

COURSE CATALOG

2020–2021

Published November 2019

Notices

Degree Exemption

In accordance with the Degree-Granting Institutions Act Regulations (WAC 250-61-060 (3)), institutions that meet certain criteria are eligible for exemption from degree authorization. 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.

Nonimmigrant Alien Students

This school is authorized under Federal law to enroll nonimmigrant alien students.

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.

The Bachelor of Science in Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, abet.org. This accreditation action extends retroactively from October 1, 2012.

The Bachelor of Science in Computer Science in Real-Time Interactive Simulation program is accredited by the Computing Accreditation Commission of ABET, abet.org. This accreditation action extends retroactively from October 1, 2015.

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DigiPen Institute of Technology 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 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 Office of the Registrar. Current major and degree requirements may also be obtained from the Office of the Registrar. For the most current information, visit DigiPen’s official Course Catalog online at digipen.edu/academics/course-catalog.

**Please note that “Institute” and “DigiPen” refer to “DigiPen Institute of Technology” when used in the Course Catalog.*

Academic Calendar

- **August 24-26, 2020**
Monday – Wednesday
Orientation - First Year Students
- **August 31, 2020**
Monday
Fall Semester 2019 Begins
- **September 7, 2020**
Monday
Labor Day
No Classes – Labs Open
- **November 11, 2020**
Wednesday
Veterans Day
No Classes – Labs Open
- **November 26-27, 2020**
Thursday – Friday
Thanksgiving
No Classes – Labs Open
- **December 7-11, 2020**
Monday – Friday
Fall Semester 2020 Finals Week
- **December 11, 2020**
Friday
Fall Semester 2020 Ends
- **December 12, 2020-January 3, 2021**
Saturday – Sunday
Winter Break
No Classes – Labs Open
- **January 4, 2021**
Monday
Spring Semester 2021 Begins
- **January 18, 2021**
Monday
M.L. King Jr. Day
No Classes – Labs Open
- **February 3, 2021**
Wednesday
Founder's Day
No Classes – Labs Open
- **February 15, 2021**
Monday
Presidents' Day
No Classes – Labs Open
- **TBD 2021**
Monday – Friday
Spring Break
No Classes – Labs Open
- **April 19-23, 2021**
Monday – Friday
Spring Semester 2021 Finals Week
- **April 23, 2021**
Friday
Spring Semester 2021 Ends
- **April 26-30, 2021**
Monday – Friday
Intersession
- **T.B.A.**
Commencement
- **May 3, 2021**
Monday
Summer Semester 2021 Begins
- **May 31, 2021**
Monday
Memorial Day
No Classes – Labs Open
- **July 5, 2021**
Friday
Independence Day Observed
No Classes – Labs Open
- **July 19–23, 2021**
Monday – Friday
Summer Semester 2021 Finals Week
- **July 23, 2021**
Friday
Summer Semester 2021 Ends
- **August 23-25, 2021**
Monday – Wednesday Orientation
– Incoming Students
- **August 30, 2021**
Monday
Classes Begin – Fall Semester
- **September 6, 2021**
Monday
Labor Day
No Classes – Labs Open
- **November 11, 2021**
Thursday
Veterans Day
No Classes – Labs Open
- **November 25-26, 2021**
Thursday – Friday
Thanksgiving
No Classes – Labs Open
- **December 6-10, 2021**
Monday – Friday
Fall Semester Final Exams
- **December 10, 2021**
Friday
Fall Semester Ends

The Institute is closed on all statutory holidays. 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. It is usually the last two working days of the month unless otherwise posted. Enrollment occurs once a year, in September.

Deadlines

- **July 6, 2020** *Monday*
Last day to submit Request for Change of Major for Fall 2020 semester. Last day to submit Application for Readmission for Fall 2020 semester.
- **August 17, 2020** *Thursday*
Tuition balance due for Fall 2020 semester.
- **September 8, 2020** *Tuesday*
Last day to add courses for Fall 2020 semester.
- **September 11, 2020** *Friday*
Last day to drop Fall 2020 semester courses for 100% refund.
- **September 11, 2020** *Friday*
Final day to drop courses without academic penalty.
- **September 29, 2020** *Tuesday* Withdrawal deadline for 50% refund.
- **October 26, 2020** *Monday*
Final day to receive a “W” on transcript for Fall 2020 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) which will appear on transcript.
- **November 23, 2020** *Monday*
Last day to submit Request for Change of Major for Spring 2021 semester. Last day to submit Application for Readmission for Spring 2021 semester.
- **December 15, 2020** *Tuesday*
Tuition balance due for Spring 2021 semester.
- **January 11, 2021** *Monday*
Last day to add courses for Spring 2021 semester.
- **January 15, 2021** *Friday*
Last day to drop Spring 2021 semester courses for 100% refund.
- **January 15, 2021** *Friday*
Final day to drop courses without academic penalty.
- **February 2, 2021** *Tuesday*
Withdrawal deadline for 50% refund.
- **March 1, 2021** *Monday*
Final day to receive a “W” on transcript for Spring 2021 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) which will appear on transcript. Final day to drop a course.
- **April 5, 2021** *Monday*
Last day to submit Request for Change of Major for Summer 2021 semester. Last day to submit Application for Readmission for Summer 2021 semester.
- **April 15, 2021** *Wednesday*
Tuition balance due for Summer 2021 semester.
- **May 10, 2021** *Monday*
Last day to add courses for Summer 2021 Semester.
- **May 14, 2021** *Friday*
Last day to drop Summer 2021 semester courses for 100% refund. Automatic Withdrawal date from courses missing prerequisites.
- **May 14, 2021** *Friday*
Final day to drop courses without academic penalty.
- **June 1, 2021** *Tuesday*
Last day to receive 50% Summer 2021 tuition refund.
- **June 28, 2021** *Monday*
Final day to receive a “W” on transcript for Summer 2021 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) which will appear on transcript. Final day to drop a course.
- **July 6, 2021** *Tuesday*
Last day to submit Request for Change of Major for Fall 2021 semester. Last day to submit Application for Readmission for Fall 2021 semester.
- **August 16, 2021** *Monday*
Tuition balance due for Fall 2021 semester.
- **September 6, 2021** *Monday*
Last day to add courses for Fall 2021 semester.
- **September 10, 2021** *Friday*
Last day to drop Fall 2021 semester courses for 100% refund.
- **September 10, 2021** *Friday*
Final day to drop courses without academic penalty.
- **September 28, 2021** *Tuesday*
Withdrawal deadline for 50% refund.
- **October 25, 2021** *Monday*
Final day to receive a “W” on transcript for Fall 2021 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) which will appear on transcript.
- **November 22, 2021** *Monday*
Last day to submit Request for Change of Major for Spring 2022 semester. Last day to submit Application for Readmission for Spring 2022 semester.
- **December 15, 2021** *Wednesday*
Tuition balance due for Spring 2022 semester.

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Contact Information

Name of the School

DigiPen Institute of Technology

Contact Information

DigiPen Institute of Technology

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USA

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Campus List

MAIN CAMPUS

DigiPen Institute of Technology

9931 Willows Road NE

Redmond, WA 98052

USA

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*

Beta1 – Ribera de Zorrozaurre, 2

48014 Bilbao (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 Science in Computer Science and Digital Audio
- Bachelor of Science in Computer Science in Machine Learning
- Bachelor of Science in Computer Science
- Bachelor of Science in Computer Engineering
- Bachelor of Fine Arts in Digital Art and Animation
- Bachelor of Arts in Game Design
- Bachelor of Arts in Music and Sound Design
- Master of Science in Computer Science
- Master of Fine Arts in Digital Arts

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 will strive to be ethical practitioners.

Student Outcomes

Towards achieving the above objectives, upon completion of the BS in Computer Science in Real-Time Interactive 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.

Students in the BS in Computer Science in Real-Time Interactive Simulation degree program who are interested in pursuing a graduate degree at DigiPen or are taking graduate-level coursework during their undergraduate studies may participate in the "BS/MS in Computer Science Accelerated Schedule" option, which permits students to obtain the Bachelor of Science and Master of Science (both in Computer Science) degrees within five years. Students who meet the minimum requirements to take selected graduate-level courses during the junior and senior years of their undergraduate study can apply up to 15 credits towards both BS and MS degree requirements. Students who pursue the accelerated schedule can successfully complete their BS in Computer Science in Real-Time Interactive Simulation degree program and Master of Science in Computer Science in five years sequentially. Please refer to the *BS/MS in Computer Science Accelerated Schedule* section for more details.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science in Real-Time Interactive Simulation degree program requires completion of at least 142 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

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all courses for the BS in Computer Science in Real-Time Interactive Simulation degree program.

ART AND MUSIC

The following courses are required: CG 130 and three additional credits from the following: ANI 125, ART 105, FLM 115, FLM 151, FLM 152, or MUS 115.

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, and CS 350. Students must select 12 additional credits from Computer Science courses at the 200 course-level or higher.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: ENG 110, and COM 150. Students must take six additional credits of English courses and an additional three credits of Social Sciences courses.

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.

PHYSICS

The following courses are required: PHY 200, PHY 200L, and PHY 250.

PROJECTS

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 300, and GAM 350. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490.

GENERAL STUDIES

The following course is required: COL 101.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation: ART or MUS elective (3), COM 150 (3), ENG 110 (3), six credits of English courses (6), three credits of Social Sciences courses (3), MAT 150 or MAT 180 (4), MAT 250 (3), PHY 200 (4), PHY 200L (1), and PHY 250 (4).

Recommended Course Sequence for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	4
	CS 100	Computer Environment	4
	CS 120	High-level Programming I: The C Programming Language	4
	ENG 110	Composition	3
	COL 101	College Life and Academic Skills	1
	GAM 100	Project Introduction	3
	Semester Total		
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	4
	CS 170	High-level Programming II: The C++ Programming Language	4
	CS 230	Game Implementation Techniques	3
	COM 150	Interpersonal and Work Communication	3
	GAM 150	Project I	3
	Semester Total		
Summer	One or more of the following courses may be taken in the summer for those who wish to reduce the Semester 3 and/or Semester 4 course load: CS 225, MAT 200, PHY 200		
Semester 3	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	4
	CS 180	Operating Systems I: Man-Machine Interface	3
	CS 200	Computer Graphics I	3
	CS 225	Advanced C/C++	3
	GAM 200	Project II	4
	Semester Total		

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 4	MAT 250	Linear Algebra	3
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Lab	1
	CS 250	Computer Graphics II	3
	CS 280	Data Structures	3
	GAM 250	Project II	4
	Semester Total		
Summer	One or more of the following courses may be taken in the summer for those who wish to reduce the Semester 5 and/or Semester 6 course load: CS 300, CS 315, MAT 258		
Semester 5	MAT 258	Discrete Mathematics	3
	PHY 250	Waves, Optics, and Thermodynamics	4
	CS 260	Computer Networks I: Interprocess Communication	3
	CS 300	Advanced Computer Graphics I	3
	CS 330	Algorithm Analysis	3
	GAM 300	Project III	4
	Semester Total		
Semester 6	Math Elective	Any MAT course numbered 200 or higher	3
	CS 315	Low-Level Programming	3
	CS 350	Advanced Computer Graphics II	3
	Computer Science Elective	Any CS course numbered 200 or higher	3
	CG 130	3D Computer Animation Production I	3
	GAM 350	Project III	4
	Semester Total		
Semester 7	Math Elective	Any MAT course numbered 200 or higher	3
	Computer Science Elective	Any CS course numbered 200 or higher	3
	English Elective	Any ENG course of three credits or more	3
	ART and MUS Elective	Select one: ANI 125, ART 105, FLM 115, FLM 151, FLM 152, or MUS 115	3
	GAM 375*	Project III	4
	Semester Total		
Semester 8	English Elective	Any ENG course of three credits or more	3
	Computer Science Elective	Any CS course numbered 200 or higher	3
	Computer Science Elective	Any CS course numbered 200 or higher	3
	HSS Elective	Any HIS, PSY, or SOS course of three credits or more	3
	GAM 400*	Project IV	4
	Semester Total		
Degree Total - minimum credits			142

*Note: Other courses may fulfill this requirement. See Degree Program Requirements for details.

Accelerated Schedule: BS/MS in Computer Science

DigiPen offers students the opportunity to complete both the Bachelor of Science in Computer Science in Real-Time Interactive Simulation and Master of Science in Computer Science programs in five years through an accelerated schedule. The accelerated schedule permits students who meet the minimum requirements to take selected graduate-level courses during the junior and senior years of their undergraduate study and apply up to 15 credits towards both BS and MS degree requirements. Students who pursue the accelerated schedule will successfully complete their BS in Computer Science in Real-Time Interactive Simulation degree while at the same time beginning to extend their knowledge into the graduate-level curriculum. This allows students to finish both degree programs in five years sequentially (i.e., Bachelor of Science in Computer Science in Real-Time Interactive Simulation in four years, and then Master of Science in Computer Science in one year).

Eligibility

To be considered for the BS/MS accelerated schedule, students must meet the following requirements:

- be enrolled in Bachelor of Science in Computer Science in Real-Time Interactive Simulation degree program at DigiPen Institute of Technology
- have junior standing
- have a cumulative GPA in CS/MAT/PHY courses of 3.00 or higher
- submit petition to take graduate-level CS electives to MSCS Program Director

The Master of Science in Computer Science Program Director will review the student's request of entering the accelerated schedule and inform the student within three weeks upon receiving the petition. Please note that the petition to be considered for the BS/MS accelerated schedule does not indicate admission to the Master of Science in Computer Science degree program. Students must still apply for the Master of Science in Computer Science degree program following the standard admission procedures.

Policies

The recommended course sequence for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation degree program includes several electives. Students on the accelerated schedule may choose up to five graduate-level CS, PHY, or MAT courses for their corresponding electives. Those courses will be shared between undergraduate and graduate programs. No more than two of the shared courses can be non-CS electives. Students may only share credits of courses for which they earn a grade of "B-" (or 2.7 quality points) or higher. Shared courses must satisfy requirements of the Master of Science in Computer Science degree program.

Degree Requirements

The MS in Computer Science degree program requires a total of 37 credits; students who complete 15 credits during their undergraduate program will have 22 credits remaining. Those remaining credits may be completed in two semesters (i.e., 12 credits during the first semester and 10 during the second). Students taking the accelerated schedule must also satisfy the MS in Computer Science degree program graduation requirements by completing the following:

- One of the remaining courses must be a MAT course numbered 500 or higher.
- GAM 550 and GAM 551 are required.
- Students must take CS 598 (MS in Computer Science Colloquium).
- A sequence of two graduate-level courses in an approved concentration area. Graduate-level courses taken during the undergraduate program may be used to fulfill this requirement.
- Either one of the following:
 - » Thesis or
 - » Extra coursework and Comprehensive Exam.

