technologies commonly used in game development. Topics may include spreadsheets, file formats, lighting, shaders, art pipelines, networking, databases, physics engines, audio engines, and artificial intelligence. These topics are covered only at a basic level— enough to be able to use them as a designer, but not enough to be able to implement them.

GAT 250 **2D Game Design I** (3 cr.)
Prerequisite(s): CS 170 or CS 175, GAT 210

This course focuses on designing and implementing games using a 2D engine. Students work to create several original games in common genres, such as platformers, shooters, brawlers, or puzzle games. Topics may include aesthetics, level construction, enemy placement, resource placement, player guidance, player controls, scripting, and game mechanics in 2D.

GAT 251 **2D Game Design II** (3 cr.)
Prerequisite(s): GAT 250, GAT 211

This course focuses on designing and implementing some of the more complicated types of 2D games, such as role-playing games, strategy games, or economic games. Students work to create several original games in these genres, including one in the genre of their choice. Topics may include character advancement, inventory, strategic balance, diplomacy, trading, and real-time economic systems.

GAT 260 **User Experience Design I** (3 cr.)
Prerequisite(s): None
Credit may be received for GAT 260 or ART 260, but not both.

This course explores fundamental principles of interactive design and psychological principles related to design. Emphasis is placed on information architecture, graphic design concepts, user interface documentation, and interface prototyping techniques.

GAT 261 User Experience Design II (3 cr.)
Prerequisite(s): GAT 250, GAT 260

This course explores elevating the user experience of interactive software through the intersection of visuals, audio, programming, and design. Emphasis is placed on the implementation of effective user input methods and the presentation of intuitive and engaging real-time feedback.

GAT 315 3D Game Design I (3 cr.)
Prerequisite(s): GAT 251

This course focuses on designing and implementing games using a 3D engine. Students will work to create one or more levels from start to finish, including any needed modifications to game mechanics, controls, and cameras. Topics may include aesthetics, environment building, lighting, texturing, resource placement, player guidance, player controls, camera controls, scripting, and game mechanics in 3D.

GAT 316 3D Game Design II (3 cr.)
Prerequisite(s): GAT 315, ART 310

This course focuses on designing and implementing 3D games in specific genres, such as first-person shooters, adventure games, role-playing games, platformers, or real-time strategy games. Students work to create an original prototype for each genre covered using a 3D engine of the appropriate type. Topics may include puzzle design, platforming design, boss fight design, cover mechanics, and terrain modification for a 3D game.

GAT 330 Interactive Narrative and Character Creation for Games (3 cr.)
Prerequisite(s): GAT 251, ENG 110

This course focuses on how to write stories that integrate with gameplay and mechanics. From creating characters to writing branching and interactive dialogue, students work on storytelling in various genres by incorporating their stories and characters into an existing game engine. Topics may include the design and structure of dialogue trees, creating mood parameters for dialogue choices, interactive narrative, autonomous behaviors, emergent gameplay, adding emotional depth through the use of character archetypes, and weaving theme and story into the game in a way that resonates with the player.

GAT 360 User Research and Testing (3 cr.)
Prerequisite(s): GAT 250, GAT 260

This course covers a variety of user research and testing methodologies, with a strong emphasis on usability testing with a scientific approach. Additional topics include selecting research methods, selecting test candidates, focus group testing, end-user data collection, and end-user research.

GAT 370 Information Visualization and Data Analysis (3 cr.)
Prerequisite(s): GAT 360

This course covers key techniques of information visualization, the primary tool for both analyzing and presenting data. This course will cover methods for collecting and building data sets, assessing the quality of those data sets, and selecting the optimal method of visualizing the data.

GAT 399 Special Topics in Game Development (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

GAT 401 Rapid Prototyping (3 cr.)
Prerequisite(s): CS 225 or CS 176

This course introduces students to high-level tools for rapid prototyping of creative, interactive, multimedia experiences, using current technologies for making small, portable games. The design, development, and iterative processes commonly used for developing web-based game applications and other multimedia presentations are also covered.

GAT 405 Advanced Game Design (3 cr.)
Prerequisite(s): GAT 251

This course focuses on one or more advanced game design topics based on the expertise of the instructor. Topics may include art games, music games, social games, educational games, serious games, handheld games, alternative input games, radically innovative games, and more. Students work to create one or more prototypes of a game in the areas being covered, either individually or in teams, as appropriate. Emphasis is heavily placed on innovation and students are encouraged to challenge their assumptions about what games are and what games can be.

GAT 480 Senior Portfolio (1 cr.)
Prerequisite(s): GAM 350 or GAM 352

This one-credit course covers advanced portfolio development. Students work to organize and present their work in online, paper, and electronic media in a professional form. Topics may include targeted resumes, non-standard cover letters, advanced interviewing techniques, interactive portfolios, and voice-over videos.

Management Courses

MGT 451 **Project Management** (3 cr.)
Prerequisite(s): None

This course provides in-depth examination of theories, techniques, and issues in project management. It covers various aspects of project management including team leadership, marketing, budgeting, long-range project planning, contract negotiations, and intellectual property considerations. The course includes exercises that give students insight into dealing with product conceptualization, team effectiveness and performance issues.

Department of Humanities and Social Sciences

College Life Courses

COL 230 **College Success for Artists** (1 cr.)
Prerequisite(s): PRJ 201 or PRJ 202

This course introduces industry research, professional expectations, and requisite levels of proficiency. The course helps identify strengths, skills, interests, and areas for growth and requires the creation of an academic plan.

COL 499 **Career Search Preparation: Materials, Logistics and Communication** (1 cr.)
Prerequisite(s): None

This is a capstone course for students to prepare their application materials and learn how to effectively search for an entry-level job in their field. The goal of the course is for each student to have a polished resume, cover letter, business card, and online/web presence by the end of the semester, as well as a search strategy for seeking employment.

Communications Courses

COM 150 **Interpersonal and Work Communication** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course provides an introduction to interpersonal and professional communication. Particular attention is paid to verbal and nonverbal communication skills, small-group communication, and conflict resolution.

COM 250 **Professional Communication** (3 cr.)
Prerequisite(s): None

This course prepares students for the communication challenges that await them in the professional world. Topics

covered may include professional networking strategies, career search materials, self-presentation and interview skills, and effective communication across all levels and functions of the workplace.

COM 351 **Gender and Communication** (3 cr.)
Prerequisite(s): COM 150

This course introduces the theory and vocabulary of gender studies and relevant socio-political movements such as the women's movement. It investigates how ideas about sex and gender and identities as men, women, and sexual beings are influenced by and manifested in communication behaviors and in the communication channels and messages that permeate society. Key themes include: the fluidity of gender, the gendered body, gender in verbal and non-verbal communication in professional and non-professional settings, and gender-based power and authority.

COM 399 **Special Topics in Communication** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty or students that is not covered by the courses in the current catalog.

Economics Courses

ECN 100 **Introduction to Economics** (3 cr.)
Prerequisite(s): None

This course introduces the fundamentals of micro- and macroeconomics. Topics may include supply and demand, competition, market efficiency, auctions, barter, monopolies, externalities, welfare, unemployment, growth, inflation, interest rates, exchange rates, and budget deficits.

ECN 350 **Engineering Economics** (3 cr.)
Prerequisite(s): None

This course gives students a sound basis for making economic decisions in business and industry environments. Students learn how to decide which projects are worthwhile, determine priorities, and select components. Topics in this course include present worth, future amounts, cash flows, salvage value, depreciation, rates of return, income tax, basic cost accounting, and funding sources, including venture capital and SBIR. The course also covers the basics of intellectual property, patents, and copyright.

English Courses

ENG 110 **Composition** (3 cr.)
Prerequisite(s): None

This course focuses on generating and discussing ideas for composition and engages in all stages of the writing process, with emphasis on the development and application of critical thinking skills. The primary focus of the course is developing the ability to construct, write, and revise argumentative/persuasive essays. Assignments may also include other types of writing, such as narrative, descriptive, and comparative essays.

ENG 116 **Storytelling** (3 cr.)
Prerequisite(s): None

This course covers the principal elements of storytelling including theme, character, perspective, setting, plot, and dialogue. It emphasizes non-visual media such as short stories, novels, and plays, though visual media including film and video games may be discussed as well.

ENG 120 **Research, Reasoning, and Writing** (3 cr.)
Prerequisite(s): ENG 110

In this composition course, students practice advanced argumentative essay writing with a focus on research, critical analysis of the research, thesis presentation, and defense. During the semester, students write several research essays on various topics using both traditional and new information techniques.

ENG 150 **Mythology** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course studies myths from different world cultures. It provides an in-depth discussion of the Hero's Journey (a basic pattern that appears in many narratives) and its principal archetypes. It also studies mythology across the arts and examines how essential it is to the study of literature, drama, film and video games.

ENG 230 **Speculative Fiction** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course is a survey of speculative fiction (in literature, television, film, and graphic novels) that moves beyond pure realism to include fantastic or imaginative elements and to present worlds that differ significantly from our own. Each semester, the course will focus on one or more sub-genres which may include science fiction, fantasy, horror, magic realism, alternate history, steampunk, or cyberpunk.

ENG 242 **Multicultural Literature** (3 cr.)
Prerequisite(s): ENG 110, ENG 150

This course explores what modernity and post-modernity have or have not meant to American writers whose histories and cultures are not European in origin but whose writings are steeped in European-American literary traditions. The course explores the cultural hybridism of this literature as well the unique visions of the world they have created. These funny, humorous, bitterly satirical, and downright serious (post)-modern fantasies are quintessentially American, yet also unique and peculiar to these authors' ethnic experiences. The selected works also offer an opportunity to read or re-read well established and newer American works of literature.

ENG 243 **Epic Literature** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116, ENG 150

This course provides an introduction to the epic as a genre, including poetry, drama, and novels. Particular attention is paid to the theme of heroism and its many cultural manifestations.

ENG 245 **Introduction to Fiction Writing** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course provides an introduction to the study and practice of fiction writing including characterization, plot, setting, and point of view. It presents selected works of short and long fiction. The course is an opportunity for students to practice their own creative writing skills. They are required to write at least two short stories.

ENG 246 **American Ethnic Literatures** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course covers prominent themes and techniques in American ethic literatures such as Native, African, Asian, and Hispanic American Literatures. Modern Texts are emphasized but pre- or early 20th century classics may also be included.

ENG 250 **The Graphic Novel** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course provides an introduction to the study of graphic novels, a unique field of inquiry encompassing many world cultures and drawing on many disciplines. Students will read, discuss, and analyze many different types of novels, such as stand-alone, serial, and adaptive books.

ENG 315 **Scriptwriting** (4 cr.)
Prerequisite(s): ENG 116 or ENG 245

This course covers the fundamentals of concept development, dramatic structure, and writing for a visual medium. It leads to the completion of at least one original preproduction script in screenplay format.

ENG 340 **Creative Writing Across the Arts** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course focuses on the generation of creative writing in multiple genres and media, including poetry, fiction, creative non-fiction, and graphic novels. Students study and practice writing in a workshop atmosphere and engage in intensive reading of excellent writings, most of which employ interdisciplinary, cross-genre approaches that encompass painting, photography, and other visual art. Discussions of readings are followed by writing experiments designed to spark original thinking, to develop facility with writing, and to enhance understanding of the creative process. Students gain in-depth knowledge of the possibilities of creative writing and apply this experience by writing both short creative pieces and longer works.

ENG 360 **Gender Identity in Literature** (3 cr.)
Prerequisite(s): ENG 116 or ENG 150 or ENG 230 or ENG 242 or ENG 243 or ENG 245 or ENG 246 or ENG 250

This course introduces students to expressions and representations of gender/sexual identity in literary works, including poetry, fiction, creative non-fiction, drama, and film. The course takes a historical and multicultural approach to the topic, covering key texts from the past and the present by authors from different cultures and backgrounds.

ENG 399 **Special Topics in English** (3 cr.)
Prerequisite(s): None
Permission of instructor required.

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

ENG 400 **Creative Writing for Game Design** (3 cr.)
Prerequisite(s): ENG 150 or ENG 110

This course focuses on the narrative elements of creative writing. Exercises generate thinking and hone students' basic storytelling talents, including characterization, exposition, plot, conflict, back-story, dialogue, and appropriate use of language. Students learn how to use symbols to design a story and how to manipulate the symbols to create character, plot, message, and interactivity. Students are encouraged to access their own genius, culture, and life experience in the development of their stories.

ENG 410 **Interactive Storytelling** (3 cr.)
Prerequisite(s): ENG 110

In this class, students learn to design stories with symbolic language. Exercises help students apply and understand character design and development, archetypes, conflict, plot patterns, back-story, dialogue, exposition, premise, and the psychological dynamics of human choice. Students also learn how to manipulate symbols in images by drawing from a variety of theoretical models, such as Carl Jung's dream analysis, personality profiling per Myers-Briggs, Gestalt psychology, and narrative architecture.

ENG 420 **Cybertexts: Interactive Media and the Future of Narrative** (3 cr.)
Prerequisite(s): ENG 110 or ENG 150

Video games and other forms of interactive media are widely touted as the future of both popular entertainment and narrative storytelling. If video games and other interactive media are developing into art forms, then we can expect that these emerging narrative forms will be able to accommodate genres of storytelling that have existed since time immemorial, including romance, comedy, tragedy and epic. Yet the dynamics of nonlinear storytelling, the limits of current video game technology, and the constraints of the marketplace do not seem conducive to expanding the narrative elements of interactive media. This course traces the boundaries between narratives and games, and aims to identify areas of overlap that can lead to the development of new expressions of narrativity in interactive media. One central goal of the course is to grapple with the problem(s) posed by interactive narrative. Assigned readings examine the difference between traditional narrative texts and texts that require a higher degree of interactivity, collectively called cybertexts. The goal of the course is to identify what differences may exist, and to analyze the possibilities for adapting traditional narrative into interactive media. This class's central innovation requires students to actively adapt an element of traditional narrative into a cybertext. By the end of the class, students reach a conclusion, based on their reading and course work, as to whether cybertexts can effectively encompass traditional narrative genres, and if not, whether this is due to limitations of the form, or the limitations of technology.