Accelerated Schedule: MS Recommended Course Sequence

Below is the recommended MS in Computer Science schedule for students completing the accelerated schedule.

SEMESTER	OPTIONS	COURSE NAME	CREDITS
Semester 1	MAT Elective	MAT 500 or above	3
	Concentration Elective	See MS in Computer Science Degree Requirements section for details	3
	GAM 550	Advanced Game Project	3
	Elective or CS 601	CS 500 or above or Master's Thesis I	3
Semester Total			12
Semester 2	CS 598	CS Colloquium	1
	Concentration Elective	See MS in Computer Science Degree Requirements section for details	3
	GAM 551	Advanced Game Project	3
	Elective or CS 602	CS 500 or above or Master's Thesis II	3
Semester Total			10

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++, giving them the technical foundation to become proficient in programming with scripting languages, game logic, user interfaces, artificial intelligence, and design tools. Graduates will also be able to design and implement game levels, game systems, and game behaviors. Graduates will have extensive experience testing, iterating, and polishing, 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 AND GPA

The Bachelor of Science in Computer Science and Game Design requires completion of at least 142 semester credits with a cumulative GPA of 2.0 or better. The program spans eight semesters of 15 weeks each, or four academic years.

GRADE

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all courses for the BS in Computer Science and Game Design major.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 180, CS 225, CS 230, CS 280, CS 325, and CS 330. 12 additional credits must be selected from other CS courses numbered 200 or higher.

MATHEMATICS AND SCIENCE

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, MAT 258, PHY 200, PHY 200L, and PHY 250. Six additional credits must be selected from other PHY or MAT courses numbered 250 or higher.

PROJECTS

The following courses are required: GAM 100 and GAM 150. Twenty-four additional credits must be selected from other GAM or CSP courses numbered 200 or higher.

DESIGN

The following courses are required: DES 115, DES 212, DES 214, and DES 315. Six additional credits must be selected from Game Design courses at the 200 course-level or higher.

PSYCHOLOGY

The following course is required: PSY 101.

ENGLISH

Six credits must be selected from English courses.

HUMANITIES AND SOCIAL SCIENCES

Three credits must be selected from Humanities and Social Sciences courses.

ART, CG, OR MUSIC

One of the following courses is required: ART 102, ART 105, CG 102, CG 125, CG 130, or MUS 115.

CAREER PREPARATION

The following course is required: COM 150.

COLLEGE PREPARATION

The following course is required: COL 101.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science and Game Design: COM 150 (3), PSY 101 (3), two ENG electives (6), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), PHY 200 (4), PHY 200L (1), PHY 250 (4), and one HSS elective (3).

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

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	GAM 100	Project Introduction	3
	CS 100	Computer Environment	4
	CS 120	High-Level Programming I: The C Programming Language	4
	MAT 140	Linear Algebra and Geometry	4
	ENG 110*	Composition	3
	COL 101	College Life and Academic Skills	1
	Semester Total		19
Semester 2	GAM 150	Project I	3
	CS 170	High-Level Programming II: The C++ Programming Language	4
	CS 230	Game Implementation Techniques	3
	MAT 150*	Calculus and Analytic Geometry I	4
	COM 150	Interpersonal and Work Communication	3
	Semester Total		17
Semester 3	GAM 200*	Project II	4
	CS 180	Operating System I, Man-Machine Interface	3
	CS 225	Advanced C/C++	3
	MAT 200*	Calculus and Analytic Geometry II	4
	DES 115	Introduction to Game Design	3
	Semester Total		17
Semester 4	GAM 250*	Project II	4
	CS 280	Data Structures	3
	MAT 250	Linear Algebra	3
	DES 212	System Design Methods	3
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Lab	1
	Semester Total		18
Semester 5	GAM 300*	Project III	4
	CS 330	Algorithm Analysis	3
	CS 380*	Artificial Intelligence for Games	3
	MAT 258	Discrete Mathematics	3
	DES 214	Level Design Methods	3
	PHY 250	Waves, Optics, and Thermodynamics	4
	Semester Total		20
Semester 6	GAM 350*	Project III	4
	CS 325	User Interface and User Experience Design	3
	Computer Science Elective	Any three-credit CS course numbered 200 or higher.	3
	DES 315	Technical Design Methods	3
	Math or Science Elective	Any three-credit MAT or PHY course numbered 200 or higher.	3
	PSY 101	Introduction to Psychology	3
	Semester Total		19

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 7	GAM 375 or GAM 400*	Project III or Project IV	4
	Computer Science Elective	Any three-credit CS course numbered 200 or higher.	3
	Design Elective	Any three-credit DES course numbered 200 or higher.	3
	Math or Science Elective	Any three-credit MAT or PHY course numbered 200 or higher.	3
	Art, CG, or Music Elective	ART 105, CG 102, CG 125, CG 130, or MUS 115	3
	Semester Total		
Semester 8	GAM 400 or GAM 450*	Project IV	4
	Computer Science Elective	Any three-credit CS course numbered 200 or higher.	3
	Design Elective	Any three-credit DES course numbered 200 or higher.	3
	English Elective	Any three-credit English course.	3
	Humanities and Social Sciences Elective	Any three-credit course from the Department of Humanities and Social Sciences, except those with the COL designation.	3
	Semester Total		
Degree Total (minimum credits required)			142

*Other courses may fulfill this requirement. See degree program requirements for details

Bachelor of Science in Computer Science and Digital Audio

Program Overview

The Bachelor of Science in Computer Science and Digital Audio degree program is designed to prepare software engineers for careers in software development with an emphasis on audio-related applications. The program includes instruction in computer audio, graphics, real-time simulation programming, and digital signal processing. The BS in Computer Science and Digital Audio degree program offers extensive instruction in basic science and software engineering fundamentals as well as instruction and project work in game development, audio technology, digital signal processing, and sound design. Graduates will have had the opportunity to work on individual and team-based projects to produce and implement software technology and music and audio content for video games, simulations, and other interactive media.

Graduates of this program will have gained expertise in working with computer software and hardware that is essential to the sound design and synthesis process. The program provides a balance between foundational subjects, such as mathematics, acoustics, and data structures, and applied laboratory project work in game development and sound design. This interdisciplinary approach gives the graduate the technical and creative experience to be a software engineer with special emphasis on the art and science of sound.

Graduates of this program are prepared for the following entry- and intermediate-level positions: Digital Audio Programmer, Audio Software Engineer, Audio Engine Programmer, Engine and Tools Programmer, Game Developer, Software Engineer, Software Developer, Computer Programmer, Audio Production Editor, Recording Engineer, Sound Designer, and Dialog Editor.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science and Digital Audio degree program requires completion of 143 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or four academic years. Students must receive special permission in writing from their Academic Advisor to take more than 20 credits in either of their first two semesters.

GRADE

Students must receive a grade of “C-” (or 1.7 quality points) or better in all courses for the BS in Computer Science and Digital Audio.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 180, CS 225, CS 230, CS 245, CS 246, CS 251, CS 280, and CS 330.

ELECTRICAL AND COMPUTER ENGINEERING

The following course is required: ECE 101L.

FILM

The following course is required: FLM 115.

PROJECTS

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 300, and GAM 350. Four additional credits must be selected from Computer Science Project or Game Project courses at the 375 course-level or higher.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COM 150, ENG 110, and LAW 115. Students must take an additional three credits of Humanities and Social Sciences courses.

MATHEMATICS

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 258, MAT 320, and MAT 321.

MUSIC

The following courses are required: MUS 112, MUS 113, MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 370, MUS 370L, MUS 371, MUS 371L, MUS 470, MUS 470L, MUS 471, MUS 471L, and three additional credits of Music Courses.

PHYSICS

The following courses are required: PHY 200, PHY 200L, PHY 250, PHY 250L, and PHY 320.

STEM ELECTIVE (SCIENCE, TECHNOLOGY, ENGINEERING, MATH)

Three credits taken STEM disciplines at the 200 course-level or higher.

GENERAL STUDIES

The following courses are required: COL 101, and COL 499.

OPEN ELECTIVES

Sufficient additional credits to meet the required 143 semester credits for the program.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science and Digital Audio: COM 150 (3), ENG 110 (3), FLM 115 (3), LAW 115 (3), MAT 140 (4), MAT 150 (4), MAT 200 (4), PHY 200 (4), PHY 250 (4), and three HSS elective credits (3).

Recommended Course Sequence for the Bachelor of Science in Computer Science and Digital Audio

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	COL 101	College Life and Academic Skills	1
	CS 100	Computer Environment	4
	CS 120	High-Level Programming I: The C Programming Language	4
	ENG 110	Composition	3
	GAM 100	Project Introduction	3
	MAT 140	Linear Algebra and Geometry	4
	Semester Total		
Semester 2	CS 170	High-level Programming II: The C++ Programming Language	4
	CS 230	Game Implementation Techniques	3
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	4
	GAM 150	Project I	3
	COM 150	Interpersonal and Work Communication	3
	ECE 101L	Introduction to Engineering Projects	1
	Semester Total		
Semester 3	CS 225	Advanced C/C++	3
	CS 251	Introduction to Computer Graphics	3
	GAM 200	Project II	4
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	4
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Laboratory	1
	Semester Total		
Semester 4	CS 180	Operating Systems I: Man-Machine Interface	3
	CS 245	Introduction to Interactive Sound Synthesis	3
	CS 280	Data Structures	3
	GAM 250	Project II	4
	PHY 250	Waves, Optics, and Thermodynamics	4
	PHY 250L	Waves, Optics, and Thermodynamics Lab	1
	Semester Total		
Semester 5	COL 499	Career Search Preparation: Materials, Logistics, and Communication	1
	CS 246	Advanced Sound Synthesis	3
	GAM 300	Project III	4
	MAT 320	Mathematics of Digital Signal Processing I	3
	MUS 370	Audio Design Project I	1
	MUS 370L	Audio Design Project I Lab	2
	MUS 120	Music Theory and Musicianship I	2
	MUS 120L	Music Theory and Musicianship I Lab	1
	MUS 112	Vocal Ensemble	1
Semester Total			18

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 6	GAM 350	Project III	4
	MAT 258	Discrete Mathematics	3
	MAT 321	Mathematics of Digital Signal Processing II	3
	MUS 113	Vocal Ensemble	1
	MUS 121	Music Theory and Musicianship II	2
	MUS 121L	Music Theory and Musicianship II Lab	1
	MUS 371	Audio Design Project II	1
	MUS 371L	Audio Design Project II Lab	2
	Semester Total		
Semester 7	CS 330	Algorithm Analysis	3
	FLM 115	History of Film and Animation	3
	GAM 375*	Project III	4
	MUS 470	Audio Design Project III	1
	MUS 470L	Audio Design Project III Lab	2
	PHY 320	Acoustics I	3
	Semester Total		
Semester 8	Humanities and Social Sciences elective	Any three-credit COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS course	3
	LAW 115	Introduction to Intellectual Property and Contracts	3
	MUS 471	Audio Design Project IV	1
	MUS 471L	Audio Design Project IV Lab	2
	Music elective	Any three-credit Music Course	3
	Open elective	An elective from any department at DigiPen	3
	STEM elective	Science, Technology, Engineering, or Math Elective: CS, ECE, MAT, or PHY course numbered 200 or higher	3
	Semester Total		
Degree Program Total (minimum credits required)			143

*Note: Other courses may fulfill this requirement. See degree program requirements for details.

Bachelor of Science in Computer Science in Machine Learning

Program Overview

The Bachelor of Science in Computer Science in Machine Learning prepares students to develop software that can make use of data in obtaining meaningful conclusions and correct predictions.

Graduates of this program will be skilled at writing computer programs for the purposes of extracting and visualizing information. They will be proficient in mathematical and software development aspects of data science and machine learning.

Educational Objectives

The Bachelor of Science in Computer Science in Machine Learning Program Educational Objectives are to produce graduates who will:

- be exceptionally competent data scientists;
- possess a breadth of knowledge in the field of machine learning;
- have an in-depth understanding of computer science.

Student Outcomes

Upon completion of the BS in Computer Science in Machine Learning, students are expected to achieve the following outcomes:

- an ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the data science discipline;
- an ability to analyze a problem, and provide its mathematical solution together with its implementation;
- an ability to design a predictive system;
- an ability to function effectively on teams to accomplish a common goal;
- an understanding of professional, ethical, legal, security and social issues and responsibilities;
- an ability to communicate effectively with a range of audiences including business professionals;
- an ability to analyze the local and global impact of data science on individuals, organizations, and society;
- a recognition of the need for, and an ability to engage in continuing professional development;
- an ability to use current techniques, skills, and tools necessary for practice;
- an ability to apply design and development principles in the construction of software systems of varying complexity.

Graduates of this degree program will be prepared to enter technical industries as entry-level data scientists or software engineers. Possible entry-level positions include Software Engineer, Software Developer, Software Development Engineer, Software Development Engineer in Test, Computer Programmer, Game Developer, Program Manager, Software Analyst, Application Analyst, Data Scientist, Predictive Analyst, and Business Intelligence.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science in Machine Learning degree program requires completion of at least 138 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, for a total of four academic years.

GRADE

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all courses for the BS in Computer Science in Machine Learning degree program.

GENERAL STUDIES

The following course is required: COL 101.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 180, CS 211, CS 225, CS 230, CS 271, CS 272, CS 280, CS 330, CS 362, CS 387, CS 487, and three additional credits of Computer Science or Electrical and Computer Engineering at the 200 course-level or higher.

HUMANITIES AND SOCIAL SCIENCES REQUIREMENTS

The following courses are required: COM 150, ENG 110, three additional credits of English courses, and six additional credits of Humanities and Social Sciences courses.

MATHEMATICS

The following courses are required: MAT 140, MAT 150, MAT 200, MAT 225, MAT 250, MAT 258, MAT 340, MAT 345, MAT 346, and MAT 357.

MAT 180, MAT 230, and three additional credits may substitute for MAT 150, MAT 200, and MAT 225.

PHYSICS

The following courses are required: PHY 200, and PHY 200L.

PROJECTS

The following courses are required: CSP 100 or GAM 100, CSP 150 or GAM 150, and 24 additional credits of GAM or CSP courses.

STEM ELECTIVE

Three credits from STEM disciplines, at the 200 course-level or higher.