ENG 440 **Advanced Fiction Writing** (3 cr.)
Prerequisite(s): ENG 245 or ENG 315 or ENG 340

This course builds upon the concepts and skills taught in previous writing courses. This course offers students the opportunity to further develop their fiction-writing skills by engaging in intensive writing and regular critique of their peers' creative work. The emphasis is on refining narrative writing skills and developing individual style and voice. Students write three full-length short stories and read contemporary fiction by established authors not discussed in previous courses.

ENG 450 **Elements of Media and Game Development** (2 cr.)
Prerequisite(s): None

Relative to modern technological media, the most important issue to consider is the nature of the interactive loop of influence between media and culture. Interactivity is one of the most powerful and important potentials of the game medium, but the term is often used with superficial understanding of its implications. This course emphasizes the nature of interactivity primarily from psychological and sociological perspectives. Students review and define interactive media using examples drawn from academic

research, film, television, and games. Students have ample opportunity to contemplate and discuss how they can apply a more comprehensive understanding of interactivity in order to surpass the current limits of interactive media products.

History Courses

HIS 100 **Introduction to World History I** (3 cr.)
Prerequisite(s): None

Covering a wide range of world history (Prehistoric to Middle Ages, Western and Asian Civilizations), this course provides an overview of events, civilizations, and cultures throughout time that form major historical shifts. Students analyze a series of case studies with particular focus on governments, technology, religion, and culture, and how clashes between these (and other) themes created changes in culture, power, and civilizations. Three major themes connect several topics discussed in this course with those explored in HIS 150: issues of authority and inequality within civilizations; encounters and conflicts between civilizations; and cultural and technological exchanges within and between civilizations.

HIS 150 **Introduction to World History II** (3 cr.)
Prerequisite(s): HIS 100

This course continues the topics covered in HIS 100, covering from approximately 1650 A.D. until present day (Renaissance to present day, Western and Asian Civilizations). Students analyze a series of case studies with particular focus on governments, technology, religion, and culture, and how clashes between these (and other) themes created changes in culture, power, and civilizations. Three major themes connect several topics discussed in this course with those explored in HIS 100: issues of authority and inequality within civilizations; encounters and conflicts between civilizations; and cultural and technological exchanges within and between civilizations.

Japanese Courses

JPN 101 **Introduction to Japanese I** (3 cr.)
Prerequisite(s): None

This course is designed for students with little or no background in Japanese. The course presents the basics of pronunciation, orthography, speaking, listening comprehension, reading, writing, and the sociolinguistics of modern Japanese. This course emphasizes acquiring the ability to communicate and function accurately and appropriately in both speaking and writing Japanese.

JPN 102 **Japanese II** (3 cr.)
Prerequisite(s): JPN 101

This course is designed for students who have taken JPN 101. The pace of JPN 102 is slightly faster than JPN 101. JPN 102 emphasizes acquiring the ability to communicate and function in Japanese accurately and appropriately, both in speech

and in writing. By the end of the course, students are able to speak, understand, read, and write Japanese on a limited variety of topics.

Law Courses

LAW 115 **Introduction to Intellectual Property and Contracts** (3 cr.)
Prerequisite(s): None

The animation and computer software industries are founded upon the principle of intellectual property. This course introduces students to the social concepts and traditions that led to the idea of intellectual property. It surveys the various international legal systems governing intellectual property, giving special consideration to Title 17 and the local statutes that govern copyrights, trademarks, and patents in the United States. Students learn fundamental issues surrounding this field, such as fair use, international relations, and economics. The course also introduces students to a basic overview of contracts, including structure, traditions, and vocabulary.

Media Courses

MED 210 **Race and Ethnicity in Media** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course explores the origins and evolution of racial and ethnic images in media. It pays special attention to the process of creating new images in both traditional visual media such as film and television and newer interactive media.

Philosophy Courses

PHL 150 **Introduction to Philosophy** (3 cr.)
Prerequisite(s): ENG 110

This course introduces some of the basic philosophical issues and questions related to everyday life. Topics include human nature (self, mind, consciousness, and freedom), values (ethics, morality, and aesthetics), knowledge (reasoning, rationality, and truth), philosophy of science (universe and origins of life), philosophical positions (naturalism, idealism, realism, pragmatism, and existentialism), and philosophy of religion (god(s) and religion). Students apply these concepts to the philosophical issues related to games and video games, specifically definitional issues, philosophical themes in games, and art in games, among others.

PHL 399 **Special Topics in Philosophy** (3 cr.)
Prerequisite(s): None
Permission of instructor required

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

Psychology Courses

PSY 101 **Introduction to Psychology** (3 cr.)
Prerequisite(s): None

This course introduces major topics in psychology, specifically as they relate to cognition and learning. These topics include perception, cognition, personality and social psychology, and biological aspects of behavior. Students are also introduced to human information processing, memory, problem solving, attention, perception, and imagery. Other topics covered may include mental representation and transformation, language processing, and concept formation.

PSY 201 **Cognitive Psychology** (3 cr.)
Prerequisite(s): PSY 101

This course emphasizes emergent research and theory exploring the nature of human mental processes. Topics include neuroscience, attention, perception, memory, creativity, decision making, and information processing.

PSY 210 **Social Psychology** (3 cr.)
Prerequisite(s): PSY 101

This course will provide an overview of research and theory in social psychology by focusing on concepts including mental processing, attitude formation and change, conflict and aggression, persuasion, and socio-behavioral influences.

PSY 350 **Psychology of the Media** (3 cr.)
Prerequisite(s): PSY 201

The course explores the psychology of advertising from its emergence, its relationship to the psychology of propaganda, its influence on political thought during the latter half of the 20th century, and its influence on contextual value formations and cultural reality.

PSY 399 **Special Topics in Psychology** (3 cr.)
Prerequisite(s): None
Permission of instructor required

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

Social Sciences Courses

SOS 115 **Media and Ethics: A Social Science Perspective** (3 cr.)
Prerequisite(s): None

This course guides students in the ethical assessment of both the processes and outcomes of social decision-making. After an introduction to basic ethical theories, students acquire an understanding of the structure of social institutions and the process through which one makes social choices. Central to the analysis is a study of ethics as a criterion for assessment of social decision-making with emphasis on the study of particular issues of social choice. The course also provides a theoretical framework within which to spot and analyze ethical issues in the media.

SOS 150 **Society and Technology** (3 cr.)
Prerequisite(s): None

This course draws on techniques and perspectives from the social sciences, humanities, and cultural studies to explore technology and change in the modern era. In particular, students examine how technology influences and is influenced by values and cultures in America and abroad. The course helps students recognize the range of consequences that technology in general, and information and communication technology (ICT) in particular, have when shaped and used by individuals, organizations, and society. Through readings, discussion, lectures, and written assignments, students become acquainted with current controversies related to the socio-cultural dimensions of technology in the "digital era." While the course examines the impact of technologies—including video gaming and robotics—on the contemporary world, it also uses an historical approach to address some of the technological innovations that have most affected U.S. society in the past. The course considers how technologies are developed and sustained, and how they interact with and affect our urban culture. Specific themes likely to be addressed include technology's impact on the private and public spheres; the body and the self in cyberspace; and the criteria used to determine a technology's success, failure, and danger.

SOS 190 **Introduction to Popular Culture** (3 cr.)
Prerequisite(s): ENG 110 or ENG 116

This course surveys trends in popular culture and the debates about how those trends affect the larger culture in general. The course will focus on a variety of popular media, which can include: music, video games, movies, television, and social networking. Topics for discussion may cover: the process of invention in popular culture; the relationship between popular culture, intelligence and engagement; the nature of celebrity; the function of simulacra; changes in narrative structure; representation of race and gender, and more.

SOS 399 **Special Topics in Social Sciences** (3 cr.)
Prerequisite(s): None
Permission of instructor required.

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

Department of Life Sciences

Biology Courses

BIO 225 **Animal Motion: Sequential Limb Movement** (3 cr.)
Prerequisite(s): None

This course introduces the major locomotion cycles with the associated skeletal and muscular structures of animals in motion. Students compare the moving bipedal, human-like form to the structure and form of a variety of animal types. Special emphasis is placed on the impact of locomotion on form. Vocabulary, structural arrangement, and kinetic function are all considered. The course also considers standard locomotion cycles of humans and various animals. Special emphasis is given to adapting this knowledge to the needs of artists and animators.

BIO 399 **Special Topics in Biology** (3 cr.)
Prerequisite(s): None

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

Department of Mathematics

Mathematics Courses

MAT 100 **Precalculus with Linear Algebra and Geometry** (4 cr.)
Prerequisite(s): None

This course presents fundamentals of college algebra and trigonometry, with an introduction to concepts in 2D geometry and linear algebra. Topics include: polynomial, rational, trigonometric, exponential and logarithmic functions as well as their inverses; analytic trigonometry, trigonometric identities, the unit circle, and trigonometric functions of a real variable; introduction to linear systems, basics of linear transformations in 2D; vectors, parametric lines, dot product, and projections in 2D.

MAT 105 **Introductory Probability and Statistics** (3 cr.)
Prerequisite(s): None

This course presents fundamentals of probability and statistics without calculus. Topics include: data representation, population mean, variance, and standard deviation, finite probabilities, events, conditional and marginal probability, discrete random variables, binomial distribution, normal distribution, sampling distributions for mean and variance, estimation of means, confidence intervals, hypothesis testing, inference, and chi-square tests.

MAT 140 **Linear Algebra and Geometry** (4 cr.)
Prerequisite(s): None
Credit may be received for either MAT 100 or MAT 140, but not for both.

The two main themes throughout the course are vector geometry and linear transformations. Topics from vector geometry include vector arithmetic, dot product, cross product, and representations of lines and planes in three-space. Linear transformations covered include rotations, reflections, shears and projections. Students study the matrix representations of linear transformations along with their derivations. The curriculum also presents affine geometry and affine transformations along with connections to computer graphics. This course also includes a review of relevant algebra and trigonometry concepts.

MAT 150 **Calculus and Analytic Geometry I** (4 cr.)
Prerequisite(s): None
Credit may be received for MAT 150 or MAT 180, but not for both.

This course introduces the calculus of functions of a single real variable. The main topics include limits, differentiation, and integration. Limits include the graphical and intuitive computation of limits, algebraic properties of limits, and continuity of functions. Differentiation topics include techniques of differentiation, optimization, and applications to graphing. Integration includes Riemann sums, the definite integral, anti-derivatives, and the Fundamental Theorem of Calculus.

MAT 180 **Vector Calculus I** (4 cr.)
Prerequisite(s): MAT 140
Credit maybe received for either MAT 150 or MAT 180, but not for both.

This course extends the standard calculus of one-variable functions to multi-variable vector-valued functions. Vector calculus is used in many branches of physics, engineering, and science, with applications that include dynamics, fluid mechanics, electromagnetism, and the study of curves and surfaces. Topics covered include limits, continuity, and differentiability of functions of several variables, partial derivatives, extrema of multi-variable functions, vector fields, gradient, divergence, curl, Laplacian, and applications.

MAT 200 **Calculus and Analytic Geometry II** (4 cr.)
Prerequisite(s): MAT 150 or MAT 180
Credit may be received for MAT 200 or MAT 230, but not for both.

This course builds on the introduction to calculus in MAT150. Topics in integration include applications of the integral in physics and geometry and techniques of integration. The course also covers sequences and series of real numbers, power series and Taylor series, and calculus of transcendental functions. Further topics may include a basic introduction to concepts in multivariable and vector calculus.

MAT 220 Mathematics of Digital Sound Processing
(3 cr.)
Prerequisite(s): MAT 200 or MAT 230
Credit may be received for MAT 220 or MAT 320 but not for both.

This course explores further topics in the mathematical foundations of music and sound, with emphasis on digital signal processing. Topics include: Digital signals and sampling, spectral analysis and synthesis, discrete fourier transforms, FFT, convolution, filtering, wave equation, Bessel functions, sound synthesis and physical modeling.

MAT 225 Calculus and Analytic Geometry III (3 cr.)
Prerequisite(s): MAT 200 or MAT 230

This course extends the basic ideas of calculus to the context of functions of several variables and vector-valued functions. Topics include partial derivatives, tangent planes, and Lagrange multipliers. The study of curves in two- and three space focuses on curvature, torsion, and the TNB-frame. Topics in vector analysis include multiple integrals, vector fields, Green's Theorem, the Divergence Theorem and Stokes' Theorem. Additionally, the course may cover the basics of differential equations.

MAT 230 Vector Calculus II (4 cr.)
Prerequisite(s): MAT 180
Credit may be received for MAT 200 or MAT 230, but not for both.

This course is a continuation of MAT 180. Topics covered include differential operators on vector fields, multiple integrals, line integrals, general change of variable formulas, Jacobi matrix, surface integrals, and various applications. The course also covers the theorems of Green, Gauss, and Stokes.

MAT 250 Linear Algebra (3 cr.)
Prerequisite(s): MAT 200 or MAT 230

This course presents the mathematical foundations of linear algebra, which includes a review of basic matrix algebra and linear systems of equations as well as basics of linear transformations in Euclidean spaces, determinants, and the Gauss-Jordan Algorithm. The more substantial part of the course begins with abstract vector spaces and the study of linear independence and bases. Further topics may include orthogonality, change of basis, general theory of linear transformations, and eigenvalues and eigenvectors. Other topics may include applications to least-squares approximations and Fourier transforms, differential equations, and computer graphics.

MAT 256 Introduction to Differential Equations (3 cr.)
Prerequisite(s): MAT 200 or MAT 230

This course introduces the basic theory and applications of first and second-order linear differential equations. The course emphasizes specific techniques such as the solutions to exact and separable equations, power series solutions, special functions and the Laplace transform. Applications include RLC circuits and elementary dynamical systems, and the physics of the second order harmonic oscillator equation.

MAT 258 Discrete Mathematics (3 cr.)
Prerequisite(s): MAT 200 or MAT 230

This course gives an introduction to several mathematical topics of foundational importance in the mathematical and computer sciences. Typically starting with propositional and first order logic, the course considers applications to methods of mathematical proof and reasoning. Further topics include basic set theory, number theory, enumeration, recurrence relations, mathematical induction, generating functions, and basic probability. Other topics may include graph theory, asymptotic analysis, and finite automata.

MAT 300 Curves and Surfaces (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course is an introduction to parameterized polynomial curves and surfaces with a view toward applications in computer graphics. It discusses both the algebraic and constructive aspects of these topics. Algebraic aspects include vector spaces of functions, special polynomial and piecewise polynomial bases, polynomial interpolation, and polar forms. Constructive aspects include the de Casteljau algorithm and the de Boor algorithm. Other topics may include an introduction to parametric surfaces and multivariate splines.

MAT 340 Probability and Statistics (3 cr.)
Prerequisite(s): MAT 200 or MAT 230, MAT 258

This course is an introduction to basic probability and statistics with an eye toward computer science and artificial intelligence. Basic topics from probability theory include sample spaces, random variables, continuous and discrete probability density functions, mean and variance, expectation, and conditional probability. Basic topics from statistics include binomial, Poisson, chi-square, and normal distributions; confidence intervals; and the Central Limit Theorem. Further topics may include fuzzy sets and fuzzy logic.

MAT 350 Advanced Curves and Surfaces (3 cr.)
Prerequisite(s): MAT 300

This course is a continuation of MAT 300 with topics taken from the theory and applications of curves and surfaces. The course treats some of the material from MAT 300 in more detail, like the mathematical foundations for non-uniform rational B-spline (NURBS) curves and surfaces, knot insertion, and subdivision. Other topics may include basic differential geometry of curves and surfaces, tensor product surfaces, and multivariate splines.

MAT 351 Quaternions, Interpolation and Animation (3 cr.)
Prerequisite(s): MAT 300

This course gives an introduction to several mathematical topics of foundational importance to abstract algebra, and in particular the algebra of quaternions. Topics covered may include: operations, groups, rings, fields, vector spaces, algebras, complex numbers, quaternions, curves over the quaternionic space, interpolation techniques, splines, octonions, and Clifford algebras.

MAT 352 Wavelets (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course presents the foundations of wavelets as a method of representing and approximating functions. It discusses background material in complex linear algebra and Fourier analysis. Basic material on the discrete and continuous wavelet transforms forms the core subject matter. This includes the Haar transform, and multi-resolution analysis. Other topics may include subdivision curves and surfaces, and B-spline wavelets. Applications to computer graphics may include image editing, compression, surface reconstruction from contours, and fast methods of solving 3D simulation problems.

MAT 353 Differential Geometry (3 cr.)
Prerequisite(s): MAT 300

This course presents an introduction to differential geometry, with emphasis on curves and surfaces in three-space. It includes background material on the differentiability of multivariable functions. Topics covered include parameterized curves and surfaces in three-space and their associated first and second fundamental forms, Gaussian curvature, the Gauss map, and an introduction to the intrinsic geometry of surfaces. Other topics may include an introduction to differentiable manifolds, Riemannian geometry, and the curvature tensor.

MAT 354 Discrete and Computational Geometry (3 cr.)
Prerequisite(s): MAT 250, MAT 258

Topics covered in this course include convex hulls, triangulations, Art Gallery theorems, Voronoi diagrams, Delaunay graphs, Minkowski sums, path finding, arrangements, duality, and possibly randomized algorithms, time permitting. Throughout the course, students explore various data structures and algorithms. The analysis of these algorithms, focusing specifically on the mathematics that arises in their development and analysis is discussed. Although CS 330 is not a prerequisite, it is recommended.

MAT 355 Graph Theory (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course provides an introduction to the basic theorems and algorithms of graph theory. Topics include graph isomorphism, connectedness, Euler tours, Hamiltonian cycles, and matrix representation. Further topics may include spanning trees, coloring algorithms, planarity algorithms, and search algorithms. Applications may include network flows, graphical enumeration, and embedding of graphs in surfaces.

MAT 356 Advanced Differential Equations (3 cr.)
Prerequisite(s): MAT 250, MAT 256

This course covers the advanced theory and applications of ordinary differential equations. The first course in differential equations focused on basic prototypes, such as exact and separable equations and the second-degree harmonic oscillator equation. This course builds upon these ideas with a greater degree of generality and theory. Topics include qualitative theory, dynamical systems, calculus of variations, and applications to classical mechanics. Further topics may include chaotic systems and cellular automata. With this overview, students will be prepared to study the specific applications of differential equations to the modeling of problems in physics, engineering, and computer science.

MAT 357 Numerical Analysis (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course covers the numerical techniques arising in many areas of computer science and applied mathematics. Such techniques provide essential tools for obtaining approximate solutions to non-linear equations arising from the construction of mathematical models of real-world phenomena. Topics of study include root finding, interpolation, approximation of functions, cubic splines, integration, and differential equations. Further topics may include stability, iterative methods for solving systems of equations, eigenvalue approximation, and the fast Fourier transform.

MAT 359 Computational Algebraic Geometry (3 cr.)
Prerequisite(s): MAT 300

This course introduces computational algebra as a tool to study the geometry of curves and surfaces in affine and projective space. The central objects of study are affine varieties and polynomial ideals, and the algebra-geometry dictionary captures relations between these two objects. The precise methods of studying polynomial ideals make use of monomial orderings, Grobner bases, and the Buchberger algorithm. Students have opportunities to program parts of these algorithms and to use software packages to illustrate key concepts. Further topics may include resultants, Zariski closure of algebraic sets, intersections of curves and surfaces, and multivariate polynomial splines.

MAT 361 Introduction to Number Theory and Cryptography (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course is an introduction to elementary number theory and cryptography. Among the essential tools of number theory that are covered, are divisibility and congruence, Euler's function, Fermat's little theorem, Euler's formula, the Chinese remainder theorem, powers modulo m, kth

roots modulo m, primitive roots and indices, and quadratic reciprocity. These tools are then used in cryptography, where the course discusses encryption schemes, the role of prime numbers, security and factorization, the DES algorithm, public key encryption, and various other topics, as time allows.

MAT 362 **Fuzzy Sets and Logic** (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course introduces the basic theory of fuzzy sets and fuzzy logic and explores some of their applications. Topics covered include classical sets and their operations, fuzzy sets and their operations, membership functions, fuzzy relations, fuzzification/defuzzification, classical logic, multi-valued logic, fuzzy logic, fuzzy reasoning, fuzzy arithmetic, classical groups, and fuzz groups. Students will also explore a number of applications, including approximate reasoning, fuzzy control, fuzzy behavior, and interaction in computer games.

MAT 364 **Combinatorial Game Theory** (3 cr.)
Prerequisite(s): MAT 258

Combinatorial Game Theory studies finite, two-player games in which there are no ties. Techniques from logic combinatorics and set theory are used to prove various properties of such games. Typical games include Domineering, Hackenbush, and Nim. The analysis of such games can also be used to study other more complex games like Dots and Boxes, and Go. Topics covered in this course include Conway's theory of numbers as games, impartial and partizan games, winning strategies, outcome classes and algebra of games.

MAT 365 **Introduction to Topology** (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course introduces topology and its applications. Topics covered include topological spaces, quotient and product spaces, metric and normed spaces, connectedness, compactness, and separation axioms. Further topics may include basic algebraic topology, fixed point theorems, theory of knots, and applications to kinematics, game theory, and computer graphics.

MAT 399 **Special Topics in Mathematics** (3 cr.)
Prerequisite(s): Permission of instructor

The content of this course may change each time it is offered. It is for the purpose of offering a new or specialized course of interest to the faculty and students that is not covered by the courses in the current catalog.

MAT 400 **Introductory Analysis I** (3 cr.)
Prerequisite(s): MAT 250

This course introduces the foundations of real analysis by means of a rigorous reexamination of the topics covered in elementary calculus. The course starts with the topology of the real line and proceeds to a formal examination of limits,

continuity, and differentiability. The course also covers the convergence of sequences and series of real numbers and the uniform convergence of sequences of real valued functions.

MAT 410 **Introductory Analysis II** (3 cr.)
Prerequisite(s): MAT 400

A continuation of MAT 400, this course emphasizes the formal treatment of the theory of integration of functions of a real variable. It reexamines the Riemann integral and the Fundamental theorem of calculus as well as the theory of the Stieltjes and Lebesgue integral and their applications in probability and Fourier analysis. The course concludes with a discussion of the topology of R^n, and the differentiability and integrability of functions of several variables, including the theorems of Green and Stokes and the divergence theorem.

MAT 450 **Abstract Algebra I** (3 cr.)
Prerequisite(s): MAT 250, MAT 258

This course provides an introduction to the foundations of abstract algebra. The fundamental objects of study are groups, rings, and fields. The student builds on previous courses in algebra, particularly linear algebra, with an even greater emphasis here on proofs. The study of groups is an ideal starting point, with few axioms but a rich landscape of examples and theorems, including matrix groups, homomorphism theorems, group actions, symmetry, and quotient groups. This course extends these ideas to the study of rings and fields. Topics in ring theory include polynomial rings and ideals in rings. The course also covers fields, their construction from rings, finite fields, basic theory of equations, and Galois theory.

MAT 460 **Abstract Algebra II** (3 cr.)
Prerequisite(s): MAT 400

This course builds on the foundations established in MAT 450. It extends the fundamental objects of groups, rings, and fields to include modules over rings and algebras. The course gives the basic ideas of linear algebra a more rigorous treatment and extends scalars to elements in a commutative ring. In this context, students study the general theory of vector spaces and similarity of transformations. The curriculum also discusses non-commutative algebras and rings, emphasizing examples, such as quaternion algebras. Further topics may include non-associative rings and algebras, Galois theory, exact sequences, and homology.

Department of Physics

Physics Courses

PHY 115 **Introduction to Applied Math and Physics** (3 cr.)
Prerequisite(s): None

We live in a world governed by physical laws. As a result we have become accustomed to objects' motions being in accordance with these laws. This course examines the basic physics and mathematics governing natural phenomena, such as light, weight, inertia, friction, momentum, and thrust as a practical introduction to applied math and physics. Students explore geometry, trigonometry for cyclical motions, and physical equations of motion for bodies moving under the influence of forces. With these tools, students develop a broader understanding of the impact of mathematics and physics on their daily lives.

PHY 200 **Motion Dynamics** (3 cr.)
Prerequisite(s): MAT 150

This calculus-based course presents the fundamental principles of mechanics, including kinematics, Newtonian dynamics, work and energy, momentum, and rotational motion.

PHY 250 **Waves, Optics, and Thermodynamics** (3 cr.)
Prerequisite(s): PHY 200, MAT 200

This calculus-based course presents the fundamentals of fluid dynamics, oscillations, waves, geometric optics, and thermodynamics.

PHY 270 **Electricity and Magnetism** (3 cr.)
Prerequisite(s): PHY 250

This calculus-based course presents the basic concepts of electromagnetism, including electric fields, magnetic fields, electromagnetic forces, DC and AC circuits, and Maxwell's equations.

PHY 290 **Modern Physics** (3 cr.)
Prerequisite(s): PHY 250 or PHY 270, MAT 200 or MAT 230, PHY 200

The wake of modern physics has given rise to massive technological advancements that have changed our daily lives. This course covers many of the modern issues within the field and emphasizes the problem-solving nature of physics. The course is a calculus based scientific examination of topics from general relativity and quantum mechanics through nuclear physics, high-energy physics, and astrophysics.

PHY 300 **Advanced Mechanics** (3 cr.)
Prerequisite(s): MAT 200 or MAT 230, CS 250, MAT 250, PHY 250

This course covers the physics behind more complex mechanical interactions as well as the numerical techniques required to approximate the systems for simulations. A thorough analysis of mechanical systems through energy analysis provides the basis for the understanding of linear and rotational systems. The combination of theoretical physics and numerical methods provide students with the background for simulating physical systems with limited computational power. Topics covered include Lagrangian Dynamics, Hamilton's Equations, dynamics of rigid bodies, motion in non-inertial reference frames, the use of the inertia tensor, collision resolution, and numerical techniques including methods of approximation.

Standards of Progress

Semester Credit Hour

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

Over any semester, one semester credit hour of academic credit equals:
- at least 15 hours of classroom contact, or
- at least 22.5 hours of supervised laboratory time, or
- at least 45 hours of internship experience.

In addition, each semester credit also assumes:
- a minimum of 30 hours over the semester for external preparation, project work, or homework by the student, except for independent studies or internship experience.

A classroom contact hour is 53 minutes in length.

Whenever "semester hour" is used in this Catalog, it is synonymous with "semester credit hour" (SCH) and does not always represent "hours per week in class."

Grading System

The following grading system is in use and, except where otherwise specified, applies to both examinations and homework assignments. The weight of a final examination grade is a matter individually determined by each instructor. See the following *Grade Point Average* section for additional information.

GRADE	DESCRIPTION	QUALITY POINTS	EXPLANATION OF MINIMUM GRADE REQUIREMENT
A	Excellent	4.0	
A-	Excellent	3.7	
B+	Good	3.3	
B	Good	3.0	
B-	Good	2.7	
C+	Fair	2.3	
C	Fair	2.0	
C-	Fair	1.7	minimum grade required for undergraduate students to earn credit in core courses
D	Poor	1.0	minimum grade required for undergraduate students to earn credit in non-core courses for their majors
F	Failure	0	

The following grades do not affect the GPA:

AU - AUDIT
"AU" indicates that the student attended the course without expectation of receiving credit or a grade.

IP - IN PROGRESS
"IP" indicates that the grade was not available from the instructor at the time the transcript was printed.

I - INCOMPLETE
"I" is used when students have completed most of the required work for a course and submitted passing work, but circumstances beyond their control prohibit them from taking the final exam or completing coursework by the final due date. Students seeking an "Incomplete" must meet with a Student Life and Advising Officer to review the procedure and receive the request packet before the scheduled final examination, or the deadline of a final requirement such as a project.

Arrangements for the "I" grade and any make-up work must be initiated by the student and agreed to by the instructor. An Assignment of Final Grade for Completion of an Incomplete (I) form must be completed each time a grade of "I" is assigned. On the form, the instructor will specify to both the student and the department the work remaining to be done, the procedures for its completion, the grade in the course to date, and the weight to be assigned to work remaining to be done when the final grade is computed.