OPEN ELECTIVE

Sufficient additional credits to meet the required 138 credits for the program.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science in Machine Learning: COM 150 (3), ENG 110 (3), three credits of English courses (3), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), PHY 200 (4), PHY 200L (1), and six credits from the Humanities and Social Sciences courses (6).

Recommended Course Sequence for the Bachelor of Science in Computer Science in Machine Learning

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	4
	CS 100	Computer Environment	4
	CS 120	High-level Programming I: The C Programming Language	4
	ENG 110	Composition	3
	COL 101	College Life and Academic Skills	1
	GAM 100	Project Introduction	3
	Semester Total		19
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	4
	CS 170	High-level Programming II: The C++ Programming Language	4
	CS 230	Game Implementation Techniques	3
	COM 150	Interpersonal and Work Communication	3
	GAM 150	Project I	3
	Semester Total		17
Semester 3	CS 211	Introduction to Databases	3
	CS 225	Advanced C/C++	3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	4
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Lab	1
	CSP 200*	Computer Science Project II	4
Semester Total		19	
Semester 4	CS 180	Operating Systems I: Man-Machine Interface	3
	CS 271	Supervised Machine Learning	3
	CS 280	Data Structures	3
	MAT 225*	Calculus and Analytic Geometry III	3
	MAT 258	Discrete Mathematics	3
	CSP 250*	Computer Science Project II	4
	Semester Total		19
Semester 5	MAT 340	Probability and Statistics	3
	CS 330	Algorithm Analysis	3
	CSP 300*	Computer Science Project III	4
	CS 272	Reinforcement Machine Learning	3
	MAT 250	Linear Algebra	3
	Semester Total		16

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 6	MAT 345	Data Science	3
	CSP 350*	Computer Science Project III	4
	Humanities and Social Sciences Elective	Any course from the HSS department except COL courses	3
	CS 387	Unsupervised Machine Learning	3
	CS 362	Operations Research	3
	Semester Total		
Semester 7	English Elective	Any ENG course	3
	MAT 346	Predictive Modeling	3
	CSP 400*	Computer Science Project IV	4
	CS 487	Advanced Machine Learning	3
	Humanities and Social Sciences Elective	Any course from the HSS department except COL courses	3
	Semester Total		
Semester 8	Computer Science Elective	Any CS or ECE course numbered 200 or higher	3
	MAT 357	Numerical Analysis	3
	STEM Elective	Any CS, ECE, MAT, or PHY course numbered 200 or higher	3
	Open Elective	An elective of the student's choice from any department at DigiPen	3
	CSP 450*	Computer Science Project IV	4
	Semester Total		
Degree Total (minimum credits required)			138

*Note: Other courses may fulfill this requirement. See degree program requirements for details.

Bachelor of Science in Computer Science

Program Overview

The Bachelor of Science in Computer Science degree program prepares students to develop software through a combination of computer science theory and continuous practical application in team-based projects. Students learn to gather, store, and analyze real-world data, to connect and harness the power of distributed computing devices, and to create digital interfaces that are natural and intuitive. This background prepares students to not only understand the technologies of today, but to find solutions to problems that seem unsolvable and collaboratively build the technologies of tomorrow.

Graduates of this program will be skilled at writing computer programs with core languages such as C and C++, reinforced by a strong knowledge of operating systems, compilers, assembly language, and computer hardware. Graduates of this program will be proficient in programming application logic, user interfaces, artificial intelligence, databases, and networked client-server applications. Graduates will be well-versed in data structures, algorithm analysis, software architecture principles, parallel computing techniques, software engineering techniques, software engineering practices, and software production methodologies. Graduates will have extensive experience working as individuals and in teams to test, iterate, and polish full software applications and tools, taking them from functional specification to final archiving.

Graduates of this degree program will be prepared to enter technical industries as entry-level software engineers. Possible entry-level positions include Software Engineer, Software Developer, Software Development Engineer, Software Development Engineer in Test, Quality Assurance Engineer, Software Analyst, Application Analyst, Computer Programmer, Artificial Intelligence Programmer, Networking Programmer, Server Programmer, Web Programmer, User Interface Programmer, Tools Programmer, or Game Developer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions such as Producer, Program Manager, Technical Program Manager, and Technical Writer. With sufficient experience in the industry, graduates may obtain positions such as Lead Engineer, Lead Program Manager, Development Manager, Software Architect, or Technical Director.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science requires completion of at least 142 semester credits with a cumulative GPA of 2.0 or better. The program spans eight semesters of 15 weeks each, or four academic years.

GRADE

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all courses for the BS in Computer Science degree program.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 180, CS 211, CS 212, CS 225, CS 230, CS 250 or CS 251, CS 260, CS 261, CS 280, CS 315, CS 325, CS 330, CS 355, CS 375, and CS 381. Six additional credits of Computer Science and Electrical and Computer Engineering at the 200 course-level or higher.

MATHEMATICS

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, MAT 258, and MAT 340. Three additional credits must be selected from either MAT 256, or any other MAT course numbered 300 or higher.

PHYSICS

The following courses are required: PHY 200, PHY 200L, and PHY 250.

PROJECTS

The following courses are required: GAM 100, GAM 150, CSP 200 or GAM 200, CSP 250 or GAM 250, CSP 300 or GAM 300, and CSP 350 or GAM 350. Eight additional credits of CSP or GAM at the 375 course-level or higher.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COL 101, ENG 110, and COM 150. Students must take six additional credits of English courses, and an additional three credits of Social Sciences courses.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Science: COM 150 (3), ENG 110 (3), two ENG electives (6), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 250 (3), PHY 200 (4), PHY 200L (1), PHY 250 (4), and one Humanities and Social Sciences elective (3).

Recommended Course Sequence for the Bachelor of Science in Computer Science

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	GAM 100	Project Introduction	3
	CS 100	Computer Environment	4
	CS 120	High-Level Programming I: The C Programming Language	4
	MAT 140	Linear Algebra and Geometry	4
	ENG 110	Composition	3
	COL 101	College Life and Academic Skills	1
	Semester Total		
Semester 2	GAM 150	Project I	3
	CS 170	High-Level Programming II: The C++ Programming Language	4
	CS 230	Game Implementation Techniques	3
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	4
	COM 150	Interpersonal and Work Communication	3
	Semester Total		
Semester 3	CSP 200*	Computer Science Project II	4
	CS 180	Operating Systems I: Man-Machine Interface	3
	CS 211	Introduction to Databases	3
	CS 225	Advanced C/C++	3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	4
	Semester Total		
Semester 4	CSP 250*	Computer Science Project II	4
	CS 212	Advanced Databases	3
	CS 251	Computer Graphics	3
	CS 280	Data Structures	3
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Lab	1
	Semester Total		
Semester 5	CSP 300*	Computer Science Project III	4
	CS 260	Computer Networks I: Interprocess Communication	3
	CS 315	Low-Level Programming	3
	CS 330	Algorithm Analysis	3
	MAT 258	Discrete Mathematics	3
	PHY 250	Waves, Optics, and Thermodynamics	4
	Semester Total		
Semester 6	CSP 350*	Computer Science Project III	4
	CS 261	Computer Networks II	3
	CS 355	Parallel Programming	3
	CS 375	Compilers and Interpreters	3
	MAT 250	Linear Algebra	3
	English Elective	Any three-credit course with the ENG designation.	3
	Semester Total		

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 7	CSP 400*	Computer Science Project IV	4
	CS 325	User Interface and User Experience Design	3
	CS 381	Introduction to Artificial Intelligence	3
	MAT 340	Probability and Statistics	3
	English Elective	Any three-credit course with the ENG designation.	3
	Semester Total		
Semester 8	CSP 450*	Computer Science Project IV	4
	Computer Science Elective	Any three-credit CS or ECE course numbered 200 or higher.	3
	Computer Science Elective	Any three-credit CS or ECE course numbered 200 or higher.	3
	Math Elective	MAT 256 or any MAT course numbered 300 or higher.	3
	Humanities and Social Sciences Elective	Any three-credit course with the HIS, PSY, or SOS designation.	3
	Semester Total		
Degree Total (minimum credits required)			142

*Note: Other courses may fulfill this requirement. See degree program requirements for details.

Bachelor of Science in Computer Engineering

Program Overview

The Bachelor of Science in Computer Engineering degree program prepares students to become engineers who understand both sides of the hardware-software interface, from designing circuits to developing operating systems. This program uniquely prepares graduates to design and develop embedded, digital, and computer systems. Graduates with a degree in Computer Engineering are highly skilled and ideally suited for industries that require cutting-edge hardware and software technologies.

Like students in DigiPen's other degree programs, the hallmark of the BS in Computer Engineering program is a variety of semester-long and yearlong projects where students receive critical feedback and evaluation from instructors who are experts in their respective fields. As they develop through the program, students have increasingly more creative control over their projects. These projects complement rigorous coursework in computer science, engineering, programming, mathematics, and physics. The BS in Computer Engineering degree program and the student projects focus on embedded systems, a term that refers to any device that uses a microprocessor or microcontroller. Embedded systems appear in a wide array of household, industrial, and military applications, including portable and console game systems, robots, game peripherals, electronic toys, digital cameras, audio/video component systems, and aircraft flight systems.

Student Outcomes

Upon completion of the Bachelor of Science in Computer Engineering degree program, students are expected to achieve the following outcomes:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Program Objectives

The Bachelor of Science in Computer Engineering Program Educational Objectives are to produce graduates:

- who are notable for their technical excellence and innovation through product launches, research and development, patent applications, industry recognition, etc.;
- with an in-depth understanding of engineering practice and judgment demonstrated by leading team projects that include concept development, design, implementation, and testing;
- who are engaged in independent, reflective learning and critical thinking via professional societies, publications, continuing education, etc.;
- who are fully aware of the societal impacts of their work through volunteer work or educational outreach.

Graduates of this degree program have the necessary skills and preparation to work at entry-level hardware and software positions within various industries such as aerospace and avionics, automotive, consumer electronics, sciences, Internet of Things, entertainment, and defense. Some targeted areas within these industries include game systems, multimedia, mechatronics, human interface devices, artificial intelligence, operating systems, information systems, telecommunications, signal processing, control systems, and instrumentation. Potential entry-level position titles for new graduates include: Software Engineer, Computer Hardware Engineer, Systems Engineer, Embedded Systems Engineer, Embedded Software Engineer, Firmware Engineer, Design Engineer, Development Engineer, Quality Control Engineer, Systems Test Engineer, Telecommunications Engineer, Software Developer, Software Analyst, Computer Programmer, and Graphics Hardware Engineer.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Science in Computer Engineering degree program requires completion of at least 143 semester credits with a cumulative GPA of 2.0 or better. The program spans eight semesters of 15 weeks each, or four academic years.

GRADE

Students must receive a grade of "C-" (or 1.7 quality points) or higher in all courses.

ELECTRICAL AND COMPUTER ENGINEERING

The following courses are required: ECE 110 or GAM 150, ECE 200, ECE 210, ECE 220, ECE 260, ECE 270, ECE 300, ECE 310,

ECE 350, and ECE 420. 12 credits chosen from ECE 360, ECE 390, ECE 410, ECE 460, and ECE 490 are also required.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 120, CS 170, CS 225, CS 280, CS 315, and CS 330.

PHYSICS

The following courses are required: PHY 200, PHY 200L, PHY 250, PHY 250L, PHY 270, and PHY 270L.

MATHEMATICS

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 225, MAT 256, MAT 258, and MAT 340. Students completing MAT 230 must replace MAT 225 with an additional three semester credits of STEM disciplines, at the 200 course-level or higher.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COM 150, ENG 110. Students must also take three semester credits of English courses numbered 116 or higher and three semester credits of any ECN or MGT course. Additionally, students must take three semester credits of any non-required Humanities and Social Sciences courses.

ART AND MUSIC

The following course is required: ART 210. Students must also take an additional three semester credits of any Animation, Fine Art, Performing Art, Film or Music courses.

STEM ELECTIVES

Nine semester credits from STEM disciplines, at the 200 course-level or higher.

OPEN ELECTIVES

Sufficient additional credits to meet the required 143 semester credits for the program.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Computer Engineering: ENG 110 (3), COM 150 (3), HSS elective (3), ART 210 (2), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), PHY 200 (4), and PHY 250 (4).

Recommended Course Sequence for the Bachelor of Science in Computer Engineering

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	COL 101	College Life and Academic Skills	1
	CS 100	Computer Environment	4
	CS 120	High-Level Programming I: The C Programming Language	4
	ENG 110	Composition	3
	MAT 140	Linear Algebra and Geometry	4
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	4
	Semester Total		
Semester 2	CS 170	High-Level Programming II: The C++ Programming Language	4
	ECE 110	CE 1st-Year Project	3
	ECE 210	Digital Electronics I	4
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	4
	PHY 200	Motion Dynamics	4
	PHY 200L	Motion Dynamics Laboratory	1
	Semester Total		

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 3	CS 225	Advanced C/C++	3
	ECE 220	CE 2nd-Year Project	3
	ECE 300	Embedded Microcontroller Systems	3
	MAT 225	Calculus and Analytic Geometry III	3
	PHY 250	Waves, Optics, and Thermodynamics	4
	PHY 250L	Waves, Optics, and Thermodynamics Lab	1
	Semester Total		
Semester 4	CS 280	Data Structures	3
	ECE 200	Electrical Circuits	3
	ECE 260	Digital Electronics II	4
	MAT 256	Introduction to Differential Equations	3
	PHY 270	Electricity and Magnetism	3
	PHY 270L	Electricity and Magnetism Lab	1
	Semester Total		
Semester 5	COM 150	Interpersonal and Work Communication	3
	CS 315	Low-Level Programming	3
	CS 330	Algorithm Analysis	3
	ECE 270	Real-Time Operating Systems	3
	ECE 310	CE 3rd-Year Project I	4
	MAT 258	Discrete Mathematics	3
	Semester Total		
Semester 6	ECE 360	CE 3rd-Year Project II	4
	ECE 420	Digital Signal Processing	3
	ECN/MGT Elective	Any non-required ECN/MGT course	3
	MAT 340	Probability and Statistics	3
	STEM Elective	Any non-required CS, ECE, MAT, or PHY course numbered 200 or higher	3
	Semester Total		
Semester 7	ART 210	Art Appreciation	2
	ANI/ART/FLM/MUS Elective	Any ANI, ART, FLM, or MUS Course	3
	ECE 350	Control Systems	3
	ECE 410	CE 4th-Year Project I	4
	English Elective	Any ENG course numbered 116 or higher	3
	STEM Elective	Any non-required CS, ECE, MAT, or PHY course numbered 200 or higher	3
	Semester Total		
Semester 8	ECE 460	CE 4th-Year Project II	4
	Humanities and Social Sciences Elective	Any non-required HSS department course, excluding ECN 100 and COL courses	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
	STEM Elective	Any non-required CS, ECE, MAT, or PHY course numbered 200 or higher	3
	Semester Total		
Degree Total (minimum credits required)			143

Bachelor of Fine Arts in Digital Art and Animation

Program Overview

The Bachelor of Fine Arts in Digital Art and Animation degree program is 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, Composer, 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 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

Students must receive a grade of “C-” (or 1.7 quality points) or higher in all courses for the BFA in Digital Art and Animation degree program.