When the student completes the course, the instructor will submit a change of grade to the Registrar's Office no later than the end of the 14th calendar day of the following semester. Should the make-up work not be completed within the agreed-upon time frame, DigiPen (Singapore) will assign a grade of "F" (or 0 quality points).

These procedures cannot be used to repeat a course for a different grade. An "I" grade will not be assigned to a student who never attended class; instead, instructors may assign a failing grade.

W - WITHDRAWAL
"W" indicates withdrawal from the course before the end of the eighth week of classes or withdrawal from DigiPen (Singapore). The grade of "W" will not be assigned to any student who has taken the final examination in the course. Withdrawal from a course is a process initiated by the student.

P - PASS
"P" is given for internship, seminar, and thesis courses.

Assessment Process

DigiPen (Singapore) has an assessment process to evaluate the defined student learning outcomes of the education and training and established competencies. This process includes a combination of methods such as grading, portfolio assessment, projects, internships, and criterion-referenced testing based on developed and appropriate rubrics.

Each course syllabus contains clearly defined course objectives and learning outcomes, course requirements, grading policy and allotment, and grading distribution.

Students are made aware of the grading policy, performance standards, and grading distribution at the beginning of each course. The faculty measures the student's achievement of the stated course objectives and learning outcomes based on the grading policy published in the course syllabus.

Grade Reports

Reports of the final grade in each course will be made available online to students soon after the close of each semester. However, grade reports may be withheld from students who have delinquent accounts with the Office of Finance, Facilities, or the Library.

Grade Point Average

The academic standing of each student is determined on the basis of the grade point average (GPA) earned each semester.

The GPA is determined by using the quality points assigned to each course grade a student earns. The quality point value for each grade earned during a semester is multiplied by the number of credit hours assigned to that course as listed elsewhere in this catalog. The sum of these points is the total number of quality points earned during the semester. This sum is divided by the number of credit hours attempted (hours from courses with grades of "A" [or 4.0 quality points] through "F" [or 0 quality points]) to obtain the GPA.

The cumulative GPA consists of all courses completed at DigiPen (Singapore). If multiple attempts were made for the same course, only the grades earned in the two most recently completed attempts are calculated in the cumulative GPA. Course grades of "AU," "I," "W," "S," "U," and "P" are non-punitive grades, so they are not calculated in the overall GPA since they carry no quality points.

The following example demonstrates how GPA is calculated:

COURSE	CREDITS	GRADE	POINTS
CS 100	4	A	16.0 (4 x 4.0)
MAT 140	4	A-	14.8 (4 x 3.7)
CS 105	3	B	9.0 (3 x 3.0)
ENG 110	3	D	3.0 (3 x 1.0)
CS 120	4	B+	13.2 (4 x 3.3)
Totals	18		56

Total grade points divided by total credits equals the cumulative grade point average. Therefore, the grade point average for the above example is 56 divided by 18 for a 3.11 GPA.

Satisfactory Academic Progress

A full attempt of 24 credits during an academic year is required to be considered a full-time student making satisfactory academic progress toward a degree. This should include registration for at least 12 credits per semester and successful completion of at least 12 credits per semester. "Full attempt" is defined as the receipt of a final letter grade ("A" [or 4.0 quality points] to "F" [or 0 quality points]) but not the receipt of a "W" or an "I." Successful completion is

defined as the receipt of a passing letter grade ("A" [or 4.0 quality points] to "C-" [or 1.7 quality points] in a degree's core courses, and "A" [or 4.0 quality points] to "D" [or 1.0 quality points] in non-major courses). Core courses and non-major courses are denoted under each individual degree program's recommended sequence of required classes chart. The Registrar makes decisions on student status.

A program of study must be completed within a reasonable period of time for a student to be eligible for graduation; that is, the credit hours attempted cannot exceed 1.5 times the credit hours required to complete the program. For example, because the BFA in Digital Art and Animation degree program requires a minimum of 131 credits to complete, students in this program have up to 196.5 credits to complete their program. The Registrar will withdraw students from the Institute who do not meet this requirement.

CHANGING MAJORS AND SAP

All courses that are deemed transferable to a student's new degree program are considered when calculating a student's satisfactory academic progress. Courses that are not part of the new major are not used.

Students should refer to the *Change of Major* and *Graduation* sections for more information.

QUALITATIVE STANDARD: UNDERGRADUATE STUDENTS

A student must be in good academic standing based on the cumulative grade point average of all courses taken at DigiPen Institute of Technology Singapore to meet the qualitative standard of SAP. Students may reference the Course Catalog of their matriculation cohort for milestone credits and cumulative GPA information for their cohort. Good academic standing for students in cohorts that began in 2015 or later is charted as follows.

CREDIT MILESTONE	MINIMUM GPA REQUIREMENT
Up to 50% of program 77 attempted credits* for BS in Computer Science in Real-Time Interactive Simulation 77 attempted credits for BS in Computer Science and Game Design 65 attempted credits for BFA in Digital Art and Animation 76 attempted credits for BA in Game Design	1.8 or better cumulative GPA
Over 50% of program 78-153 attempted credits for BS in Computer Science in Real-Time Interactive Simulation 78-153 attempted credits for BS in Computer Science and Game Design 66-130 attempted credits for BFA in Digital Art and Animation 77-152 attempted credits for BA in Game Design	2.0 or better cumulative GPA
100% of program 154 earned credits or greater for BS in Computer Science in Real-Time Interactive Simulation 154 earned credits or greater for BS in Computer Science and Game Design 131 earned credits or greater for BFA in Digital Art and Animation 153 earned credits or greater for BA in Game Design	2.0 or better cumulative GPA

*An attempted credit is defined as any credit that is awarded a final letter grade ("A" [or 4.0 quality points] to "F" [or 0 quality points]). Credits earning a "W" or "I" are not considered attempted credits for the purpose of calculating GPA.

APPEALS
Appeals involving extenuating circumstances may be addressed to the Student Life and Advising Office for action and resolution.

Passing Classes and Graduation

All students must have a cumulative GPA of at least 2.0 to graduate.

Academic Warning

Any student who fails to maintain the required minimum cumulative GPA, or who fails to complete their academic program within the maximum attempted credits allowed, will be placed on Academic Warning.

FAILING TO MEET MINIMUM GPA REQUIREMENT
Any student who fails to maintain the required minimum cumulative Grade Point Average (GPA) will be placed on Academic Warning the semester following the one where their cumulative GPA falls below the minimum required GPA. Students are removed from Academic Warning as soon as their cumulative GPA is above the minimum required GPA. Students who earn a 2.0 during their probationary semester but do not raise their cumulative GPA above the minimum requirement will continue Academic Warning until their cumulative average meets the minimum requirement.

While on Academic Warning, students may be restricted to a maximum course load of 15 credits, of which 50% must be core courses as defined in their program's Degree Requirements.

Probationary students must achieve a GPA of 2.0 or higher during their probationary semester. Failure to satisfy these requirements will result in academic expulsion, and expelled students must wait 12 months before they can apply for readmission.

FAILING TO COMPLETE PROGRAM WITHIN THE MAXIMUM TIME FRAME
Students who fail to complete their degree program within the maximum attempted credits allowed, as defined by the SAP policy, will be placed on Academic Warning to direct them towards completion. Working with their academic advisor, these students will develop a program completion plan that outlines the quickest path to completion. These students will be held to the same conditions as outlined above, with the exception that the maximum credit load per semester is waived.

Grade Changes and Appeals

Only the faculty member who administered the grade may make grade changes. In cases where the faculty is not available to consider a grade change, the department chair, in consultation with the Dean of Faculty and Academic Affairs, may make such a change.

Grade appeals must be made within 14 days of final grades being issued. Using the Grade Appeal Form, appeals are made in writing to the course instructor or the department chair if the instructor is unavailable. Students may appeal to the Department Chair and then the Dean of Faculty and Academic Affairs if a satisfactory resolution is not achieved.

Repeating Courses

Students may repeat any course in which they did not receive a passing grade (below a "C-" [or 1.7 quality points] in a core course, below a "D" [or 1.0 quality points] in a non-core course), as long as they are in good standing with the Institute and eligible to continue their studies. All grades and

attempted courses remain on a student's transcript. However, only the grades earned in the two most recent attempts of a course are calculated in a student's GPA. Courses in which a student has earned a passing grade may be repeated as audit courses only.

Course Overload

During a given semester, sophomores, juniors, and seniors may be enrolled in a maximum of 21 credits. Freshmen should check their majors for specific semester maximums. Students seeking special permission to take more than the maximum credits in a given semester should use the Override Form and get approval from their academic advisor.

Attendance

Students more than 15 minutes late to class will be marked as absent for that entire class. Students may not leave class early without instructor permission. Students absent from all classes without explanation for a period of two consecutive weeks or more are considered to have withdrawn from the Institute as of their last date of attendance.

Withdrawing from Individual Courses

To withdraw from individual courses, a student must submit a drop request through the Student Record System (SRS).

Withdrawing from the Institute

To formally withdraw from the Institute, a student must submit a completed Withdrawal Notice Form to the Registrar's Office. Withdrawal Notice Forms may be downloaded from the Student Record System (SRS).

Upon withdrawing from DigiPen (Singapore), the student shall immediately return all materials in the student's possession relating to the program, whether created by the student or other students or provided by the Institute.

Hardship Withdrawal

Students may seek a hardship withdrawal when one of three conditions prevents a student from completing all courses: death of a close family member, catastrophic illness in the family, or injury or illness that incapacitates the student. Hardship withdrawals may be sought any time after the last date to withdraw from classes, as listed in the Academic Calendar, but not after all materials for a course have been completed (i.e., after submitting the final exam or final assignment). The Hardship Withdrawal Form, a personal statement, and appropriate documentation (i.e., death certificate, obituary, letter from a state-licensed physician or mental health professional) must be provided to support all requests to the Student Life and Advising Office. Once all documents are received, the Student Life and Advising Office will forward the documents to the Hardship Withdrawal Review Committee.

If the committee grants a hardship withdrawal, the student will receive "W" grades in all approved courses and is ineligible to receive a grade or an incomplete in any course in that semester. The student will be withdrawn from DigiPen

(Singapore), effective the student's last day of attendance. Students seeking readmission must abide by the Institute's readmission policy.

The "W" Grade

If a student withdraws from individual classes or the Institute, please note:

1. If withdrawing before the end of the second week of instruction, no course entries will appear on the student's transcript for that semester.

2. If withdrawing after the end of the 14th calendar day of the semester and before the end of the 56th calendar day of the semester, the Registrar will assign a final grade of "W" for each course in which the student was enrolled.

3. Effective after the 56th calendar day of the semester, withdrawn students will receive final grades for each course in which they were enrolled.

Please refer to the SIT student handbook for information on withdrawal from SIT.

Dean's Honor List Requirements

Prepared at the end of each fall and spring semester, the Dean's Honor List officially recognizes and commends students whose semester grades indicate distinguished academic accomplishment. Both the quality and quantity of work done are considered.

Students must meet the following qualifications to be a recipient of this honor:

1. Students must be matriculated.

2. Students must be registered full-time in credit-bearing courses during the fall or spring semester.

3. Full-time students must complete 12 or more credits in one semester.

4. Only passing grades (4.0 [or "A"], 3.0 [or "B"], 2.0 [or "C"], and 1.0 [or "D"]) in credit-bearing courses are counted for eligibility.

5. No failing grades: a grade of "F" (or 0 quality points) in any course makes the student ineligible, regardless of other grades.

6. Minimum GPA of 3.5 is required.

7. Any courses that do not count towards the degree are excluded.

8. AP, Internship, and Independent Study credits are excluded.

9. Pass/Fail credits are NOT to be counted when calculating qualifying credits.

10. "Incomplete" grades will be evaluated after they are made up. The student must have qualified for the Dean's Honor List before and after the "Incomplete" grade was made up.

The student's cumulative grade-point average is not considered; only the grade-point average for that particular semester is relevant.

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 and Academic Affairs. Students may appeal grades and review exams no later than two weeks after grade reports are issued. The Administration reserves the right to destroy any examination papers after the two-week appeal period. Academic records will be kept indefinitely.

OTHER DISPUTES

Students who feel that they have any other type of dispute with the Institute should file a complaint with the relevant Department Chair or supervisor. A copy of this complaint shall be given to those involved with the dispute. If the student is not satisfied with the decision of the Department Chair or supervisor, a second complaint may be submitted to the Chief Operating Officer—International. If the student is still dissatisfied with the decision, they may appeal to the President of the Institute.

Schools accredited by the Accrediting Commission of Career Schools and Colleges must have a procedure and operational plan for handling student complaints. If a student does not feel that the Institute has adequately addressed a complaint or concern, the student may consider contacting the Accrediting Commission. All complaints considered by the Commission must be in written form, with permission for the Commission to forward a copy of the complaint to the Institute for a response. The complainant(s) will be kept informed as to the status of the complaint as well as the final resolution by the Commission. Please direct all inquiries to:

Accrediting Commission of Career Schools and Colleges
2101 Wilson Boulevard
Suite 302
Arlington, VA 22201
Tel: (703) 247-4212
accsc.org

A copy of the Commission's Complaint Form is available at the Institute and may be obtained by contacting Tan Chek Ming, Managing Director. If students are unsure of whom to speak to regarding a complaint, they may contact Tan Chek Ming at the following address:

Tan Chek Ming
Managing Director
DigiPen Institute of Technology Singapore
510 Dover Road, #03-01
SIT@SP Building
Singapore 139660
Telephone: +65 6577 1900
Email: *chekming.tan@digipen.edu*

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 routine release of the student's academic records or any information based upon the records, and withhold the issue of the student's transcripts. Students with any questions may 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. Grade reports can be viewed or printed as unofficial transcripts using the Student Record System (SRS) online.

Exams

All students are required to be in attendance at the times scheduled by the Institute for final exams. Instructors are not required to make arrangements for individuals to take final exams at a different time than the rest of the class. Should a student miss an exam, it is the student's responsibility to notify the instructor within 24 hours of the missed exam. In the event that a student fails to provide such notification to an instructor, or if the Institute does not find the reasons for missing an exam justifiable, the student will be given a failing grade for the exam(s).

If a student misses a final exam and notifies the instructor within 24 hours of the missed exam, the Registrar shall review the individual circumstances. Only documented emergencies will be considered acceptable reasons for missing exams. Exam retakes shall be allowed at the sole discretion of the Registrar and Department Chair. Examples of unacceptable reasons for missing an exam include the demands of a time-consuming job, the desire to leave town for a vacation or family gathering, the desire to do well on tests in other courses, etc.

A retaken exam shall be different than the original one taken by the other students of the class, and the timing of it shall be at the sole discretion of the individual instructor. In all cases, retakes shall be administered no later than one week after the original, missed exam.

General Policies

General Policies

Institutional Mission

DigiPen Institute of Technology Singapore provides exemplary education and furthers research and innovation in science, engineering, arts, digital media, and interactive computer technologies. Building on a foundation of academics, applied learning, industry knowledge, and multi-disciplinary team-based collaboration, we inspire our students to pursue lifelong learning as well as scientific and creative exploration, and empower them to become leaders and originators on a global level.

Notice of Non-Discrimination

DigiPen Institute of Technology Singapore is committed to maintaining a diverse community in an atmosphere of mutual respect for and appreciation of differences.

DigiPen Institute of Technology Singapore does not discriminate in its educational and employment policies on the basis of race, color, creed, religion, national/ethnic origin, sex, sexual orientation, or age.

Accreditation

DigiPen Institute of Technology is accredited by the Accrediting Commission of Career Schools and Colleges ("ACCSC", or "the Commission"), a recognized accrediting agency 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 Bachelor of Science in Real-Time Interactive Simulation degree program.
- 2002: DigiPen received ACCSC approval for the Bachelor of Fine Arts in Production Animation degree program.
- 2003: DigiPen received ACCSC approval for the Bachelor of Science in Computer Engineering 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 Bachelor of Arts in Game Design and Bachelor of Science in Game Design degree programs by ACCSC.
- 2010: DigiPen was granted approval for its change of location to its current facility by ACCSC.
- 2010: DigiPen received ACCSC approval allowing DigiPen (Singapore) to disclose in its advertising that it is a branch campus of DigiPen Institute of Technology.
- 2010: DigiPen was granted approval to change the program name from the Bachelor of Fine Arts in Production Animation to the Bachelor of Fine Arts in Digital Art and Animation.
- 2011: DigiPen was granted approval to change the program name from the Bachelor of Science in Real-Time Interactive Simulation to the Bachelor of Science in Computer Science in Real-Time Interactive Simulation.
- 2011: DigiPen (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 was granted approval for its Bachelor of Arts in Music and Sound Design and Bachelor of Science in Engineering and Sound Design degree programs by ACCSC.
- 2012: DigiPen was granted approval to change the program name from the Bachelor of Science in Game Design to the Bachelor of Science in Computer Science and Game Design.
- 2013: DigiPen (Singapore) was granted ACCSC renewal of accreditation for five years.
- 2014: DigiPen was granted approval for its Bachelor of Science in Computer Science degree program by ACCSC.
- 2014: DigiPen (Singapore) was granted approval for its first joint degree program with Singapore Institute of Technology, Bachelor of Engineering with Honours in Systems Engineering (ElectroMechanical Systems).
- 2015: DigiPen (Singapore) was granted approval for its change of location to its current facility by ACCSC.

Any person desiring information about the accreditation requirements or the applicability of these requirements to the Institute may contact ACCSC by mail at 2101 Wilson Boulevard, Suite 302, Arlington, VA 22201, or by phone at (703) 247-4212. ACCSC's website address is *accsc.org*.

History of DigiPen Institute of Technology

DigiPen was founded in 1988 by Mr. Claude Comair as a computer simulation and animation company based in Vancouver, British Columbia, Canada. As the demand for production work increased, DigiPen faced difficulty finding qualified personnel, and in 1990, it began offering a dedicated training program in 3D computer animation to meet this growing need.

That same year, DigiPen approached Nintendo of America to jointly establish a post-secondary program in video game programming. The result of this collaborative effort was the DigiPen Applied Computer Graphics School, which in 1994, officially accepted its first class of video game programming students to its Vancouver campus for the two-year Diploma in the Art and Science of 2D and 3D Video Game Programming. In 1995, DigiPen implemented a revised two-year 3D computer animation program and graduated student cohorts over each of the following four years.

Around this time, the video game industry underwent a paradigm shift from dealing primarily with 2D graphics and gameplay to full 3D worlds that players could freely explore. As these worlds became more sophisticated, so did the task of programming, designing, and animating them. In anticipation of this change, DigiPen developed a four-year bachelor's degree in video game programming (the Bachelor of Science in Computer Science in Real-Time Interactive

Simulation) that would prepare students for the challenges of creating complex 3D game and simulation software.

In 1996, the Washington State Higher Education Coordinating Board (HECB) granted DigiPen the authorization to award both Associate and Bachelor of Science degrees in Real-Time Interactive Simulation. Two years later, in 1998, DigiPen Institute of Technology opened its campus in Redmond, Washington, USA. In 1999, DigiPen began offering the Associate of Applied Arts in 3D Computer Animation. At this time, DigiPen phased out its educational activities in Canada, moving all operations to its Redmond campus. On July 22, 2000, DigiPen held its first commencement ceremony, where it awarded Associate of Science and Bachelor of Science degrees.

In 2002, DigiPen received accreditation from the Accrediting Commission of Career Schools and Colleges (ACCSC). In 2004, DigiPen began offering three new degrees: the Bachelor of Science in Computer Engineering, the Master of Science in Computer Science*, and the Bachelor of Fine Arts in Digital Art and Animation. In 2008, DigiPen added two more degree programs: the Bachelor of Science in Computer Science and Game Design and the Bachelor of Arts in Game Design.

Also in 2008, DigiPen partnered with Singapore's Economic Development Board to open its first international branch campus, offering the following degrees: the Bachelor of Science in Computer Science in Real-Time Interactive Simulation, the Bachelor of Science in Computer Science and Game Design, the Bachelor of Fine Arts in Digital Art and Animation, and the Bachelor of Arts in Game Design. In 2010, DigiPen announced plans to open its first European campus in Bilbao, Spain**.

That same year, DigiPen relocated its U.S. campus to its current location at 9931 Willows Road Northeast in Redmond, Washington.

On September 26, 2011, DigiPen launched DigiPen Institute of Technology Europe-Bilbao offering two bachelor's degree programs: the Bachelor of Science in Computer Science in Real-Time Interactive Simulation and the Bachelor of Fine Arts in Digital Art and Animation.

On October 11, 2011, DigiPen (Singapore) was granted accreditation by ACCSC as a branch campus of the main school located in Redmond, Washington, USA.

In 2012, DigiPen added three new degree programs: the Bachelor of Arts in Music and Sound Design, the Bachelor of Science in Engineering and Sound Design, and the Master of Fine Arts in Digital Arts.

In 2014, DigiPen added a new degree program: the Bachelor of Science in Computer Science. In that same year, DigiPen (Singapore) received approval for the Bachelor of Engineering (with Honours) in Systems Engineering (ElectroMechanical Systems) degree program.

In 2015, DigiPen (Singapore) was granted approval to move from Pixel Building, 10 Central Exchange Green to SIT@SP Building, 510 Dover Road.

*DigiPen began offering the MS in Computer Science program in 2004 before ACCSC expanded its scope of recognition by the United States Department of Education to grant approval for master's degree programs. ACCSC granted approval for this degree in 2006.

**DigiPen's Europe-Bilbao campus does not fall within the scope of ACCSC accreditation.

About DigiPen (Singapore)'s Facilities and Equipment

DigiPen (Singapore) encompasses over 2,960 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 80 students to small classrooms accommodating 60 students. The labs also vary in size from those accommodating 150 students to smaller ones seating 50 students.

The computer workstations provided at DigiPen are selected to meet or exceed the hardware specifications for required educational software. 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.

Description of the Library Facilities and Internet Access

LIBRARY SERVICES

DigiPen (Singapore)'s library aims to support the Institute's curriculum, students, and faculty. Students have access to a variety of resources and reference books relevant to their program of study. The library also subscribes to a selection of major journals and magazines related to the fields of gaming, simulation, and animation. Furthermore, the library allocates an annual budget for updating the contents of the library. In addition to curriculum-related resources, the library has a collection of career-oriented materials, including books on resumes, cover letters, and interviews.

INTERNET ACCESS

Internet access is a regulated service and is provided for students free of charge. Students may lose this privilege if they do not abide by the *Network and Internet Usage Policy*.

Student Network and Internet Usage Policy

GENERAL POLICIES

DigiPen (Singapore)'s computer and network resources are provided exclusively for educational purposes. To ensure that these resources remain available for legitimate academic usage, DigiPen (Singapore) requires compliance with the following policies:
- Students are required to respect the Institute's property. Students may not abuse, damage, vandalize, steal, or in

any way alter the Institute's property in any manner that would prevent another student from using it.

- Students may not install software, drivers, patches, or any other program on the Institute's computers. Additional software may be requested through an instructor; it is the sole responsibility of the Institute to decide if, how, and when any software is installed.
- Students are responsible for their own data and are encouraged to protect their work by utilizing the resources provided by DigiPen (Singapore) and by using a personal storage device such as a flash drive or laptop computer.
- Students may not attempt to access another student's information or display any material that may offend another student.
- Students may not copy, publish, or make available any DigiPen (Singapore)'s property without written consent. This includes, but is not limited to, storing materials on any unauthorized network service or personal server.
- Commercial use of DigiPen (Singapore)'s computer or network resources is expressly and strictly forbidden. Any commercial activity will result in legal action against the offender.

The Institute reserves the right to monitor, log, and inspect any data stored on any DigiPen computer or transmitted over the DigiPen network without restriction or limitation in order to ensure compliance with the above policies. Students found to be in violation of these policies may be restricted from the Institute's network and subject to disciplinary action.

Internet Filter Policy

Internet access through the DigiPen (Singapore)'s network is filtered to ensure that students are better able to access information and materials related to their education. All internet traffic from within DigiPen (Singapore)'s network, including labs, classrooms, and administrative offices, are sent through a system of proxies, filters, and analyzers to protect school resources from outside disruption, prevent network abuse, and prioritize legitimate educational usage. For questions or concerns about this policy, or to report a problem with internet access, contact *helpdesk.sg@digipen.edu*.

Applying to DigiPen (Singapore)

Visiting DigiPen (Singapore)

DigiPen (Singapore) offers regular information sessions for the general public. Anyone interested in finding out more about DigiPen (Singapore) and its programs is welcome to attend. For information on dates and times for these events, please visit *singapore.digipen.edu* or email *admissions.sg@digipen.edu*.

Visitors interested in learning about DigiPen (Singapore)'s admission requirements, application process, and degree programs are encouraged to schedule a meeting and school tour with an Admissions representative. To schedule an appointment, please contact the Admissions Office at *admissions.sg@digipen.edu*.

One of the best ways to find out what DigiPen (Singapore) is like as a student is to spend a day on campus, attending classes and meeting students, faculty, and staff. Throughout the year, the Admissions Office can help prospective students arrange to shadow a current student. Most visitors will combine a student shadow with a one-on-one admissions meeting. Student shadow requests should be made at least one week in advance. To learn more about this program and to schedule a time for your visit, please contact the Admissions Office at *admissions.sg@digipen.edu*.

Undergraduate Application Process

The admissions 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: *singaporetech.edu.sg*

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, *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. Successful applicants who accept 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 *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 *singaporetech.edu.sg*.

2. An application fee of $18 (includes GST) will be payable to SIT. For more information about the application fee payment, please visit *singapore.edu.sg*.

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):

    I. Certified-true copy of GCE "O" Level exam results or certificate.

    II. Certified-true copy of Junior College transcripts showing the grades for all courses taken by the student.

    III. Certified-true copy of Junior College diploma/certificate.

- Any of Singapore's five Polytechnics:

    I. Certified-true copy of GCE "O" Level exam results or certificate.

    II. Certified-true copy of Polytechnic transcripts showing the grades for all courses taken by the student.

    III. Certified-true copy of Polytechnic diploma.

- Any of Singapore's International Schools/schools outside of Singapore:

    I. Certified-true copy of all transcripts showing the grades for all courses taken by the student.

    II. Certified-true copy of diploma showing proof of completion of high school level education sufficient for entrance to university.

    III. 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 Admissions Office at DigiPen (Singapore) at *admissions.sg@digipen.edu*.

4. Personal statement. To be completed within SIT's online application portal. Please see the Personal Statement section below for the requirements and recommendations about completing this important component of the application.

5. Proof of English Proficiency. This 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. Please see the Proof of Proficiency in the English Language section for ways to fulfill this requirement. .

6. 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) and photocopies of the personal particulars.

7. Math and Science Requirement for applicants who apply for admission to the Bachelor of Science in Computer Science in Real-Time Interactive Simulation and Bachelor of Science in Computer Science and Game Design degree program:

    - In addition to the requirements listed for all undergraduate applicants, those applying to any of the Bachelor of Science programs must submit the applicable documents showing that they fulfill the Math and Science requirements. Applicants must provide the document(s) listed below which pertain to their previous education:

        » Polytechnic Diploma with a recommended Grade "B" or better in Mathematics courses in their Diploma programs and GCE 'O' Level Results in Mathematics or Science

        » Singapore-Cambridge GCE 'A' Level (H2 pass in Mathematics or Physics or Computing; or a "good pass in H1 Mathematics)

        » NUS High School Diploma

        » International Baccalaureate Diploma

        » International Educational Records

8. International applicants applying for the BS in Computer Science in Real-Time Interactive Simulation degree program and the BS in Computer Science and Game Design degree program who could not attend the interview at DigiPen Institute of Technology Singapore campus are required to submit the Official scores for the SAT 1 to the Institute. The Institute's SAT code: 5473. Shortlisted applicants are required to attend a remote interview.

9. Art Portfolio: This is only required of applicants to the Bachelor of Fine Arts in Digital Art and Animation degree program. Please see the Art Portfolio section for complete details about this important component of the application. International applicants who could not attend the interview at DigiPen Institute of Technology Singapore campus are required to mail their portfolio to the Institute's Admissions Office. Shortlisted applicants are required to attend a remote interview.