ANIMATION

The following courses are required: ANI 101 and ANI 151.

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.

COMPUTER GRAPHICS

The following courses are required: CG 201, CG 225, CG 275, and CG 300.

FILM

The following courses are required: FLM 115 and either FLM 201 or FLM 210.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COM 250, LAW 115, SOS 115, ENG 116, and any three credits of English courses at the 150 course-level or higher.

PROJECTS

The following courses are required: PRJ 101, and 24 additional credits of Project courses.

SCIENCE

The following courses are required: CS 115 and three credits of Physics courses.

GENERAL STUDIES

The following courses are required: COL 101 AND COL 230.

OPEN ELECTIVES

Sufficient additional credits to meet the required 131 semester credits for the program.

GENERAL EDUCATION

Three credits of General Education courses, including Humanities and Social Sciences, and Mathematics.

*NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Fine Arts in Digital Art and Animation: ART 115 (3), ENG 116 (3), three credits of English courses (3), FLM 115 (3), LAW 115 (3), SOS 115 (3), CS 115 (3), COM 250 (3), three credits of Physics courses (3), and three credits of General Education courses (3).

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

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

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

Bachelor of Arts in Game Design

Program Overview

The field of interactive design 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 have proven design skills, as well as knowledge of technology, information processing, and psychology. Interactive designers must continually place themselves in the minds of their users and players, shaping every action and response, carefully teaching them what they need to know, and skillfully blending the interactive, spatial, narrative, visual, and aural aspects of an experience. Whether working on digital tools and simulations, on traditional or digital games, or even on physical installations, this degree program prepares graduates to be interactive designers, capable of working in large teams, communicating and collaborating with other designers, artists, and engineers, able to create any kind of interactive experience.

Graduates will be well-versed in both interactive design and game design theory, including user interface design, usability, spatial 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 both individual and team projects. Graduates will be familiar with the basics of psychology, programming, art, and writing, and will also have been introduced to concepts of sound design, statistics, and probability.

Graduates of this degree program will be prepared to enter the software industry as entry-level User Experience Designers and the game industry as entry-level Game Designers. Possible entry-level position titles include User Interface Designer, User Experience Designer, Usability Researcher, Installation Designer, Game Scriptor, Technical Designer, System Designer, Level Designer, Content Designer, Encounter 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, and Technical Artist. After many years in the industry, graduates may obtain titles such as Lead Designer, User Experience Architect, Creative Director, and Director.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Arts in Game Design requires completion of at least 136 semester credits with a cumulative GPA of 2.0 or better. The program spans eight semesters of 15 weeks each, or four academic years.

GRADE

Students must receive a grade of “C-” (or 1.7 quality points) or higher in all courses for the BA in Game Design degree program.

DESIGN

The following courses are required: DES 100, DES 101, DES 105, DES 220, DES 240, DES 260, DES 270, DES 301, DES 302, DES 303, DES 350, DES 365, and DES 400, and three credits of Game Design courses at the 300 course-level or higher. Three additional credits must be selected from the Game Design courses at the 300 course-level or higher or Psychology courses at the 200 course-level or higher.

PROJECTS

The following course is required: GAM 120 or GAM 150. 24 additional credits must be selected from Game Project or Computer Science Project courses at the 200 course-level or higher.

PSYCHOLOGY

The following courses are required: PSY 101 and PSY 201. Three additional credits must be selected from Psychology courses.

COMPUTER SCIENCE

The following course is required: CS 116 or CS 120. 10 additional credits must be selected from Computer Science courses at the 150 course-level or higher.

MATHEMATICS

The following course is required: MAT 105 or MAT 340. Four additional credits must be selected from Mathematics courses.

PHYSICS

Three credits must be selected from Physics courses.

ENGLISH

Six credits must be selected from English courses.

HUMANITIES AND SOCIAL SCIENCES

Three credits must be selected from Humanities and Social Sciences courses.

COMPUTER GRAPHICS

Six credits must be selected from Computer Graphics or Digital Arts courses.

ART

One of the following courses is required: ART 101, ART 102, or ART 105.

MUSIC

The following course is required: MUS 115.

CAREER PREPARATION

The following course is required: COM 250. Three additional credits must be selected from Management courses.

GENERAL STUDIES

The following courses are required: COL 101 and COL 235.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Arts in Game Design: two ENG electives (6), MAT 105 or MAT 340 (3), one MAT elective (4), MUS 115 (3), PSY 101 (3), PSY 201 (3), one PSY elective (3), one PHY elective (3), and one Humanities and Social Sciences course (3).

Recommended Course Sequence for the Bachelor of Arts in Game Design

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	DES 100	Introduction to Design Process	4
	DES 101	Principles of Interactive Design	4
	PSY 101	Introduction to Psychology	3
	CS 116*	Introduction to Computer Technology and Programming	4
	MAT 105*	Introductory Probability and Statistics	3
	COL 101	College Life and Academic Skills	1
	Semester Total		
Semester 2	GAM 120*	Introduction to Digital Production	3
	DES 105	Game Design Process	3
	DES 260	User Experience Design I	3
	PSY 201	Cognitive Psychology	3
	ENG 116*	Storytelling	3
	CG 102*	2D Raster Graphics for Designers	3
	Semester Total		
Semester 3	GAM 200*	Project II	4
	DES 220	System Design I	3
	DES 270	User Research I	3
	ART 105*	Art Processes	3
	MAT 100*	Pre-Calculus with Linear Algebra and Geometry	4
	Semester Total		
Semester 4	GAM 250*	Project II	4
	DES 240	Level Design I	3
	DES 301	Game Design I	3
	CS 165*	Programming Foundations	4
	PHY 115*	Introduction to Applied Math and Physics	3
	COL 235	College Success for Designers	1
	Semester Total		

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 5	GAM 300*	Project III	4
	DES 302	Game Design II	3
	DES 365	Game Feel	3
	CS 175*	Scripting Languages	3
	CG 125*	Introduction to 3D Production for Designers	3
	Semester Total		16
Semester 6	GAM 350*	Project III	4
	DES 303	Game Design III	3
	DES 370	User Research II	3
	CS 176*	Advanced Scripting Languages	3
	MUS 115	Fundamentals of Music and Sound Design	3
	Semester Total		16
Semester 7	GAM 375 or GAM 400*	Project III or Project IV	4
	DES 400	Integrated Digital Design	3
	Design Elective	Any three-credit Design course numbered 300 or higher.	3
	Psychology Elective	Any three-credit Psychology course.	3
	COM 250	Professional Communication	3
	Semester Total		16
Semester 8	GAM 400 or GAM 450*	Project IV	4
	Design or Psychology Elective	Any three-credit Design course numbered 300 or higher, or Psychology course numbered 200 or higher.	3
	English Elective	Any three-credit English course.	3
	Management Elective	Any three-credit Management course.	3
	Humanities and Social Sciences Elective	Any three-credit course from the Department of Humanities and Social Sciences, except those with the COL designation.	3
	Semester Total		16
Degree Total (minimum credits required)			136

*Note: Other courses may fulfill this requirement. See degree program requirements for details.

Bachelor of Arts in Music and Sound Design

Program Overview

The Bachelor of Arts in Music and Sound Design offers extensive training in music fundamentals such as music theory, music history and literature, composition, and ear training, as well as training and project work in music technology, audio recording, and technical sound design. Students have the opportunity to work on both individual and team-based projects to produce musical scores and soundscapes for video games, animation, and other interactive media. Through lab courses in each of the eight semesters, these students gain expertise in working with computer software and audio recording hardware that is essential to the sound design and synthesis process. The balance between music fundamentals – including composition, performance, and ear training – and lab and studio recording projects gives the student the technical and creative experience to be a composer/sound designer.

The Bachelor of Arts in Music and Sound Design prepares musicians for a wide variety of music- and audio-related careers and job opportunities in existing and emerging industries such as video games, film and animation, theater, radio, television, and web/new media. This four-year undergraduate degree program includes training in music composition and performance, audio recording technology, and music and sound design production and implementation for video games and new media. Graduates of this program are prepared for the following entry and intermediate level positions: Sound Designer, Music Composer, Music Arranger, Recording Engineer, Audio Production Editor, Dialog Editor, Music Supervisor, Music Editor, Copyist/Engraver, Music Librarian, Music Supervisor, Music Performer, and Music Teacher.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Arts in Music and Sound Design requires completion of 140 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or four academic years. Students must receive special permission in writing from their academic advisor to take more than 20 credits in either of their first two semesters.

GRADE

Students must receive a grade of “C-” (or 1.7 quality points) or better in all courses for the BA in Music and Sound Design.

COMPUTER SCIENCE

The following courses are required: CS 116 and CS 174.

FILM

The following courses are required: FLM 115 and FLM 201.

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COM 150, ENG 110, and LAW 115. Three additional credits must be selected from English courses. Nine additional credits must be selected from Humanities and Social Sciences courses.

MATHEMATICS

The following course is required: MAT 120.

MUSIC

The following courses are required: MUS 110, MUS 111, MUS 112, MUS 113, MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 150, MUS 150L, MUS 151, MUS 151L, MUS 210, MUS 211, MUS 212, MUS 213, MUS 220, MUS 220L, MUS 221, MUS 221L, MUS 230, MUS 231, MUS 240, MUS 241, MUS 250, MUS 250L, MUS 251, MUS 251L, MUS 260, MUS 261, MUS 310, MUS 311, MUS 320, MUS 321, MUS 322, MUS 330, MUS 331, MUS 340, MUS 341, MUS 350, MUS 350L, MUS 351, MUS 351L, MUS 410 or MUS 415, MUS 411 or MUS 416. Six additional credits must be selected from the following courses: MUS 390, MUS 450, MUS 450L, MUS 451, MUS 451L, MUS 490. Nine additional credits must be selected from other Music courses.

GENERAL STUDIES

The following courses are required: COL 101, and COL 499.

OPEN ELECTIVES

Sufficient additional credits to meet the required 140 semester credits for the program.

PHYSICS

The following courses are required: PHY 115, and PHY 116.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Arts in Music and Sound Design: COM 150 (3), ENG 110 (3), FLM 115 (3), LAW 115 (3), PHY 115 (3), PHY 116 (3), nine credits of Humanities and Social Sciences courses (9), and three credits of English courses (3).

Recommended Course Sequence for the Bachelor of Arts in Music and Sound Design

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 1	COL 101	College Life and Academic Skills	1
	ENG 110	Composition	3
	FLM 115	History of Film and Animation	3
	MAT 120	Mathematics of Music and Sound I	3
	MUS 110	Private Lessons I: Instrumental or Vocal	1
	MUS 112	Vocal Ensemble	1
	MUS 120	Music Theory and Musicianship I	2
	MUS 120L	Music Theory and Musicianship I Lab	1
	MUS 150	Sound Design Project I	2
	MUS 150L	Sound Design Project I Lab	2
Semester Total			19
Semester 2	COM 150	Interpersonal and Work Communication	3
	FLM 201	Cinematography	3
	MUS 111	Private Lessons II: Instrumental or Vocal	1
	MUS 113	Vocal Ensemble	1
	MUS 121	Music Theory and Musicianship II	2
	MUS 121L	Music Theory and Musicianship II Lab	1
	MUS 151	Sound Design Project II	2
	MUS 151L	Sound Design Project II Lab	2
	PHY 115	Introduction to Applied Math and Physics	3
Semester Total			18
Semester 3	CS 116	Introduction to Computer Technology and Programming	4
	MUS 210	Private Lessons III: Instrumental or Vocal	1
	MUS 212	Vocal Ensemble	1
	MUS 220	Music Theory and Musicianship III	2
	MUS 220L	Music Theory and Musicianship III Lab	1
	MUS 230	Composition I	2
	MUS 240	Sound Design Collaborative Project I	1
	MUS 250	Sound Design Project III	1
	MUS 250L	Sound Design Project III Lab	2
	MUS 260	Music History and Literature I	3
Semester Total			18
Semester 4	CS 174	Audio Scripting	3
	MUS 211	Private Lessons IV: Instrumental or Vocal	1
	MUS 213	Vocal Ensemble	1
	MUS 221	Music Theory and Musicianship IV	2
	MUS 221L	Music Theory and Musicianship IV Lab	1
	MUS 231	Composition II	2
	MUS 241	Sound Design Collaborative Project II	2
	MUS 251	Sound Design Project IV	1
	MUS 251L	Sound Design Project IV Lab	2
	MUS 261	Music History and Literature II	3
Semester Total			18

SEMESTER	COURSE	COURSE TITLE	CREDITS
Semester 5	COL 499	Career Search Preparation: Materials, Logistics, and Communication	1
	ENG Elective	English Elective	3
	MUS 310	Private Lessons V: Instrumental or Vocal	1
	MUS 320	Conducting and Instrumentation	2
	MUS 330	Advanced Composition I	3
	MUS 340	Sound Design Collaborative Project III	1
	MUS 350	Sound Design Project V	1
	MUS 350L	Sound Design Project V Lab	2
	PHY 116	Physics of Music and Sound	3
	Semester Total		
Semester 6	HSS Elective	Humanities and Social Sciences Elective	3
	MUS 311	Private Lessons VI: Instrumental or Vocal	1
	MUS 321	Introduction to Orchestration	3
	MUS 322	Adaptive Music for Video Games	3
	MUS 331	Advanced Composition II	3
	MUS 341	Sound Design Collaborative Project IV	2
	MUS 351	Sound Design Project VI	1
	MUS 351L	Sound Design Project VI Lab	2
	Semester Total		
Semester 7	Elective	An elective of the student's choice from any department at DigiPen	3
	HSS Elective	Humanities and Social Sciences Elective	3
	HSS Elective	Humanities and Social Sciences Elective	3
	MUS 410	Private Lesson VII: Instrumental or Vocal	1
	MUS 450	Sound Design Project VII	1
	MUS 450L	Sound Design Project VII Lab	2
	MUS Elective	Any MUS course	3
	Semester Total		
Semester 8	Elective	An elective of the student's choice from any department at DigiPen	3
	LAW 115	Introduction to Intellectual Property and Contracts	3
	MUS 411	Private Lesson VIII: Instrumental or Vocal	1
	MUS 451	Sound Design Project VIII	1
	MUS 451L	Sound Design Project VIII Lab	2
	MUS Elective	Music Elective	3
	MUS Elective	Music Elective	3
	Semester Total		
Degree Program Total (minimum credits required)			140

Minors

To obtain a minor at DigiPen, students must apply for the minor via SRS and satisfy criteria prescribed by the department awarding the minor. Students may only receive minors outside of their major focus of study. Freshmen may not apply for minors. Students may not apply for a minor if they cannot complete it before or concurrent with their undergraduate graduation. The following minors are available:

- Minor in Art
- Minor in Electrical and Computer Engineering
- Minor in English
- Minor in Mathematics
- Minor in Music
- Minor in Physics
- Minor in Psychology

Art Minor

(Not available to BFA DAA students)

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

- Three credits from ART 101 or ART 102
- And three credits from ART 125 or ART 126
- And 12 additional credits from the following:
 - » ART 110, ART 111, ART 115, ART 151, ART 201, ART 222, ART 223, ART 226, ART 228, ART 230, 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.