10. Letters of Recommendation (optional): Two letters of recommendation from individuals familiar with your academic background and/or work ethic (e.g., instructor, guidance counselor, employer) may be included. Recommendation letters from family members will not be considered.

PERSONAL STATEMENT

The personal statement is an important part of the application for admission to DigiPen (Singapore). What you write will help us find out information about you that is not apparent from your application or transcripts.

This section is required for ALL undergraduate applicants regardless of the program to which they are applying.

TOPIC

Please address all of the following in your personal statement essay:

Obtaining a degree from DigiPen (Singapore) will prepare you to be a software engineer programmer (BS in Computer Science in Real-Time Interactive Simulation), technical designer (BS in Computer Science in Game Design), game designer (BA in Game Design) or digital artist (BFA in Digital Art and Animation).

What are your reasons for applying to DigiPen (Singapore)?

Describe an exceptional achievement that highlights your academic and employment experience gained.

How would these support your choice of programs and help you attain your goal(s) in life?

What are your plan(s) upon graduation?

Spelling, grammar, and sentence structure, along with the correct use of punctuation, capitalization, quotation marks, etc. are all considered, so proofread your essay carefully.

OPTIONAL ESSAY

Applicants should use this optional essay to explain any unusual circumstances or situations that they think may have an impact on their application.

SUBMISSION

Applicants must submit their personal statement via SIT's online application portal at: *singaporetech.edu.sg.* Answers must be drafted and prepared before beginning the online application.

PROOF OF PROFICIENCY IN THE ENGLISH LANGUAGE

Non-native English speakers must provide proof of English proficiency in one of the following ways:

- A minimum Test of English as a Foreign Language (TOEFL) score of 550 (paper exam). 213 (computer exam), or 80 (IBT – Internet Based Test). TOEFL code: 1493.
- A minimum International English Language Testing System (IELTS) score of 6.5 or higher.
- A minimum Cambridge English: Advanced (also known as a Certificate in Advanced English or CAE) score of C1 or higher.
- Completion of four years of high school or secondary education at an English-speaking school, or an International School where the primary language of instruction is English.
- Completion of a bachelor's degree at an English-speaking institution.

Art Portfolio

Applicants to the BFA in Digital Art and Animation degree program are required to submit an art portfolio that showcases the applicant's best and most recent work. This portfolio must contain between 15-20 samples of artwork created by the applicant. If necessary, DigiPen (Singapore) may request more samples for review.

THE PORTFOLIO SHOULD INCLUDE:

Prescribed Drawings from Direct Observation – Using graphite pencil or charcoal and on quality art paper, the applicant should draw the following four Prescribed Drawings from real life (not from images or photographs):

1. Pair of shoes

2. Same pair of shoes as above but from a different perspective (e.g. shoes drawn from the back) or a different orientation (e.g. shoes turned upside down)

3. Interior space, such as a kitchen or bedroom

4. Self-portrait

The primary objective of these four Prescribed Drawings is for the applicant to demonstrate foundational drawing skills. The applicant should focus on drawing realistically and accurately, and should NOT apply any artistic style (e.g. cartooning) to these four Prescribed Drawings.

Miscellaneous Art Samples - The remaining 11-16 pieces should demonstrate an applicant's current range, skill, and process. These personal works may include animations, figure/animal studies, color studies, original character designs, architectural renderings, landscape studies, sculptures, and paintings. The submitted work should not contain illustrations copied directly from manga, animé, animations, paintings, or photographs (cited master copies are acceptable).

GUIDELINES FOR ART PORTFOLIO SUBMISSIONS
- Applicants are required to present their portfolios during the interview and to submit the identical portfolio in CD format to the DigiPen (Singapore) Admissions Office. Applicants should label their CD-ROM clearly with their name on the front.
- Label all artwork with the date of completion and the medium used. Indicate clearly which drawings are the four Prescribed Drawings from Direct Observation. Please note that DigiPen (Singapore) prefers that the artwork submitted be less than two years old.
- Images should be in focus and properly oriented for the subject.

Admission/Denial to DigiPen (Singapore)'s Programs

DigiPen (Singapore) considers every part of an applicant's materials and qualifications when evaluating the applicant for admission. Meeting the minimum standards is not a guarantee for admission. Applicants who exceed the minimum standards are more likely to be admitted.

Accepted undergraduate applicants will receive an enrollment packet via standard mail. This packet includes an official letter of acceptance, and, if applicable, a request to furnish proof of high school graduation, polytechnic diploma, or completion of a bachelor's degree before the start of classes in the fall. Students will receive their student enrollment agreement by email. By returning the signed enrollment agreement and proof of graduation, an applicant has confirmed enrollment.

Applicants who are accepted and enroll are required to attend an official orientation session prior to the start of the program.

Applicants who are not accepted to the Institute will receive a letter of rejection via email by SIT. When possible, DigiPen (Singapore) will attempt to provide information about the specific areas in which an applicant needs improvement if the applicant wishes to reapply in subsequent years. Please see the Reapplication Information section for more information.

Reapplication Information

Applicants who are denied admission are encouraged to reapply for a future year. By improving the areas suggested on the original decision letters (e.g. devoting more time and energy to a new art portfolio), many of those individuals reapplying for admission are accepted. To reapply, applicants should submit a new application through the SIT application portal at *singaporetech.edu.sg*.

Readmission Information

Any student who wishes to return to the Institute after an absence may apply to do so by contacting SIT's admission team. SIT or DigiPen (Singapore) may require certified-true copies of transcripts from all institutions attended since last attending the Institute and other official documentation for specific circumstances as requested below:

MEDICAL WITHDRAWALS

A physician's statement must be included, and it must indicate that the applicant is ready to resume studying. Additionally, it should describe any special needs the student may require upon returning to DigiPen (Singapore).

READMISSION AFTER ACADEMIC DISMISSAL

A statement explaining how time away from the Institute was spent, why the student wishes to return, and how the student plans to be successful by returning should be submitted as part of the application for readmission. Students dismissed for academic reasons must wait at least one year before they can matriculate. It is highly recommended that students take the time away to raise their GPA through college-level coursework in order to boost the likelihood of being readmitted.

READMISSION AFTER DISCIPLINARY ACTION

Students should include a formal appeal for the Appeals and Disciplinary Committee to review along with their application for readmission. Students previously withdrawn for disciplinary reasons must receive clearance from the Appeals and Disciplinary Committee to return.

READMISSION FOR PERSONAL REASONS

There are usually no impediments to returning to the Institute if there is space available; however, an academic plan may need to be developed with the student's advisor upon re-enrollment, and students requesting readmission after an extended period of time must meet with an academic advisor to determine the viability of completing their degree program.

READMISSION AFTER NON-PAYMENT OF ACCOUNT

Outstanding accounts must first be settled before applying for readmission. Once settled, the policy for readmission follows the same guidelines listed under the *Readmission for Personal Reasons* section.

Exceptions to these requirements will only be made on a case-by-case basis at the discretion of SIT and the Institute.

SUBMISSION OF OFFICIAL TRANSCRIPTS OF COURSEWORK FROM OTHER UNIVERSITIES/COLLEGES

All readmission applicants to DigiPen Institute of Technology Singapore must request an official transcript from the Institute's Registrar's Office to be sent to the Admissions Office as part of their application. Additionally, if the applicant has taken courses from another college since leaving the Institute, any and ALL official transcripts must be forwarded to the Admissions Office from the Registrar of each institution attended. The transcripts should show all academic work until the last semester or quarter completed. If the applicant is approved for readmission with coursework in progress, the applicant's admission status will be provisional, pending receipt of the final transcript(s). Finally, readmission applicants who are applying for readmission more than one year after withdrawing and who are not native English speakers may have to submit additional Proof of English language proficiency. Please see the *Proof of English Language Proficiency* section.

Non-Matriculated Studies

Applicants who are interested in taking individual courses that are part of the Institute's degree programs may register for them based on each semester's course offerings and availability. Applicants will be handled on a first-come, first-served basis.

1. Applicants to Non-Matriculated Studies must show proof of graduation from high school and a recommended minimum 2.5 GPA in their most recent studies for acceptance.

2. Upon application, a degree program track must be selected and additional corresponding materials may be required.

3. Students must pass or show proof of having passed prerequisite courses before they are able to register for more advanced courses. Waiver exams may be administered if students feel they have achieved proficiency.

4. Students must receive a grade of "C-" (or 1.7 quality points) or better to pass courses that are core to their chosen track.

5. Students must maintain a minimum 2.0 GPA in order to remain enrolled in Non-Matriculated Studies. Enrollment is on a continuous basis unless students do not register for courses for a given semester, at which time they will be withdrawn.

6. Applicants who are not native English speakers must provide Proof of English Language proficiency. Please see the *Proof of English Language Proficiency* section.

Please note that courses taken in Non-Matriculated Studies do not lead to a degree and are not applicable to earning a professional certificate from the Institute.

Waiver Credit, Advanced Placement Examinations, CLEP, and Other Credit

Students may apply for course waivers if they can demonstrate that their knowledge and skills - whether they were gained by formal education, exam, work experience, or life experience - are equivalent to those gained by courses offered at DigiPen Institute of Technology Singapore. Credit may be granted through other means: Advanced Placement (AP) Exam scores, College-Level Examination Program (CLEP) subject exam scores, or transfer credits from other post-secondary institutions. Course transfers and waivers are processed at S$42.80 (inclusive of 7% GST) per credit.

Course Waiver Examinations

Students may meet an academic requirement, within specified limits, by passing a waiver examination at least equal in scope and difficulty to a final examination in a course. Successful completion of the examination waives the curricular requirement for a specific course but does not result in credit earned. Waiver credits will not reduce the total number of semester hours required for a degree; however, they will increase the available number of elective hours for a degree. Waiver examinations must be taken prior to the final semester at DigiPen (Singapore), and they may not be repeated.

Students have the opportunity to waive designated core courses by demonstrating mastery of the material in two steps:

1. A waiver petition to the respective department, indicating prior academic coursework and relevant work experience in the subject area; and

2. Performance on a placement exam offered by the respective department at the beginning of each term.

To petition waiving a core course, the student must complete a waiver request for each course, submit a transcript or photocopy of transcript with relevant coursework highlighted, and submit the requests to the Registrar's Office. Waiver requests may be completed online through the Student Record System (SRS). Once submitted, waiver requests need to be approved by the department appropriate to the courses. For waiver requests received by July 1, students will receive notification by August 1. Waiver requests arriving in the Registrar's Office after July 1 will be handled on a rolling basis, as faculty schedules allow. Results of waiver requests received after the deadline are not guaranteed to be available before the start of classes.

It is not possible to predict the results of faculty review of core course waiver requests. Core courses generally include intermediate-level material, so a student who has completed only introductory work in a subject is not likely to be granted a waiver. Faculty take many factors into consideration, including the academic caliber of the school where the course was taken, the difficulty of the text, the grade received, and the time elapsed since completion of the course.

The following restrictions apply to all waiver examinations:

1. A student must have an approved waiver request on file before credit by examination can be recorded on the permanent record.

2. A student must be currently enrolled before a waiver examination can be recorded on the permanent record.

3. A maximum of 15 semester hours may be waived toward a bachelor's degree.

4. Examinations may not be repeated.

5. Repeat course work and "F" grades (or 0 quality points) are not open to waiver requests.

6. Students may not take waiver examinations on courses they have audited.

Advanced Placement Examinations

Course waivers or credit may be granted for satisfactory achievement on Advanced Placement (AP) Exams of the College Entrance Examination Board taken within the last 10 years. AP exams must have been taken prior to the applicant's graduation from high school. No grades will be assigned to the courses, nor will they be figured into a student's grade point average. Courses waived or transferred are entered on a student's transcripts, but no grades or quality points are awarded. Official results must be sent to the Registrar before course waivers or transfers are granted.

DigiPen (Singapore)'s course credits may be waived or transferred if a student obtained the minimum score on the AP examination corresponding to DigiPen (Singapore)'s course (as listed below), and these may be applied to satisfy the Institute's degree requirements.

ACCEPTED AP SCORES AND DIGIPEN COURSE EQUIVALENTS

AP EXAM	MINIMUM SCORE	DIGIPEN COURSE
Art - History of Art	4	ART 210
English - Literature and Composition	4	ENG 110
English - Language and Composition	4	ENG 110
History - World History	4	HIS 100
Japanese	4	JPN 101
Mathematics - Calculus AB	4	MAT 150
Mathematics - Calculus BC	4	MAT 200
Music Theory	4	MUS 120 & MUS 120L
AP Physics – Electricity and Magnetism	4	PHY 270
Physics B - Physics (Introduction) or Physics 1 - Physics (Introduction)	4	PHY 115
Physics C - Physics (Mechanical)	4	PHY 200
Psychology	4	PSY 101

College-Level Examination Program (CLEP)

There are two types of CLEP examinations: General and Subject. DigiPen (Singapore) grants credit or course waivers for Subject Examinations only, and credit will be given only in those areas in which comparable courses are offered at the Institute. Courses waived or transferred are entered on students' transcripts, but no grades or quality points are awarded. These exams may not be repeated. Examination must be taken prior to the student's completion of a total of 40 hours of college credit, and official results must be sent to the Registrar's Office.

CLEP offers a number of subject-matter examinations. Students obtaining the percentiles established by the mathematics, computer science, and humanities and social sciences departments will receive credit toward those basic requirements. Students wishing credit in subjects other than those listed above should consult the appropriate departmental chair. DigiPen (Singapore) will grant credit to students who pass the CLEP Subject Examinations approved by the department appropriate to the examination. The score necessary to receive credit through a Subject Examination will be the mean score achieved by C students in the national norms sample. The appropriate department will determine the number of course credits to be given for passing a Subject Examination.

Students should check with the College Board at *collegeboard.org* for further details and information concerning test centers and dates.

Transfer Credit

Credit earned by examination at other colleges or universities in the last 10 years may be transferred, provided such credit meets the guidelines used by the Institute. A student must take a minimum of 50% of the entire program at the Institute (unless the student attended an institution with which the

Institute has established an articulation agreement). Due to the rigorous nature and subject specificity of the programs at the Institute, students transferring in to the Institute should usually expect that no more than 25% of credits will transfer.