Electrical and Computer Engineering Minor

(Not available to BS CE students)

To earn an Electrical and Computer Engineering minor at DigiPen, a student must complete a block of 12 credits satisfying the following:

- Credits chosen from any ECE course, CS 315, PHY 270, or PHY 270L
- At least nine of these credits must be earned at DigiPen
- All credits must be earned with a grade of “C-” (or 1.7 quality points) or better

English Minor

DigiPen’s Department of Humanities and Social Sciences offers a diverse array of English courses encompassing literature, expository 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 upperdivision ENG course numbered 300 or above.

Math Minor

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

- The courses are taken from MAT 140 or higher.
- Six credits must be numbered 300 or higher.
- Three credits may be substituted with a PHY course 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.

Music Minor

(Not available to BSCS DA or BA MSD students)

To earn a music minor at DigiPen, a student must complete a block of 18 credits including the following:

- MUS 120, MUS 120L, MUS 121, MUS 121L (6 credits)
- Six credits from any MUS course numbered 200 or higher
- The remaining 6 credits may be selected from MAT 120 or any MUS course
- At least nine credits must be earned at DigiPen.
- All credits must be earned with a grade of “C-” (or 1.7 quality points) or better.

Physics Minor

To earn a physics minor at DigiPen, a student must complete a block of 18 credits from PHY courses numbered 200 or above, or CS 550; at least nine of these credits must be earned at DigiPen. All credits must be earned with a grade of “C-” (or 1.7 quality points) or better.

Psychology Minor

To earn a psychology minor at DigiPen, a student must complete a block of 15 credits from the following PSY courses:

- PSY 101 and any PSY courses numbered 200-level or higher.
- All credits must be earned with a grade of “C-” (or 1.7 quality points) or better.

Graduate Degree Programs Rules and Policies

The following regulations are in affect for DigiPen Institute of Technology’s Master of Science in Computer Science and Master of Fine Arts in Digital Arts degree programs.

Graduate Grading System

The following system applies to graduate students.

- A Excellent = 4.0 quality points
- A- Excellent = 3.7 quality points
- B+ Good = 3.3 quality points
- B Good = 3.0 quality points
- B- Good = 2.7 quality points
- C+ Fair = 2.3 quality points
- C Fair = 2.0 quality points*
- C- Fair = 1.7 quality points
- D Failure = 1.0 quality points
- F Failure = 0 quality points
- AU Audit
- M Missing grade
- I Incomplete
- W Withdrawal
- P Pass
- NP No Pass

** A grade of “C” (or 2.0 quality points) or better is required to earn credit for graduate-level classes.*

AU—AUDIT

“AU” indicates that the student attended the course without expectation of receiving credit or a grade. A student may not change a credit bearing course to audit mid-semester.

M—MISSING

This indicates that the grade was not available from the instructor at the time the transcript was printed. The “M” grade is ignored in credit and grade computations.

I—INCOMPLETE

The “I” grade is included in the satisfactory pace calculation.

W—WITHDRAWAL

The “W” grade is included in the satisfactory pace calculation.

P—PASS

“P” is given for internship, seminar, and thesis courses.

NP—NO PASS

“NP” is given for courses where a letter grade is not required. “NP” means that the student has not successfully completed the requirements of the course, but there is no impact on the GPA.

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 Accounting, Facilities, or the Library.

Graduate Satisfactory Progress

See also: *Satisfactory Academic Progress for Financial Aid*

MINIMUM GPA REQUIREMENTS

Graduate students are required to maintain a cumulative GPA of 3.0 or better. If a student’s cumulative GPA falls below 3.0, then the student will be placed on Academic Warning. Students placed on Academic Warning must earn a 3.0 GPA in their graduate-level classes in subsequent semesters, until the cumulative GPA is 3.0 or better. Students who fail to attain a 3.0 in graduate-level classes while on Academic Warning will be academically withdrawn. Withdrawn students may apply for readmission after a 12-month period.

FAILING TO COMPLETE PROGRAM WITHIN THE MAXIMUM TIME FRAME

Students who fail to complete their program within 55 attempted credits for the Master of Science in Computer Science and within 90 attempted credits for the Master of Fine Arts in Digital Arts will be placed on Academic Warning. Students will work with their Student Success Advisor to develop an academic completion plan that outlines the quickest path to completion. Failure to meet the terms of this plan will result in Administrative Withdrawal.

Students are required to complete their program within 150% of the normal length of their program, as measured in semester credit hours. The normal time frames for the Master of Science in Computer Science and MFA in Digital Arts full-time and part-time graduate programs are two years and four years, respectively. See the Recommended Sequence of Courses at the end of the *Master of Science in Computer Science* section and the Recommended Sequence of Courses at the end of the *Masters of Fine Arts in Digital Arts* section.

Full-Time to Part-Time Program Transfer

When a matriculated full-time graduate student is employed full time, or when they cannot maintain the full-time student status for two consecutive semesters (summer semesters are not included), the student should transfer from the full-time program to the part-time program. All graduate-level credits earned in the full-time program can be transferred to the part-time program. The student must fill out a Program Transfer Request form, obtain approval from the Student Success Advisor, and submit the completed form to the Office of Admissions in order to transfer from the full-time to the part-time program. Once granted, the student will be transferred to the part-time program for the next semester.

Master of Science in Computer Science

Program Overview

Driven by thriving technology and innovations, the interactive real-time simulation software and video game industry is an exciting and dynamic field with active research that is still young and offers tremendous opportunities to talented people. The number of people involved in different game production activities (game console, personal computer, hand-held, on-line, wireless devices, etc.) has been rising. Three-dimensional computer graphics, artificial intelligence (AI), networking, and distributed computing technology continue to drive innovations in both hardware and software. Real-time animation and realistic rendering techniques have also demonstrated many application potentials in movies, television commercials, scientific visualization, medical studies, military training, and other industries and fields.

Gaming companies increasingly demand leading programmers and engineers with an in-depth comprehension of and a solid background in mathematics, physics, real-time rendering, AI, graphics programming, and networking. On the other hand, many developers currently working in the field have been seeking postgraduate education to update their knowledge, to sharpen their professional skills, or to advance in the industry. However, the curriculum taught in many colleges and universities lacks a focus on implementation of these exclusive objectives. Consequently, both companies and individuals feel that a general four-year computer science bachelor's degree program might limit them from advancing professionally in careers related to the theory and technology involved in real-time simulations. More directed, extensive education at a postgraduate level is needed.

DigiPen Institute of Technology has been teaching the Bachelor of Science in Computer Science in Real-Time Interactive Simulation since 1998. This degree provides both academic and practical training for programming computer games. It has been highly successful, and DigiPen has received much recognition for this achievement and for the achievements of its alumni in the industry. Building on this success, the Institute offers a Master of Science in Computer Science to meet the postgraduate education need.

While many developers currently working in the field have been seeking postgraduate education to update their knowledge, to sharpen their professional skills, or to advance in the industry, they have the difficult challenge of balancing busy production schedules and professional growth. Additionally, for many of them, leaving a full-time job to pursue full-time graduate studies is simply not an option.

For these reasons, DigiPen also offers the Part-Time Master of Science in Computer Science degree. This program provides an opportunity for those who currently work in a video game company or have a full-time job in another industry and want to expand their knowledge of academic fundamentals in an advanced study of Computer Science and applications in interactive simulation.

This program specializes in real-time interactive simulation and is designed to attract talented students who have recently graduated with a bachelor's degree in one of the following disciplines:

- Computer Science
- Computer Engineering or related studies
- A general field, along with some computer science studies or some game-industry experience

The Master of Science in Computer Science degree program offers extended education in areas of 3D computer graphics, animation and modeling techniques, AI algorithms, image processing, and real-time rendering. It combines this with related training in computer science, mathematics, and physics.

This graduate program at DigiPen provides an opportunity for students to expand their knowledge of academic fundamentals in 3D computer graphics. Students who successfully complete this master's degree program will possess and/or improve the following professional skills:

- In-depth foundation in mathematics and physics, such as implicit curves and surfaces, theory and applications of quaternions, differential geometry, computational geometry, graph theory, advanced numerical analysis, fuzzy logic and sets, number theory and cryptography, and finite elements.
- Advanced knowledge in computer science, including advanced animation and modeling algorithms (interpolation, rigid body, deformable object, inverse kinematics, natural phenomena simulation, facial expression, motion blending and capture, etc.), advanced rendering techniques (shader programming, lighting techniques, HDR, shading and shadows, anti-aliasing, etc.), artificial intelligence (reinforcement learning, neural network, advanced search algorithms, uncertainty handling, etc.), game engine design (levels of detail, implicit surfaces, pipeline optimization, advanced intersection and collision detection, etc.), physically-based modeling algorithms, ray tracing, and radiosity.
- Solid hands-on experience on game projects, including advanced game (single- or multi-player) design, documentation, project management, marketing, networking, distributed systems, streaming media testing, and working with external contractors.
- Strong capability of academic research in the area of 3D computer graphics and AI, including virtual reality, illumination and shading algorithms, animation techniques, surface representation and rendering, volume visualization and morphing algorithms, geometry, modeling, path finding, and searching and planning algorithms.

Computer technology pervades modern society. Those who thoroughly understand it have a wide range of rewarding career options. This graduate degree program prepares students specifically for advanced career choices and job opportunities in existing and emerging industries where skills in computer graphics, AI, real-time simulation programming, and networking are in great demand. These include the video game, computer-based modeling, aerospace, server back-end, and medical industries, just to name a few. Graduates of this program may attain occupations as software engineers, software developers, computer programmers, engine programmers, graphics programmers, tools programmers, AI programmers, gameplay programmers, and physics engine programmers.

Degree Requirements

NUMBER OF CREDITS & GPA

The Master of Science in Computer Science degree program requires completion of at least 37 semester credits with a grade “C” (or 2.0 quality points) or above in each course and a cumulative GPA of 3.0 or better. The full-time program typically spans four semesters of 15 weeks each and an additional semester to complete a thesis or comprehensive examination, for a total of two calendar years. The part-time program typically spans twelve semesters (including summer semesters) for a total of four calendar years. Students may choose to complete the program in less time by following an alternative three-year course sequence. For candidates with a lack of experience in computer graphics or mathematics, some articulation classes may be required.

COMPUTER SCIENCE

CS 525, CS 529, CS 541, two courses from one of the concentration areas listed below, CS 598, and two additional CS courses numbered 500 and up are required. (Total: 22 credits)

CONCENTRATION AREAS:

- Artificial Intelligence
 - » CS 581
 - » one of the following courses: CS 580, CS 582
- Graphics
 - » CS 560
 - » one of the following courses: CS 500, CS 561, CS 562
- Physically-based Simulation
 - » PHY 500
 - » CS 550
- Image Processing
 - » CS 570
 - » one of the following courses: CS 571, CS 572

ELECTIVE

One course from the following is required: any CS course numbered 500 and up, PHY 500, or any MAT course numbered 500 and up. (Total: 3 credits)

MATHEMATICS

At least one MAT course numbered 500 or above is required. (Total: 3 credits)

PROJECTS

GAM 541 and two courses from the following: GAM 550, GAM 551, GAM 590, and GAM 591 are required. (Total: 9 credits)

NOTE: THESIS OR EXTRA COURSE

CS 601 and CS 602 are required for the research and project theses tracks and will count toward fulfillment of the Computer Science Requirement. Students who choose the comprehensive examination track cannot receive credit for CS 602.

WAIVED REQUIRED COURSES

Required courses can be waived on a case-by-case basis for qualified students. The academic advisor will decide on whether or not to approve these requests. In any case, students are required to satisfactorily complete a minimum of 37 semester credits to earn a MS in Computer Science degree.

Length Restrictions

Full-time students in the MS in Computer Science degree program should complete the requirements for the degree in 36 months. Students in the part-time MS in Computer Science degree program should complete the requirements for the degree in 72 months. All students must remain in continuous matriculation throughout the duration of their degree program.

Note on Capstone Experience

Upon the successful completion of MS in Computer Science degree requirements, students need to have fulfilled a “capstone experience.” This is designed to bring reflection and focus to a student’s area of concentration and to enhance the skills, methodology, and knowledge learned throughout the degree program. Components of the capstone experience can include (but are not limited to): game project classes, externships at a game company, extra courses, comprehensive examination, project thesis classes, thesis defense.

Thesis and Examination Tracks

Students in the Master of Science in Computer Science program must select to focus their studies through the completion of one of three tracks: research thesis, project thesis, or extra coursework. The research thesis option is designed for those students who wish to develop analytic research skills and to make an original contribution to the field. The project thesis

option allows students to advance their professional careers through a hands-on experience or practical application of their study. The extra coursework option is intended for those preferring extended knowledge and broader skills in computer science or a related discipline.

1. RESEARCH THESIS (CS 601 AND CS 602)

Students choosing this track must identify an area of interest within the discipline of computer science, computer engineering, mathematics, physics, or game production. They shall conduct a literature survey on existing techniques and algorithms in the field, propose an innovative approach to the field, develop the theory and prototypes, and write and defend the thesis.