The Registrar will evaluate college credits earned elsewhere with respect to graduation requirements at the Institute. Developmental classes, orientation classes, or classes in which a student receives a "Pass" are not eligible for transfer credit consideration. Courses transferred or waived are entered on transcripts, but no grades or quality points are awarded.

Transfer credit may be accepted subject to the following conditions and restrictions:

1. The course(s) offered for transfer must be taken at a bona fide, legitimate institution recognized and approved by a regulatory authority which oversees the educational system in the country where the institution is located. These courses must appear on official transcripts from the institution. The final decision regarding the transferability of credits remains at the Institute's discretion.

2. The course(s) must be comparable in academic quality to the Institute courses; transfer credit will be denied for courses not meeting this standard. Accordingly, current students are strongly urged to seek transfer approval from their advisor and the Registrar using the form provided for this purpose prior to enrollment in any course for which transfer approval might be sought.

3. Transfer credit will be considered for courses in which the grade of "B-" (or 2.7 quality points) or better is recorded.

4. Courses transferred to a student's major may also require a validation examination in order to be accepted.

5. "Credit" or "Pass" grades will not be accepted for transfer.

If a course is accepted for credit, it will be counted as a transfer credit. No grade points from such transfer courses will be calculated in the Institute grade point average. However, grades transferred for courses taken in residence at institutions with which the Institute has articulation agreements are exempt from this policy and will be recorded. Credit hours from another institution that are accepted towards the student's educational program must count as both attempted and completed hours. Courses transferred in may not be used to substitute improved grades for passing grades earned at the Institute.

Transfer Credits for Diploma Graduates from Local Polytechnics

The Institute and SIT entered into collaboration in March 2010 to offer an admission pathway for graduates with related diplomas from the five local polytechnics, namely:
- Nanyang Polytechnic
- Ngee Ann Polytechnic
- Republic Polytechnic
- Singapore Polytechnic
- Temasek Polytechnic

Students should refer to the SIT website at *singaporetech.edu.sg* for information on related diplomas.

Under this collaboration, students may transfer certain credits for courses that they have successfully completed at their respective polytechnics.

The Institute will communicate to these students their respective course sequences after taking into consideration the approved transfer credits. Students will also be informed of any other necessary bridging courses and/or additional electives that they need to successfully complete in order to meet the requirements to graduate with a degree from the Institute.

Any clarifications on course sequences for graduates from these polytechnics under the SIT collaboration scheme should be directed to the Registrar at the Institute.

Articulation Agreements

Credits from a college with an articulation agreement with DigiPen Institute of Technology Singapore will be accepted and grades earned will be included in students' DigiPen (Singapore) transcripts. Please contact the Registrar for a list of colleges with articulation agreements.

Credit Evaluation Request

Challenge and waiver examinations may be requested from the Registrar's Office or online. A student must have approval for an exam prior to taking it.

Transferability of Credits to Other Institutions

A student wishing to transfer DigiPen (Singapore) credits to another institution may request the Institute to furnish transcripts and other documents necessary to a receiving institution. The Institute advises all prospective students that the courses and credits reflected on their transcript may or may not be accepted by a receiving institution. Students should inquire with the specific receiving institution about the transferability of DigiPen (Singapore) credits.

Granting Credits for Work Experience

The Institute does not grant credit for work experience.

Tuition and Fees

Tuition, Miscellaneous, and Incidental Fees

All tuition, miscellaneous, and incidental fees are collected by SIT.

Students who withdraw before the end of the second week of a semester are not liable to pay tuition fees;

Students who leave SIT either through a withdrawal of their own accord, or termination of candidature by SIT after the second week of a semester, will be liable to pay tuition fees for the entire semester.

For the most updated information, please refer to SIT's website at *singaporetech.edu.sg*, the SIT student handbook, or contact SIT's Registrar's Office.

Alumni Audit Fee

Tuition, application, and enrollment fees are waived, but alumni are responsible for any course, administrative, and technology fees. Fees are non-refundable for alumni audits.

Books and Supplies

Textbooks and supplies are estimated to be approximately S$1,500 (plus 7% GST) per year. This cost is not included as part of the tuition.

Cancellation and Refund Policies

THE INSTITUTE'S CANCELLATION POLICY:
Applicants who have not visited the school prior to enrollment will have the opportunity to withdraw without penalty within three (3) business days following either the regularly scheduled orientation procedures or following a tour of the school facilities and inspection of equipment where training and services are provided.

SINGAPORE INSTITUTE OF TECHNOLOGY'S REFUND POLICIES:
For more information on SIT's withdrawal and refund policy, please refer to *http://www.singaporetech.edu.sg/academic-information/withdrawal&refundpolicy*.

Financial Assistance

(Financial assistance schemes and scholarships are available for those who qualify.)

MDA Media Education Scheme

(For Singaporean citizens and Permanent Residents only)

Singapore's Media Development Authority (MDA) offers a yearly scholarship for students pursuing higher education in media industry-related fields. For more details and to apply for the scholarship, please contact the MDA directly at *mda.gov.sg*.

Financial Assistance Schemes Offered by SIT

(For Singaporean citizens and Permanent Residents only)

Students enrolled at DigiPen Institute of Technology Singapore are eligible to apply for financial assistance schemes offered by SIT. For more information about financial assistance schemes and scholarships offered by SIT, please visit *singaporetech.edu.sg* or contact SIT's Admissions department.

Student Life and Advising

The Student Life and Advising Office provides services to all degree-seeking students in order to support their academic, professional, and personal development. The Student Life and Advising Office provides services that a student will need in their life at DigiPen (Singapore) and beyond, including:

- Academic Advising
- Academic Support Center
- Campus Life
- Counseling Helplines
- Disability Support Services

The sections below detail some aspects of a few of the services provided by Student Life and Advising Office.

Student Advising

DigiPen (Singapore) has adopted a faculty advisor model to provide academic and career-related advising for students. Each student is assigned a full-time faculty member as an academic advisor. Advisors provide answers to academic questions, approve extra courses, and perform degree audits and other administrative functions. Students meet with their advisor during new student orientation and are encouraged to meet with their advisors twice per semester or as-needed during their education. Advisors are instructed to follow up with advisees once a semester, especially during course registration time. Students are required to seek advisor approval for academic status changes, such as changing majors or applying for graduation.

Academic Support Center

Peer tutoring is available for most 100 and 200 level courses in the Academic Support Center. For further information please contact *asc.sg@digipen.edu*.

Disability Support Services

DigiPen Institute of Technology Singapore is committed to providing equal access to all of its programs, courses, events, activities, and services. Wherever possible, reasonable accommodations will be offered provided they neither fundamentally alter the nature of the programs or the academic requirements that are considered essential to the program of study, nor create an undue hardship for DigiPen (Singapore).

DigiPen (Singapore) staff will engage in a collaborative effort with students to ensure equal access for students with disabilities.

Overseas Immersion Program

As required by the collaboration with Singapore Institute of Technology, DigiPen Institute of Technology Singapore operates an overseas exchange program, named as "Overseas Immersion Program," for all DigiPen – SIT students to attend a particular phase of the Institute's baccalaureate degree programs of study (as defined by the Program Directors) at the main campus, DigiPen Institute of Technology, located in Redmond, Washington, USA.

The Overseas Immersion Program is designed to allow DigiPen (Singapore)'s students to acquire overseas learning and immersion experience at the main campus, which enriches their baccalaureate programs of study. All DigiPen – SIT students should complete this program at their own expense. For more information, please refer to SIT's website at *singaporetech.edu.sg* and DigiPen (Singapore)'s website at *singapore.digipen.edu*.

Career and Alumni Services

Career Services

DigiPen (Singapore)'s Career Services staff provides a variety of resources for enrolled degree-seeking students to jumpstart their professional development before they graduate and transition into the industry. These resources include on-campus events for students to meet and interact with game industry professionals, online tools and on-campus facilities to connect students with prospective employers, communication workshops, and both group and one-on-one appointments to review application materials (e.g., resumes, cover letters, websites) and discuss interviewing and other job search skills.

The Career Services staff coordinates a variety of on-campus events for students; recruiters meet with juniors and seniors to offer insight into their companies, review resumes and student work, and interview potential hires at weekly Company Day presentations. Career Services hosts an annual Career Fair for all graduating students to showcase their projects and

portfolios to employers and recruiters from local companies. DigiPen (Singapore)'s Career Services staff also works closely with faculty to host guest lectures by industry professionals on campus.

DigiPen (Singapore)'s Career Services staff establishes relationships with potential employers and maintains an online professional/social networking groups for alumni. The Career Services staff also maintains an SRS bulletin board where open job and internship opportunities for students and visiting alumni are posted.

For further information, please email the Career Services staff at *careerservices.sg@digipen.edu*. Please note that employment upon graduation is not guaranteed, nor is the Institute obligated to secure employment on behalf of students.

Alumni Relations

DigiPen (Singapore) maintains a database of all graduates and DigiPen (Singapore) alumni are encouraged to report back regarding changes to their professional status. DigiPen (Singapore) hosts alumni gathering events for alumni to connect with one another. The Institute also provides career resources post-graduation and encourages alumni to remain connected with the DigiPen community.

The Alumni Audit allows graduates of DigiPen Institute of Technology to take courses tuition-free within two calendar years of graduation. Participating alumni must review and sign an Alumni Audit Enrollment Agreement prior to attending courses.

Regulation of Conduct and Disciplinary Procedures

The Institute has the right to take appropriate disciplinary action warranted by a student's misconduct. The specific provisions as to offenses, penalties, and disciplinary procedures set out below should not be construed as limiting the general authority of the Institute.

Rules and Regulations

1. It is strictly forbidden to bring in or out of the premises any digital storage and any form of memory sticks or optical media, diskettes, video recorders, etc. other than for academic and approved usages which directly apply to courses being taken by the student during the term of this agreement, or for the required purpose of maintaining back-up copies of student-created projects and assignments. Students are responsible for guaranteeing that any files transferred to and from the Institute's equipment are free of malicious viruses or Trojan horses. In respect to the above, students are only allowed to carry in and out of the Institute's premises data files only and not executable files. This includes student-created executables. Following this policy will greatly reduce the risks of virus infections to the Institute's network. In order for the Institute's

faculty to review and grade projects and assignments, source code must be stored and executables must be generated at the Institute from the corresponding source code.

2. Students are forbidden from downloading any files from the internet or installing any software, including but not limited to freeware and/or shareware, without the written approval from an Institute faculty member or from the Institute's IT staff. Furthermore, illegal use of the internet may be prosecuted to the fullest extent of the law.

3. In order to prevent damage to equipment and facilities, food and/or drink are not permitted anywhere within the training areas of the premises.

4. Smoking is not permitted anywhere within the premises, including, but not limited to, the washrooms, elevators, and stairwells.

5. Student ID tags must be worn visibly when on the premises. Lost or stolen ID tags must be reported to the Administration Office as soon as possible.

6. All student projects must receive approval from the Institute's instructors prior to commencement of any production. The Institute reserves the right to reject ideas or to stop production of any student game, animation, or project for reasons deemed appropriate to the Institute. The Institute will not allow the production of any student work that contains or makes a direct or indirect reference to any of the following material/subjects:
   - o Religious content
   - o Religious symbols
   - o Pornographic material
   - o Excessive violence
   - o Sexual and nude content
   - o Promotion of illegal substances
   - o Promotion of racism or hate
   - o Content demeaning to any group of society

7. Plagiarism will not be tolerated. Any student who submits the work of another person as the student's own is considered to have committed plagiarism. Types of work that can be plagiarized include, but are not limited to, source code, artwork, concepts, designs, or other material. Anyone submitting someone else's work without the explicit written permission from the legal owner may have violated the owner's intellectual property rights or copyrights, in addition to committing plagiarism. If any student is unsure as to what constitutes a case of plagiarism, the student should consult an instructor for clarification.

8. Students shall not submit any work to the Institute that infringes upon the intellectual property rights of a third party. If, during the program, a student submits such work to the Institute, the student shall indemnify or hold harmless the Institute from and against all loss, damage, cost (including legal fees), and other liability, which the Institute may suffer as a result of the same.

9. Cheating on an examination will not be tolerated. Using any materials other than those authorized by the examiners during an exam is an example of cheating.

10. Submitting false documents, transcripts, or any other academic credentials to gain admission to DigiPen or to obtain any academic benefit is grounds for expulsion without recourse.

11. Disrupting instructional activities, including making it difficult to proceed with scheduled lectures, seminars, examinations, tests, etc., shall be considered an offense.

12. In the interest of maintaining an environment that is safe and free of violence and/or threats of violence for its employees, students, and visitors, possession of a dangerous weapon is prohibited on property owned by or under the control of the Institute. Weapons and ammunition are potential safety hazards. Possession, use, or display of weapons or ammunition is inappropriate in an academic community for any reason, except by law enforcement officials. No weapons or ammunition shall be worn, displayed, used, or possessed on campus. Any member of the Institute community who violates this policy shall be subject to appropriate disciplinary action up to and including dismissal from the Institute and shall be subject to all appropriate procedures and penalties including, but not limited to, the application of the criminal trespass provisions of the law of the state of Washington. Any person who is not a member of the DigiPen community who violates this policy shall be subject to all appropriate procedures and penalties including, but not limited to, the application of the criminal trespass provisions of the law of the Republic of Singapore. Members of the Institute community who are aware of any violations of this policy or who have other concerns about safety or weapons should report them to the Dean of Faculty and Academic Affairs, Managing Director, or the Chief Operating Officer – International.

13. Evidencing symptoms of alcohol or drug use while on Institute property, or the procurement or possession of alcohol or illegal substances on Institute property, is considered an offense.

14. It is forbidden to damage, remove, or make unauthorized use of the Institute's property or the personal property of faculty, staff, students, or others at the Institute. Without restricting the generality of "property," this includes information; however it may be recorded or stored.

15. It is strictly forbidden to use any equipment in the premises to produce any commercial work. The equipment is only to be used for homework and training purposes. Any attempt to produce commercial work will result in legal action against the offenders.

16. Public areas and equipment of the building must be kept clean. No tampering, moving, defacing, or otherwise altering the premises, equipment, or the building property is allowed.