2. PROJECT THESIS (CS 601 AND CS 602)

This option is similar to the research thesis. However, instead of an original contribution to the field, the project thesis emphasizes the practical aspect of a specific problem. After surveying the literature in a narrowly focused area of study, students choosing this track shall select existing algorithm(s) to implement. They must also analyze and compare different approaches. This option also requires that students write a technical report and demonstrate the implementation of the algorithm(s) to the thesis committee.

3. EXTRA COURSEWORK WITH COMPREHENSIVE EXAM

This option allows a student to take one or two additional electives offered at the graduate level to replace CS 602 or both CS 601 and CS 602, along with the satisfactory completion of a comprehensive exam.

The comprehensive examination tests a student's knowledge of basic computer science material and material covered by the chosen concentration area. The exam is based on graduate courses and suitable undergraduate material. To schedule an examination, the student shall complete the Comprehensive Examination Request Form no later than six weeks prior to the proposed examination date. The student and his or her academic advisor need to sign the form.

The comprehensive examination consists of two parts - general and subject. The general part of the examination covers core computer science topics and includes all four of the following:

- Algorithms
- Data Structures
- Advanced C++ (CS 525)
- Advanced Graphics (CS 541)

The subject part of the examination covers topics from a student's chosen concentration area (see *Degree Requirements* section).

Each of the two parts of the examination will be given in a three-hour period and may be taken either on the same day or on different days. The student's final grade will be given based on individual performance in each of the two exams. Instructors will provide a syllabus of the material covered by the exam.

The outcome of the comprehensive examination will be one of the following:

- Pass - Student earns a grade of 75% or higher in each of the two parts of the examination.
- Conditional Pass - given in rare borderline cases where a student may need to fulfill additional requirements, such as retaking one part of the examination.
- Fail - Student is required to retake both parts of the examination.

Transfer Credits

The following conditions apply:

- Graduate students may transfer up to 15 semester credits into the MS in Computer Science program.
- Of those 15 semester credits, nine can be transferred from other universities/colleges (provided that they meet the transfer of credits requirements).
- If students take the BS/MS accelerated schedule, 15 semester credits are shared between the BS in Computer Science and Real-Time Interactive Simulation and MS in Computer Science programs.
- Regardless of the BS/MS accelerated schedule, students must successfully complete a minimum of 22 semester credits in order to earn a MS in Computer Science degree. Please also refer to the *BS/MS Accelerated Schedule* section for more details.

All credits earned through DigiPen's full-time MS in Computer Science program are transferable to the part-time MS in Computer Science program.

Please refer to the *Waiver Credit* chapter for complete guidelines on DigiPen's transfer policy.

BS/MS in Computer Science Accelerated Schedule

Students enrolled in DigiPen's Bachelor of Science in Computer Science in Real-Time Interactive Simulation degree program who are interested in pursuing a graduate degree at DigiPen or taking graduate-level coursework during their undergraduate studies may participate in the "Accelerated Schedule" option, which permits students who meet the minimum requirements to take selected graduate-level courses during their undergraduate study and apply up to 15 credits towards both BS and MS degree requirements. Students who pursue the accelerated schedule can successfully complete their BS in Computer Science in Real-Time Interactive Simulation degree and Master of Science in Computer Science in five years sequentially. Please refer to the *Accelerated Schedule* section for more details.

Recommended Course Sequences for the MS in Computer Science

RECOMMENDED COURSE SEQUENCE CHART FOR FULL-TIME MS IN COMPUTER SCIENCE (2-YEAR PLAN)

SEMESTER	COURSE	COURSE TITLE	R/E	CREDITS
Semester 1	CS 525	Object-Oriented Design and Programming	R	3
	CS 529	Fundamentals of Game Development	R	3
	Elective	CS, MAT* or PHY elective	E	3
	Semester Total			9
Semester 2	GAM 541	Game Project	R	3
	CS 541	Advanced Computer Graphics	R	3
	Elective	CS, MAT*, or PHY elective	E	3
	Semester Total			9
Semester 3	Concentration Elective	See Degree Requirements section	R	3
	GAM 550	Advanced Game Project	R	3
	CS 601 or Elective	Master's Thesis I or CS, MAT*, or PHY elective	R/E	3
	CS 598	Computer Science Seminar***	R	1
	Semester Total			10
Semester 4	Concentration Elective	See Degree Requirements section	R	3
	GAM 551	Advanced Game Project	R	3
	CS 602 or Elective	Master's Thesis II or CS, MAT*, or PHY elective	R/E	3
	Semester Total			9
Thesis Defense or Comprehensive Examination**				
Degree Total				37

Please note the following:

*At least one math elective must be selected.

** If the thesis defense or comprehensive examination is scheduled to take place during a fall or spring semester and all other coursework has already been completed, then the student must register for MCM 600 in order to meet the continuous matriculation requirement. See the course description for MCM 600 for additional information.

*** CS 598—Computer Science Seminar (1 credit) is required and can be taken during any semester.

RECOMMENDED COURSE SEQUENCE CHART FOR PART-TIME MS IN COMPUTER SCIENCE (4-YEAR PLAN)

SEMESTER	COURSE	COURSE TITLE	R/E	CREDITS
Semester 1	CS 525	Object-Oriented Design and Programming	R	3
Semester 2	CS 541	Advanced Computer Graphics	R	3
Semester 3	Elective	CS, MAT*, or PHY elective	E	3
Semester 4	CS 529	Fundamentals of Game Development	R	3
Semester 5	GAM 541	Master's Game Project	R	3
Semester 6	Elective	CS, MAT*, or PHY elective	E	3
Semester 7	Concentration Elective	See Degree Requirements section	R	3
Semester 8	Concentration Elective	See Degree Requirements section	R	3
Semester 9	CS Elective or CS 601	CS Elective or Master's Thesis I	R	3
Semester 10	GAM 550	Advanced Game Project	R	3
	CS 598	Computer Science Seminar***	R	1
Semester 11	GAM 551	Advanced Game Project	R	3
Semester 12	CS Elective or CS 602	CS Elective or Master's Thesis II	R	3
	Thesis Defense or Comprehensive Examination**			
Degree Total				37

Please note the following:

*At least one math elective must be selected.

** If the thesis defense or comprehensive examination is scheduled to take place during a fall or spring semester and all other coursework has already been completed, then the student must enroll in MCM 600 in order to meet the continuous matriculation requirement. See the course description for MCM 600 for additional information.

*** CS 598—Computer Science Seminar (1 credit) is required and can be taken during any semester.

Master of Fine Arts in Digital Arts

Program Overview

The Master of Fine Arts in Digital Arts degree program delivers graduate-level education with an emphasis on traditional art techniques, creativity, and personal voice. The application of these skills in a digital context prepares graduates for careers in the 3D graphics industry. Graduates will have the tools and vision to become leaders advancing the artistic styling of video games, animated films, and related digital media.

The MFA in Digital Arts degree program emphasizes the mastery of foundational studies in art, which support coinciding courses in art as a digital medium. Graduates will be well-versed in traditional art studies of their choosing, including anatomy, figure drawing, sculpture, art history, and oil painting. Graduates will also be proficient in character or concept design, digital sculpting, hard surface modeling, lighting, texturing, rendering, rigging, and the integration of these stages into a project. Innovative digital work for a thesis project is created by combining these studies with original research.

The MFA in Digital Arts degree program candidate will be required to focus on an area of specialization and demonstrate mastery of the chosen field through the production of a thesis project. Graduates' portfolios must exhibit a level of proficiency commensurate with specialists in the industry. Graduates will be qualified for positions with titles such as 3D Artist, 3D Modeler, Animator, Character Artist, Technical Artist, Texture Artist, Environment Artist, and Art Instructor. In addition, after some years in the industry, MFA in Digital Arts graduates may attain positions with titles such as Art Lead, Art Director, Senior Artist, and Senior Character Artist.

Degree Requirements

NUMBER OF CREDITS AND GPA

The MFA in Digital Arts requires completion of at least 60 semester credits with a cumulative GPA of 3.0 or better. The program typically spans four semesters of 15 weeks each, generally accomplished in two calendar years for students following the full-time recommended course sequence, and four calendar years for students following the part-time recommended course sequence.

DIGITAL ARTS

The following computer graphics courses are required: CG 501, CG 521, and CG 525. (Total: 9 credits)

PROJECTS

The following courses are required: PRJ 601 and PRJ 602. (Total: 6 credits)

FINE ARTS AND THESIS

The following courses are required: ART 701, ART 702, ART 703, ART 704, and either ART 520 or ART 522. (Total: 21 credits)

ELECTIVE

In addition to the required courses, students must take eight electives for a total of 24 credits. The electives are as follows:

ART, CG, ANI, PRJ, OR INT ELECTIVE

The following courses are required: five courses with the ART, CG, ANI, PRJ or INT prefix numbered 500 or higher. (Total: 15 credits)

STUDIO ART ELECTIVE

The following courses are required: two courses from ART 501, ART 503, ART 511, ART 512, ART 528, ART 550, ART 555, ART 560. ART Special Topics or ANI Special Topics courses which focus on the development of traditional studio art and/or observational skill sets may be approved by the Program Director. (Total: 6 credits)

OPEN ELECTIVE

At least three credits from any graduate-level offering (500 or higher) in any department at DigiPen. (Total: 3 credits)

(Total: 24 credits)

Length Restrictions

Full-time students in the MFA in Digital Arts should complete the requirements in three (3) calendar years. Students in the part-time MFA in Digital Arts should complete the program in six (6) calendar years. All students must remain in continuous matriculation throughout the duration of their program.

Graduation Requirements

In order to graduate from the program, students must demonstrate:

- Successful completion of 60 semester credits with a cumulative grade point average of 3.0 or better.
- Successful presentation and official acceptance of the Final Thesis at Thesis Presentation. This can only happen after 60 credits of coursework are completed (or in progress) and the student has taken and passed ART 704 (or is in progress).
- Submission of an archived copy for the DigiPen Library of the thesis and documentation.

Project, Capstone, Thesis Requirements or Options

THESIS PROPOSAL REVIEW

Candidates in the MFA in Digital Arts who are completing ART 704 must schedule and present their thesis proposal to an assembled thesis committee. No student may register for ART 703 without approval of their thesis committee.

THESIS REQUIREMENT

The goal of the DigiPen MFA in Digital Arts is to develop industry-quality graduates who have an innovative, creative and sincere point of view. The MFA in Digital Arts thesis is a body of work that demonstrates this professional level of expertise with industry tools as well as showcases a unique voice in digital media. The thesis, created specifically based on the candidate's project proposal, is expected to meet professional standards. At the same time, the work will represent the candidate's individual perspective, style, and philosophy. The thesis project should show a thoughtful and deep understanding of the student's theme that is compelling and persuasive, technically complete, and professionally executed.

The MFA in Digital Arts Thesis is created specifically in response to the approved thesis proposal submitted by a candidate. It includes not only the project work but also marketing and branding materials, schedules and timelines, project scope, and design documentation as appropriate. Candidates are required to present to a thesis review panel and to the public. The final work and all documents will be archived in the DigiPen Library and gallery. The MFA in Digital Arts Thesis is not a retrospective of all work produced since the student entered the graduate program.

Written Component: The thesis will have a written component, to the satisfaction of the thesis committee. Its contents may include topics such as research, theory, process, and project evaluation.

THESIS DEFENSE

The MFA in Digital Arts candidate thesis defense will be scheduled with the thesis committee once a student has successfully completed (or has in progress) the required coursework (minimum 60 approved credits).

Students will be expected to deliver a verbal description of the thesis work, production and development plans, concepts and supporting documentation. A visual presentation of the scope and plan of the thesis will be part of the defense, as well as a presentation of the production pipeline including technical description. The thesis will be presented to the committee and public. A question and answer session will follow the presentation, during which the candidate will be required to defend the work.

Transfer Credits

Graduate students are eligible to transfer up to 15 credits that qualify from other colleges and other DigiPen programs. All credits earned through DigiPen's full-time MFA in Digital Arts program are transferable to the part-time MFA in Digital Arts program. Please refer to the section on *Waiver Credit* for complete guidelines on DigiPen's transfer policy.

MFA in Digital Arts Curriculum

Listed on the next page are all the graduate-level courses currently offered at DigiPen and appropriate to the MFA in Digital Arts degree program. Courses designated with an "R" are required for the MFA in Digital Arts degree program. Courses designated with an "E" are appropriate as electives within the program.

The MFA in Digital Arts requires 60 credits total, 33 of which are specifically required and 27 of which are elective.

Graduate-Level Courses for the MFA in Digital Arts Degree Program

COURSE	COURSE TITLE	R/E	CREDITS
ART 701	Art Research Methodology	R	3
PRJ 601	Digital Arts Survey and Analysis	R	3
CG 501	3D Concepts and Production	R	3
CG 525	Digital Painting: Composition and Color	R	3
ART 702	Thesis Pre-Production	R	3
PRJ 602	Art Production Process	R	3
CG 521	Organic and Hard Surface Modeling	R	3
ART 703	Thesis I	R	6
ART 704	Thesis II	R	6
ART 501	Advanced Figure Drawing	E	3
ART 503	Gesture Drawing	E	3
ART 504	Storyboarding	E	3
ART 511	Oil Painting: The Figure	E	3
ART 512	Plein Aire Painting	E	3
ART 520	Conceptual Design and Illustration	E	3
ART 522	Character Design	E	3
ART 528	Advanced Figure Sculpting	E	3
ART 550	Human Anatomy	E	3
ART 555	Anatomy: Ecorché	E	3
ART 560	Animal Anatomy and Design	E	3
CG 530	Hair and Clothing Simulation	E	3
CG 570	Digital Painting: Matte and Background	E	3
CG 577	Facial Rigging and Animation	E	3
CG 599	Special Topics	E	3
CG 605	Digital Sculpture	E	3
CG 615	Texturing for 3D	E	3
CG 620	Lighting and Rendering	E	3
CG 661	Advanced Character Creation	E	3
CG 675	Character Rigging	E	3
INT 590	Master's Internship I	E	3
INT 591	Master's Internship II	E	3
PRJ 510	Team Project	E	3
CSX 510	Scripting for Games	E	3
FLM 508	Cinematography and The Art of The Story	E	3
GAMX 500	Game Design, Development and Production	E	3
MCM 600	Masters Continuous Matriculation	E	1
MGT 500	Management for Art Directors	E	3
PHYX 510	Physics for Animation and Modeling	E	3

Recommended Course Sequence for the MFA in Digital Arts

RECOMMENDED COURSE SEQUENCE CHART FOR FULL-TIME MFA IN DIGITAL ARTS

SEMESTER	COURSE	COURSE TITLE	R/E*	CREDITS
Semester 1	ART 701	Art Research Methodology	R	3
	PRJ 601	Digital Arts Survey and Analysis	R	3
	CG 501	3D Concepts and Production	R	3
	CG 525	Digital Painting: Composition and Color	R	3
	Elective	STUDIO ART ELECTIVE	E	3
	Semester Total			
Semester 2	ART 702	Thesis Pre-Production	R	3
	PRJ 602	Art Production Process	R	3
	CG 521	Organic and Hard Surface Modeling	R	3
	ART 520 or ART 522	Conceptual Design and Illustration or Character Design	E	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Semester Total			
Semester 3	ART 703	Thesis I	R	6
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Elective	STUDIO ART ELECTIVE	E	3
	Semester Total			
Semester 4	ART 704	Thesis II	R	6
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Open Elective	Any DigiPen course from any department, numbered 500+	E	3
	Semester Total			
Degree Total (minimum credits required)				60

*Note: electives must be selected from courses offered at DigiPen and numbered 500 or higher. Courses may have prerequisites that should be taken into consideration by the student and discussed with the student's advisor.

RECOMMENDED COURSE SEQUENCE CHART FOR PART-TIME MFA IN DIGITAL ARTS

SEMESTER	COURSE	COURSE TITLE	R/E*	CREDITS
Semester 1	PRJ 601	Digital Arts Survey and Analysis	R	3
	CG 501	3D Concepts and Production	R	3
	CG 525	Digital Painting: Composition and Color	R	3
	Semester Total			9
Semester 2	CG 521	Organic and Hard Surface Modeling	R	3
	ART 520 or ART 522	Conceptual Design and Illustration or Character Design	E	3
	Semester Total			6
Semester 3	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Elective	STUDIO ART ELECTIVE	E	3
	Semester Total			9
Semester 4	PRJ 602	Art Production Process	R	3
	Elective	STUDIO ART ELECTIVE	E	3
	Semester Total			6
Semester 5	ART 701	Art Research Methodology	R	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Semester Total			6
Semester 6	ART 702	Thesis Pre-Production	R	3
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Semester Total			6
Semester 7	ART 703	Thesis I	R	6
	Elective	ART, CG, ANI, PRJ, or INT ELECTIVE, numbered 500+	E	3
	Semester Total			9
Semester 8	ART 704	Thesis II	R	6
	Open Elective	Any DigiPen course from any department, numbered 500+	E	3
	Semester Total			9
Degree Total (minimum credits required)				60

*Note: electives must be selected from courses offered at DigiPen and numbered 500 or higher. Courses may have prerequisites that should be taken into consideration by the student and discussed with the student's advisor.

Courses

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

Please note that 500-level and higher courses are designated for DigiPen's graduate programs. Undergraduate students wishing to take graduate-level courses should contact the Office of the Registrar.

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): FLM 275 or MUS 115, ANI 350, ART 401

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 filmmaking, 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 including understanding how cameras work, how images are captured and processed, 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): CG 201, FLM 210, FLM 215

This course introduces students to two key areas of compositing -- image preparation (e.g., roto-scoping, 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): CG 275, FLM 350

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.

FLM 508 **Cinematography and the Art of the Story** (3 cr.)

Prerequisite(s): None

This course explores how stories are told in films and the cinematic elements of games to give visual artists insight and practical experience into visualizing stories. It explores not only the basic elements of drama, and pushes further into the unique language of visual storytelling. It may cover the theories of editing, sound, the basic principles of lighting, and the management of the visualization elements.

Internship Courses

INT 390 **Internship I** (5 cr.)

Prerequisite(s): None
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.

INT 450 **Internship II** (5 cr.)

Prerequisite(s): None
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.

INT 590 **Master's Internship I** (3 cr.)

Prerequisite(s): None
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 is learned 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.

INT 591 **Master's Internship II** (3 cr.)

Prerequisite(s): None
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 is learned 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.

Projects Courses

PRJ 101 **The Basics of Production** (3 cr.)

Prerequisite(s): ART 101, ART 125, ANI 101

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): ART 120, ART 130, ANI 151, 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): ART 120, ART 130, ANI 151, 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): 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): CG 275, PRJ 251 OR PRJ 252

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): ART 300, CG 300, PRJ 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, ENG 116, PRJ 350

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.

PRJ 452 Senior Game Art Project II (4 cr.)
Prerequisite(s): PRJ 402

In this course, students work to complete the projects they began in PRJ 402, or begin a new project to demonstrate a particular professional skill.

PRJ 510 Team Project (3 cr.)
Prerequisite(s): CG 501 and CG 525

This course consists of the production of art for a team project, starting with the creation of a production schedule and culminating with the delivery of various art assets. Coordination may occur with team members in other courses.

PRJ 601 Digital Arts Survey and Analysis (3 cr.)
Prerequisite(s): None

This course explores digital art production. A selection of existing projects is analyzed and special attention is paid to recognizing innovation and the trajectory of creative and technical developments. Research is conducted to examine the artistic influences and required technical background for digital art production.

PRJ 602 Art Production Process (3 cr.)
Prerequisite(s): PRJ 601

This course focuses on artistic concept, pre-production, and asset creation. Story elements are realized in a visual form. Topics include project management and effective presentations.

PRJ 690 Thesis I: Proposal Pre-Production (3 cr.)
Prerequisite(s): None

Students research, develop and refine an original idea for their thesis topic. Additionally, they create an outline of their production plan including timeline and milestones. At the end of the course, they present their work at the mid-point thesis review. Approval by the thesis committee is a requirement for passing this course.

PRJ 701 Thesis II (3 cr.)
Prerequisite(s): PRJ 690

Students begin work on a thesis project under the guidance of their thesis advisor.

PRJ 702 Thesis III (3 cr.)

Prerequisite(s): PRJ 701

Students continue work on a thesis project under the guidance of their thesis advisor.

Department of Computer Science

Computer Science Courses

CS 100 Computer Environment (4 cr.)

Prerequisite(s): None

This course provides a detailed examination of the fundamental elements on which computers are based. Topics include number systems and computation, electricity and basic circuits, logic circuits, memory, computer architecture, and operating systems. Operational code and assembly languages are discussed and then implemented on a hardware platform, such as a personal computer or an autonomous vehicle.

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 course 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 course 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 165 Programming Foundations (4 cr.)

Prerequisite(s): CS 116

Credit may be received for only one of: CS 165, CS 170.

This course expands on basic programming skills through an exploration of object-oriented programming techniques. Topics may include classes, inheritance, interfaces, polymorphism, and data structures.

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 174 Audio Scripting (3 cr.)

Prerequisite(s): CS 116 or CS 120

This course covers concepts and implementation strategies for using a high-level scripting language to achieve complex audio behavior in game development. Topics include principles of analog and digital audio, psychoacoustics, and programming.

CS 175 Scripting Languages (3 cr.)

Prerequisite(s): CS 116 or CS 120

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 course 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): CS 170, MAT 140

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 and CS 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. This course 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 100 or MAT 140, 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 engines 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 multiplayer 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 271 **Supervised Machine Learning** (3 cr.)

Prerequisite(s): CS 225, CS 230 or CS 235, MAT 150 or MAT 180

This course covers fundamental machine learning algorithms and their implementation using supervised learning techniques. Topics include classification and regression supervised learning algorithms.

CS 272 **Reinforcement Machine Learning** (3 cr.)

Prerequisite(s): CS 271, MAT 258

This course covers the fundamentals of goal-directed machine learning using reinforcement learning principles. Decision-

making frameworks based on exploitation and exploration are covered. The course also covers single- and multiple-state space approximations using regular- and linear-function approximation techniques.

CS 280 **Data Structures** (3 cr.)

Prerequisite(s): CS 225

This course introduces 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 315 **Low-Level Programming** (3 cr.)

Prerequisite(s): CS 100, CS 225

This course introduces modern microprocessor architectures. Topic areas include computer architecture, modern assembly languages, and writing assembly-language programs. Emphasis is placed on using assembly language to optimize high-level language programs.

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. Topics 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 bounding 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 362 **Operations Research** (3 cr.)

Prerequisite(s): CS 230, MAT 225 or MAT 230, MAT 250

This course introduces the fundamental concepts and numerical methods employed in the field of operations research. The course focuses on methods in constraint-based optimization. Topics include linear programming, inventory modeling, and decision-making under uncertainty.

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

This course introduces image-processing methods and applications relevant to the development of real-time interactive simulations. The course covers fundamental concepts in image representation, image filtering, frequency domain processing, and image-based rendering methods. Topics include image serialization, 2D filtering, Fourier transforms, noise modeling, and high dynamic-range imaging.

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 include 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 networks, and various clustering algorithms. Then, the course explores probabilistic algorithms like Bayesian networks, hidden Markov models, and Monte Carlo methods.

CS 387 **Unsupervised Machine Learning** (3 cr.)

Prerequisite(s): CS 272, MAT 340

This course explores unsupervised machine learning. Topics include clustering, dimensionality reduction, Gaussian mixture models, randomized optimization, covariance estimation, unsupervised neural networks, and reduction of problem space.

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, compiler, 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 problems.

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, CG 130, MAT 300

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.

CS 487 **Advanced Machine Learning** (3 cr.)

Prerequisite(s): CS 387

This course focuses on the application of machine-learning concepts in a human interactive virtual environment. Topics covered include learning processes, data collection, and efficient usage of large data. The course provides a comprehensive introduction to propositional logic, first order logic, search and exploration techniques, planning, psychological, neuroscience, and cognitive augmentation models.

CS 488 **Introduction to Console Development** (3 cr.)

Prerequisite(s): CS 250, GAM 250

This course introduces students to the game development process on a gaming console platform. It covers both the technical features and design considerations of console development. Topics covered include an overview of game console hardware and comparison with the PC environment, memory management, asynchronous data loading, graphics API,

reading optical and motion sensor data, optimization, and NAND data management. As students learn the material, they work on a game project that takes advantage of the unique capabilities of gaming consoles.

CS 500 **Ray Tracing** (3 cr.)

Prerequisite(s): CS 300 or CS 541

This course focuses on rendering techniques used for ray tracing. The course culminates with an implementation of a path-tracing algorithm able to generate images demonstrating lighting and modeling techniques not found in traditional real-time graphics. Topics include solid modeling, intersection calculations, and illumination models.

CS 525 **Object-Oriented Design and Programming** (3 cr.)

Prerequisite(s): None

This course focuses on object-oriented design and programming using the C++ programming language. It is targeted at the graduate student that is already fluent in one or more programming languages. Among the language-specific topics included are pointers, pointer arithmetic, dynamic memory management, namespaces, scope, operator overloading, generic programming (templates), the Standard Template Library, and standard compliance. Object-oriented topics will cover analysis and design considerations. Students considering this course need to have programming fluency in another imperative language, preferably with some basic knowledge of C++. After successfully completing this course, students should have a much deeper understanding of the subtleties and complexities of using object-oriented facilities of the C++ programming language, the standard programming language used in the game industry today.

CS 529 **Fundamentals of Game Development** (3 cr.)

Prerequisite(s): None

This course presents techniques in real-time interactive simulation and video game implementations. It introduces the 2D and 3D game engine architecture, including game and system components separation, game flow, game state manager, handling input/output, and the frame rate controller. The course introduces students to the game development environment, such as Windows programming SDK and graphics library DirectX API. It also covers commonly practiced techniques such as space partitioning, AI techniques, particle systems, and collision algorithms. Several physics techniques are discussed and implemented, such as jump and reflection, in addition to behavior algorithms, such as state machines. Different game genres are explained, including Asteroids (2D), Platform (2D), Brix (2D), and Pong (3D). Students learn how to implement and extend collision, matrix, and vector libraries, according to the specific requirements for different games.

CS 530 **Advanced Game Engine Design** (3 cr.)

Prerequisite(s): CS 529, CS 541

A game engine is a complex framework or library that provides vital functionalities to any video game independent of the game content or genre. A well-designed game engine must at least provide the following functionalities: data management, rendering, networking, dynamics, input controllers, audio, editing tools, modeling tools, and a high-level application programming interface (API) for the entire framework that hides the lowlevel details of graphics, networking, and audio programming. Thus, a game engine is a complex library consisting of various components that must all be efficiently integrated into a single framework using the principles of object-oriented design. In this course, students study the computer graphics, mathematics, data structures, and algorithms required to design and architect a game engine that can handle complex graphics applications that handle 3D data, such as games and computer-aided design.

CS 541 **Advanced Computer Graphics** (3 cr.)

Prerequisite(s): CS 241, MAT 250

In this course, students study algorithms and techniques that are designed to improve efficiency and increase the realism of 3D graphics. Two main subjects are discussed: techniques that add details on object surfaces, including lighting and shading models, texture mapping, bump mapping, environmental mapping and shadow algorithms; and algorithms that eliminate invisible polygons/objects from being further processed by the graphics pipeline, including BSPTree, occlusion, portal, and others.

CS 550 **Physics Simulation** (3 cr.)

Prerequisite(s): PHY 300 or PHY 500

This course will cover the implementation of various physics topics, as well as collision detection and collision resolution algorithms. Special topics such as stacking, soft-bodies, and friction may be covered.

CS 560 **Advanced Animation and Modeling I** (3 cr.)

Prerequisite(s): CS 529, CS 541, MAT 500

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 course covers two broad categories. Students 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.

CS 561 **Advanced Animation and Modeling II** (3 cr.)

Prerequisite(s): CS 560 or CS 460

This course is the continuation of Advanced Animation and Modeling I. It introduces students to advanced animation and modeling algorithms and techniques in some special areas to increase the physical realism of dynamic objects in 3D graphical environments. The topics include group object (particles, fish, and birds) control, natural phenomena (water, snow, soil, smoke, and fire) simulation, plant (trees and grass) modeling, facial animation (expression and speech synchronization), and deformable object modeling.

CS 562 **Advanced Real-Time Rendering Techniques** (3 cr.)

Prerequisite(s): CS 300 or CS 541

This course introduces students to data structures, algorithms, and techniques concerned with rendering images more accurately and efficiently in interactive computer simulations and video game software. Topics include patch and surface algorithms, terrain rendering techniques, anti-aliasing theory and practice, advanced lighting techniques, hard and soft shadow map methods, multi-pass rendering techniques, high-dynamic range (HDR) rendering, advanced shading and mapping, and real-time vertex/pixel shader programming essentials. Additionally, students practice these subjects by working with the supporting OpenGL or DirectX libraries.