17. Graffiti, other forms of mural art, or the posting of signs anywhere in the premises and the building without permission of the Administration is not permitted.

18. Office equipment (photocopier, fax, office phone, etc.) is not available for student use.

19. The assault of individuals, whether verbal, non-verbal, written, or physical, including conduct, or any other kind of assault which leads to the physical or emotional injury of faculty, staff, students, or others at the Institute, or which threatens the physical or emotional well-being of faculty, staff, students, or others at the Institute, is considered an offense.

20. In accordance with applicable law, DigiPen prohibits sexual harassment and harassment between employees, between students, and between employees and students. Harassment due to race, sex, color, national origin, ancestry, religion, physical or mental disability, veteran status, age, or any other basis protected by federal, state, or local law may violate the law and will not be tolerated. The Institute's policy prohibits inappropriate conduct even though it may not reach the legal standard for harassment.

21. It is forbidden to attempt to engage in, or aid and abet others to engage in, conduct which would be considered an offense.

22. Failing to comply with any penalty imposed for misconduct is considered an offense.

Disciplinary Process

1. Student Life and Advising Office will be notified of the alleged student misconduct.

2. Student Life and Advising Office will gather information to determine if the allegations are warranted, what, if any, policies were violated, and the extent of the violations.

3. Student Life and Advising Office will assess the need for a disciplinary hearing.

    a. One offense of academic dishonesty may or may not result in a disciplinary hearing, however two notifications of academic dishonesty will automatically result in a hearing with the Appeals and Disciplinary Committee.

4. The student(s) involved will be contacted through email, phone, or letter indicating the alleged violation and a meeting time with Student Life and Advising Office.

5. Based on the severity of the alleged violation, a Student Life and Advising Officer will determine during the meeting if the student will have the disciplinary meeting with:

a. Student Life and Advising Officer(s) (if the alleged violation does not have the possibility of resulting in suspension or expulsion), or

b. Appeals and Disciplinary Committee (if the alleged violation does have the possibility of resulting in suspension or expulsion).

   I. The Appeals and Disciplinary Committee consists of faculty, and staff who are briefed on the alleged violation and review relevant information to the alleged misconduct.

6. If the student is not found to be in violation of any academic or campus policy, there will be no further action.

7. If the student is found to be in violation of any academic or campus policy, the Student Life and Advising Office or the Appeals and Disciplinary Committee will determine the appropriate sanction, which can include, but is not limited to, a failing grade, suspension, or expulsion from the Institute.

8. The student will be notified in writing of the decision and of any possible sanctions.

9. Student Life and Advising Office will monitor any sanction imposed on the student.

10. Students who fail to comply with the terms of their sanction will be committing an additional policy violation and could be subject to more disciplinary action.

11. All documentation of the violation will be kept on file with the Student Life and Advising Office.

Warnings

1. The penalty for plagiarism or for cheating is normally suspension from the Institute.

2. Charges filed under the law of the Republic of Singapore and/or the commencement of legal proceedings do not preclude disciplinary measures taken by the Institute.

Penalties

The penalties that may be imposed, singly or in combination, for any of the above offenses may include, but are not limited to, the following:

1. A failing grade or mark of zero for any course, examination, or assignment in which the academic misconduct occurred.

2. Suspension from the Institute for a specified period of time or indefinitely. Students will not receive credit for courses taken at another institution during a suspension.

3. Reprimand, with the letter placed in the student's file.

4. Restitution, in the case of damage to property or unauthorized removal of property.

5. A notation on the student's permanent record of the penalty imposed.

6. Expulsion from the Institute.

7. Legal action against the student committing the offense.

Appealing a Charge of Academic Dishonesty or Policy Violation

A student has the right to appeal a charge of academic dishonesty or policy violation, or the penalties assigned for academic dishonesty or policy violation, with the Appeals and Disciplinary Committee. The student has two weeks from the official written charge to appeal the alleged violation.

Appealing a Decision Made by the Appeals and Disciplinary Committee

The student has the right to dispute the decision of the Appeals and Disciplinary Committee. If the student wishes to make an appeal, the student must notify the Dean of Faculty and Academic Affairs (or designee) and must provide a full explanation of the reasons for appealing in writing within one week of being notified of the decision. Appeal hearings take place before the Dean of Faculty and Academic Affairs (or designee). A member of the Appeals and Disciplinary Committee puts forth the reason for the original decision. As soon as possible after the hearing is completed, the Dean of Faculty and Academic Affairs (or designee) will notify the student of the final decision in writing.

The student has the right to dispute the disciplinary decision of the Dean of Faculty and Academic Affairs (or designee) for all decisions resulting in suspension or expulsion. If the student wishes to make an appeal, the student must notify the Chief Operating Officer – International in writing within one week of being notified of the decision, and must provide a full explanation of the reasons for appealing. The Dean of Faculty and Academic Affairs (or designee) puts forth the reasons for the original decision. As soon as possible after the hearing is completed, the Chief Operating Officer – International will notify the student of the final decision in writing.

Dismissal by the Institute

By written notice to a student, the Institute may, at its sole discretion, dismiss a student at any time if the student is in default of any of the terms, covenants, or conditions of the Institute. Furthermore, the Institute reserves the right to withdraw a student if the student is unable to maintain the minimum required GPA in the student's courses at the end of each semester. Upon dismissal, the student shall immediately return to the Institute all materials in the student's possession relating to the program, whether created by the student or other students, or provided by the Institute.

Student Internships

Overview of Internships for Credit

Student internships are monitored, on-site work or service experiences for which students earn credit. Students who meet the prerequisites and are in good academic standing are eligible for internships.

Internships can be arranged for any setting related to a student's career goals. The internship usually takes place in a professional workplace under the supervision of an experienced professional, whereby a high degree of responsibility is placed on the student. Internships can be part-time or full-time and must be paid. Internships must be approved in advance by the Institute.

Objectives of Internship Programs

Through an internship program, students establish and meet intentional learning goals through actual product development experience, while actively reflecting on what they are learning throughout the experience. The goals for the internship may include:

- Academic learning - applying knowledge learned in the classroom to tasks in the workplace.
- Career development - gaining knowledge necessary to meet minimum qualifications for a position in the student's field of interest.
- Skill development - an understanding of the skills and knowledge required in a specific job category.
- Personal development - gaining decision-making skills, critical thinking skills, and increased confidence and self-esteem.

Since internships have a strong academic component, students are carefully monitored and evaluated for academic credit. Internships may vary in duration but generally last for one semester (3-4 months) and credit is granted based on 45 hours of internship per credit. For example, 5 credits (225 hours) and 3 credits (135 hours). Typically, students may replace two semesters of their respective program's projects courses. Please refer to individual program requirements for more information. Students may not replace more than 10 internship credits.

More detailed information about student internships can be found in the Internship Guidelines available in the Student Life and Advising Office.

Change of Major and Graduation

Requesting a Change of Major

Students wishing to change their major are encouraged to speak with their academic advisor before submitting an application. To apply for a change of major, the following steps must be completed:

1. Submit a Request for Change of Major form through the Student Record System portal. Admissions will print an unofficial grade report to include with the Change of Major Application.

2. Submit a Change of Major Statement addressing the following topics:
   - Discuss reasons for requesting a change of major, and explain how these reasons relate to your future goals (personal, educational, and professional).
   - Describe how a change of major will affect your academic plan from this point forward, and include any steps you will take to ensure a smooth transition.

3. Arrange a meeting with the SIT Registrar Office and complete the SIT Change of Programme form.

4. Submit any additional materials required for the degree program to which you would like to change.

Art portfolios should be submitted in hard copy or electronic format, as originals will not be returned.

Once all relevant materials have been received and the application has been evaluated, a decision regarding the change of major will be sent to the student via mail or email. Students approved for a change of major will be emailed an enrollment agreement corresponding to the new program. The student must either sign this agreement electronically through DocuSign or print, sign, and return it to the Admissions Office before the change can take effect. In addition, students need to contact SIT's Admissions Department to undertake the necessary process stipulated by SIT.

IMPORTANT INFORMATION REGARDING CHANGE OF MAJOR REQUESTS

- Changes of Major only take effect on the first day of a new semester. To be considered, requests must be submitted at least fifteen working days before the end of the current semester; otherwise, the request will be considered for the next available semester.
- Students requesting a change of major should remember to consider add/drop deadlines. Requests for change of major do not exempt students from the add/drop policies at the Institute.
- A student may register for courses in any major prior to the deadline for adding a course, but it is recommended that the student speaks to their academic advisor if they have not yet had their request for a change of major approved.
- Students should speak to the degree program faculty if they have specific questions about transferring from one degree program to another.

Any questions about the status of a change of major request or about this process should be directed to the Admissions Office.

Graduation Requirements

Degrees will be granted at the end of the semester in which students complete the final requirements. For example, if a student receives an "I" grade in a course required for graduation in their final semester, the student will not graduate until the semester in which the "I" is replaced by a letter grade. During that semester, the student must reapply for graduation.

A program of study must be completed within a reasonable period of time for a student to be eligible for graduation. The Institute defines "reasonable time" as: the credit hours attempted cannot exceed 1.5 times the credit hours required to complete the program. Full-time students who do not complete their studies during this maximum time frame will be placed on Academic Warning and will have to complete their program requirements under the conditions of their Academic Warning. For more information, please see the *Academic Warning* section.

Applying for Graduation

The Institute sets minimum requirements for all students seeking undergraduate degrees. The Institute reserves the right to change graduation requirements at any time. Every degree candidate is expected to comply with changes in requirements as they relate to the uncompleted portion of coursework.

Most students will follow the graduation requirements published in the Catalog for the year they enter the Institute. Students who interrupt their attendance may be held to the requirements of the current Catalog when they return. Students are responsible for ensuring that all graduation requirements have been completed.

Approximately four to six weeks after students apply for graduation, a degree audit report will be issued. This report identifies courses students have taken to complete their degree requirements. This report assists students in planning future coursework to ensure that all graduation requirements are met. Students should take the degree audit report with them when checking progress toward graduation with their academic advisor and/or the Registrar's Office. Students are responsible for notifying the Registrar's Office of any changes in their proposed programs and for resolving any questions prior to registering for their final term at the Institute.

All Incomplete grades and conditions affecting graduation must be removed from the student's record by the last regular class period of the semester. All credit course work affecting graduation must be completed by the regular class period of the semester. A letter of instruction is mailed to degree candidates prior to commencement regarding deadlines and procedures for commencement-related activities.

Undergraduate students who feel there is justification for an exception to these graduation requirements may petition the Appeals and Disciplinary Committee. Information on filing a petition is available at the Registrar's Office.

Graduation Application Process

GRADUATION DATE	GRADUATION APPLICATION DUE DATE
April	December 1
August	April 1
December	August 1

1. The student completes the Graduation Application and submits the S$214.00 (inclusive of 7% GST) graduation fee by the deadlines stated above.

2. The academic advisor or the Registrar will review the most recent transcript or degree plan to verify progress and will notify the student of whether or not the student has completed all courses satisfactorily to date, and if, upon satisfactory completion of courses for which the student is currently registered, the student will be eligible for graduation.

3. Final approval will not be made until after final grades are submitted and posted to the student's record. Degrees will be mailed as soon as possible after that process, which should be from four to six weeks after completion. The student needs to keep the Registrar's Office informed of address changes so that degrees will be mailed to the correct address.

Graduating with Academic Honors

DigiPen Institute of Technology Singapore recognizes and commends students whose cumulative GPA indicates distinguished academic accomplishment upon the completion of the program.

Undergraduate students who graduate with a cumulative GPA of 3.85-4.0 are recognized as graduating Summa Cum Laude.

Undergraduate students who graduate with a cumulative GPA of 3.7-3.84 are recognized as graduating Magna Cum Laude.

Undergraduate students who graduate with a cumulative GPA of 3.5-3.69 are recognized as graduating Cum Laude.

Educational Rights and Privacy of Student Records

DigiPen Institute of Technology Singapore reserves for students certain rights with respect to their education records. These rights are:

1. The right to inspect and review their education records within 45 days of the day the Institute receives a request for access. Students should submit to the Registrar, Dean of Faculty and Academic Affairs, or head of the academic department (or appropriate official) written requests that identify the record(s) they wish to inspect. The Institute official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the Institute official to whom the request

was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes is inaccurate or misleading. Students may ask the Institute to amend a record that they believe is inaccurate. They should write to the Institute official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate. If the Institute decides not to amend the record as requested by the student, the Institute will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records. One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is defined as a person employed by the Institute in an administrative supervisory, academic, or support staff position; law enforcement officials and health staff; a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility. Upon request, the Institute discloses education records without consent to officials of another school to which a student seeks or intends to enroll.

Release of Student Directory, Academic, and Financial Records

If a student's parent, guardian, family member, or other individual wishes to obtain any of the student's information (including, but not limited to, account balance, tuition payments due, class registration, etc.), the student must fill out and submit the Student Consent for Release of Records Form listing the names of the individuals to whom the student's information may be released. This form will be distributed to all new students prior to matriculation. It can also be obtained online through the Student Records System (SRS).

Personal Data Protection Act

The Personal Data Protection Act (PDPA) of 2012 established regulations on collection, use and disclosure of personal data. It primarily aims to recognize the rights of individuals to protect, access, and correct their personal data (including directory information such as contact number, postal address) and the needs of organizations to collect, use, or disclose personal data for reasonable and valid purposes. PDPA also includes the DO NOT CALL provision (DNC) which restricts organizations from sending marketing and promotional information to individuals without their consent.

In compliance to PDPA, DigiPen Institute of Technology Singapore has outlined the following general guidelines in handling matriculated student data:

- Accumulated student data (personal and educational records) will be used for the purpose of delivering academic and administrative services, conducting internal analysis/research, report generation for authorized internal or external (i.e. auditors, government agencies) parties as well as in promoting educational activities organized by the Institute.
- Access to student data is limited to authorized staff or faculty members of the Institute who require such information to perform their educational duties. Personal data, including educational records, of any student will not be disclosed by the Institute to any external party without the student's written consent.
- The Institute will correct any error or missing information on the student record upon written request.

If you have any questions on PDPA, please contact the Registrar at *registrar.sg@digipen.edu*.