CS 570 **Computer Imaging** (3 cr.)

Prerequisite(s): None

This course introduces image-processing methods and applications relevant to the development of real-time interactive simulations. The course covers fundamental concepts in image representation, image filtering, frequency domain processing, and image-based rendering methods. Topics include image serialization, 2D filtering, Fourier transforms, noise modeling, and high dynamic-range imaging.

CS 571 **Advanced Computer Imaging** (3 cr.)

Prerequisite(s): CS 570 or ECE 420

This course introduces the computer vision pipeline. Students understand and implement state-of-the-art methods in image analysis, feature detection, face recognition and computational photography. This course provides computational skills that are complementary to the computer graphics curriculum and reinforces learning activities with a hands-on implementation approach.

CS 580 **Artificial Intelligence in Games** (3 cr.)

Prerequisite(s): None

This course introduces students to a wide range of concepts and practical algorithms that are commonly used to solve video 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 include the game AI programmer mindset, AI architecture, such as 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 581 **Introduction to Artificial Intelligence** (3 cr.)

Prerequisite(s): None

This course covers important AI areas, including search algorithms, knowledge representation, production systems, game playing, uncertainty handling, learning, and planning. Students are required to have basic knowledge of data structures, probability theory, and mathematical logic. Upon successful completion of this course, students have gained an understanding of the skills relevant to modern AI techniques, practices, and design solutions.

CS 582 **Reasoning Under Uncertainty** (3 cr.)

Prerequisite(s): CS 380 or CS 580, CS 381 or CS 581

This course covers important AI topics, including hidden Markov models and advanced search algorithms (D-lite and cooperative path finding). Students also examine uncertainty handling (Dempster-Shafer theory), learning (kernel machines), and advanced topics in planning (conditional and adversarial planning).

CS 598 **Computer Science Seminar** (1 cr.)

Prerequisite(s): None

Every semester, guest speakers, faculty members, and/or graduate students offer to DigiPen students a number of presentations that cover different research topics in computer science. Each speaker decides on the choice of topic, but they usually are within the general boundaries of students' courses of study. This seminar aims not to pursue any particular topic but rather to explore new research in more depth to allow students to develop their own skills in theoretical analysis. Each speaker's paper(s) are available to students. They are required to read these papers and to choose one to expand upon for a final paper and an oral presentation.

CS 599 **Special Topics in Computer Science** (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.

CS 601 **Research Methods in Computer Science** (3 cr.)

Prerequisite(s): Permission of Instructor

This course provides the student with an opportunity to study and apply research methods to a Computer Science topic of his/her choice. The student works with a faculty advisor to determine an appropriate area of research to survey, conducts a comprehensive survey of the area, and identifies tools and methods that may help the student in extending existing research. The student is required to write a survey report that summarizes the findings of this exploratory process.

CS 602 **Master's Thesis** (3 cr.)

Prerequisite(s): CS 601

This course is the final part of the master's program thesis. Students work under the supervision of a thesis advisory committee to develop the theory and algorithms of the proposed research topic, usually leading to creation of a prototype to verify the theory and methods. Upon completion of the class, the student must submit his or her formal written thesis to the advisory committee and pass an oral exam defending the thesis.

CSX 510 **Scripting For Games** (3 cr.)

Prerequisite(s): None

This course presents topics in computer programming, assuming no prior background experience in the subject. Emphasis is on automation of tasks. Topics may include: logic, program flow, variables, operators, conditionals, loops, and functions. Students are exposed to at least one current industry standard scripting language used by artists in the film and video games industries.

MCM 600 **Masters Continuous Matriculation** (1 cr.)

Prerequisite(s): None

Maintaining continuous matriculation is a requirement for graduate students. Students who have completed most course requirements but are finishing their thesis or are satisfying incomplete grades must register to maintain continuous matriculation. This credit may not be applied toward degree completion requirements.

Department of Digital Arts

Computer Graphics Courses

CG 102 **2D Raster Graphics for Designers** (3 cr.)

Prerequisite(s): ART 102 or ART 105

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

This course introduces game designers to the 3D production process. The course begins with the basics of interface organization strategies, equipment options, and production elements. The class also introduces techniques for texture mapping, modeling, rigging, lighting, cameras, and animation.

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 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; the course concludes with a series of applied problems in 2D vector animation.

CG 275 **Introduction to 3D Animation** (3 cr.)

Prerequisite(s): CG 225, ANI 151

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 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, posed, 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 course 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 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, and soft and rigid body dynamics. Students are required to integrate the various effects into a live action shot.

CG 501 **3D Concepts and Production** (3 cr.)

Prerequisite(s): None

Students are introduced to the computer graphics production pipeline with emphasis on latest industry practices and techniques. Project work includes planning, tasking, concept art, production, and output. Professional portfolio practices are emphasized.

CG 521 **Organic and Hard Surface Modeling** (3 cr.)

Prerequisite(s): CG 501

This course explores a variety of modeling techniques for both man-made and organic surfaces.

CG 525 **Digital Painting: Composition and Color** (3 cr.)

Prerequisite(s): None

This course covers the principles of composition and color theory in developing atmosphere, narrative, and information presentation in digital media. The limitations of digital color production, organization of the third dimension in digital environments, and issues of lighting and texture are explored.

CG 530 **Hair and Clothing Simulation** (3 cr.)

Prerequisite(s): CG 521

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 570 **Digital Painting: Matte and Background** (3 cr.)

Prerequisite(s): CG 525

This course examines the methods required to combine 2D and 3D art for cinematic, computer animation and gaming environments. Issues of scale, perspective, palette and color matching, atmospheric perspective and lighting, parallax,

horizon and eye level are addressed in a series of exercises designed to create convincing interaction of 2D and 3D art in interior scenes, cityscapes, and landscapes in a variety of media.

CG 577 **Facial Rigging and Animation** (3 cr.)

Prerequisite(s): ART 555

Students of this class are exposed to a variety of techniques to rig and animate the human face. Production techniques are introduced to help students improve their skills and decide which course of action is best suited for different projects. Key topics may include: lip sync, muscle bulging, phonemes vs. visemes, and scripts for rigs.

CG 599 **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 605 **Digital Sculpture** (3 cr.)

Prerequisite(s): CG 521

This course introduces an array of digital modeling, sculpting, and painting techniques for use with a set of 3D and 2D tools. Sculpting, modeling, posing, anatomy, texturing, and workflow are practiced.

CG 615 **Texturing for 3D** (3 cr.)

Prerequisite(s): CG 501, CG 525

This course focuses on how to generate efficient and accurate texture maps. The course also explores techniques for generating landscape-, architectural-, objects-, and character-based textures.

CG 620 **Lighting and Rendering** (3 cr.)

Prerequisite(s): CG 501, CG 525

This course introduces advanced lighting techniques in a 3D scene. A variety of output formats are presented and exposed for solutions in various media projects. Topics include shadow types, reflection, global illumination, material types, three point lighting, composition, values, and rendering.

CG 661 **Advanced Character Creation** (3 cr.)

Prerequisite(s): ART 522, CG 605

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

CG 675 **Character Rigging** (3 cr.)

Prerequisite(s): CG 501

This course focuses on how to effectively rig characters for games or films. Multiple rigging methods are explored such as: building a hierarchy of joints, creating flexible controls for characters, forward kinematics and inverse kinematics.

CG 676 **Advanced Character Rigging** (3 cr.)

Prerequisite(s): CG 675

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

Department of Electrical and Computer Engineering

Electrical and Computer Engineering Courses

ECE 101L **Introduction to Engineering Projects** (1 cr.)

Prerequisite(s): None

This course provides an introduction to ECE projects by pairing up students with an engineering team in a monitored environment. Students are assigned a project advisor and placed with a team that is typically enrolled in an upper-division project course. They are exposed to topics, such as the project development process, engineering practices, hardware design techniques, and software implementation issues.

ECE 110 **CE 1st-Year Project** (3 cr.)

Prerequisite(s): CS 100

This course introduces the basics of the Computer Engineering field. The history of computer engineering, the electronics development cycle, professional ethics, multidisciplinary team environments, and common development tools used in industry are explored. The course culminates in a project involving an embedded microprocessor.

ECE 180 **Audio Concepts and Implementation** (3 cr.)

Prerequisite(s): CS 100, CS 120

This course provides an introduction to audio concepts and implementation. Students are introduced to the basics of digital audio processing, digital sound synthesis, and sound perception. These concepts are reinforced through the lab projects, where students work with audio programming at the sample level.

ECE 200 **Electrical Circuits** (3 cr.)

Prerequisite(s): CS 100, MAT 200, PHY 200

This course covers analog circuits. Topics include passive components, series and parallel circuits, two-terminal networks, circuit reduction, impedance analysis, waveform measurement, operational amplifiers, passive and active filters, circuit step response, and circuit analysis using Laplace transforms. Integration of analog subsystems into digital circuits is emphasized.

ECE 210 **Digital Electronics I** (4 cr.)

Prerequisite(s): CS 100

This course focuses on digital circuit design and electronics. Topics include combinational and sequential logic, logic families, state machines, timers, digital/analog conversion, memory devices, and basic microprocessor architecture. Integral to this course are hands-on laboratories where the circuits presented in lecture are designed, built, and tested.

ECE 220 **CE 2nd-Year Project** (3 cr.)

Prerequisite(s): ECE 110 or GAM 150, CS 100, ENG 110

This course focuses on designing and creating a device using components such as integrated circuits and embedded microprocessors. This device usually takes the form of a robot or electronic toy that interacts with people or the environment and demonstrates digital communication. This course introduces concepts of software engineering and process documentation, and emphasizes system-level design.

ECE 225 **Robotics** (3 cr.)

Prerequisite(s): CS 100, ECE 260, PHY 200, PHY 200L

This course examines the theoretical and practical foundations of mobile robotics. Fundamental topics from structural design, sensors, actuators, motors, and artificial intelligence are covered individually. Systems-level concepts of human interface, distributed robotics, requirements engineering, and ethics are covered in an integrated manner.

ECE 260 **Digital Electronics II** (4 cr.)

Prerequisite(s): ECE 210

As a continuation of Digital Electronics I, this course has an emphasis on programmable logic. Topics include advanced state machine design techniques and an introduction to hardware description languages (such as Verilog and VHDL). Lectures are reinforced with hands-on laboratory work involving complex programmable logic devices and field programmable gate arrays. Students are expected to complete a final project that utilizes programmable logic design.

ECE 270 **Real-Time Operating Systems** (3 cr.)

Prerequisite(s): CS 280

In this course, students are introduced to programming for real-time embedded systems. This course covers topics including multi-tasking, synchronization, context switching, scheduling, interrupt handling, application loading, fault tolerance, and reliability testing. Students are expected to implement their own real-time operating system for an embedded microprocessor platform.

ECE 300 **Embedded Microcontroller Systems** (3 cr.)

Prerequisite(s): CS 100, CS 170

This course covers topics needed to build the hardware and software for embedded systems. Core topics include microcontroller and microprocessor systems architecture, embedded system standards, and inter-process communication protocols. Additional topics may include performance measurement, peripherals and their interfaces, board buses, memory interfaces, other modern communication protocols, and system integration.

ECE 310 **CE 3rd-Year Project I** (4 cr.)

Prerequisite(s): ECE 210, ECE 220, PHY 200

This course is the first semester of a project focusing on team development of an interactive embedded system. The system is expected to integrate software and hardware in a real-time environment. Project development topics include component selection, testing, implementation, and demonstration. Team management skills, presentation skills, critical design processes, and the study and implementation of human-machine interaction and interface devices are also developed.

ECE 350 **Control Systems** (3 cr.)

Prerequisite(s): MAT 225, MAT 256

This course presents mathematical methods of describing systems, with a focus on linear negative feedback control systems. Topics covered typically include signals and systems, Laplace and Fourier transforms, block diagrams, transfer

functions, time-domain modeling, and error and stability analysis. Work is done analytically and numerically with examples from computer, electrical, and aerospace engineering, communications, and mechatronics. Additionally, students are introduced to the implementation of feedback control in embedded systems.

ECE 360 **CE 3rd-Year Project II** (4 cr.)

Prerequisite(s): ECE 300, ECE 310, CS 280

This course is the second semester of a project focusing on team development of an interactive embedded system. The system is expected to integrate software and hardware in a real-time environment. Project development topics include component selection, testing, implementation, and demonstration. Team management skills, presentation skills, critical design processes, and the study and implementation of human-machine interaction and interface devices are also developed.

ECE 380 **Computer Design and Architecture** (3 cr.)

Prerequisite(s): ECE 260, ECE 300

This course is an introduction to basic computer architecture and design. It studies common architecture that is found in many modern microcontrollers. Building on past digital logic design experience, teams collaborate to design and build a simplified implementation of this architecture.

ECE 390 **CE Internship I** (4 cr.)

Prerequisite(s): ECE 270, ECE 310

An internship is any carefully monitored work or service experience in which an individual has intentional learning goals and reflects actively on what is learned 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.

ECE 399 **Special Topics in Computer Engineering** (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.

ECE 400 **Motors and Sensors** (3 cr.)

Prerequisite(s): PHY 270

An electronic system is useless unless it interacts with the outside world. Students have used sensors and actuators

before, but in this course, they examine them in more detail. They develop their understanding of the capabilities and limitations of some popular sensors. Additionally, they study the physical principles behind an electrical motor/generator. Topics in this course include three-phase circuits, transformers, power transmission, motors and generators, stepper motors and encoders, motor controllers, limit switches, and sensors (optical, acoustic, eddy current, and triangulation).

ECE 410 **CE 4th-Year Project I** (4 cr.)

Prerequisite(s): CS 330, ECE 260, ECE 360 or ECE 390, PHY 270

This course is the first semester of the Computer Engineering program capstone project. The course focuses on team development of a system that integrates software and hardware in a real-time environment. Emphasis is placed on communication and professional skills such as interview preparation, project presentations, engineering management, testing and quality control, and statistical methods. The project includes component selection, design, testing, and implementation.

ECE 420 **Digital Signal Processing** (3 cr.)

Prerequisite(s): MAT 225, MAT 256, MAT 258

This course focuses on signals represented by a sequence of numbers or symbols and the processing of these signals. Topics in this course include continuous, discrete and fast-Fourier transforms, z-transforms, transfer functions, frequency response, finite impulse response, and infinite impulse response filters. Work is done analytically and numerically with examples from areas such as computer and electrical engineering, communications, and various scientific fields. Additionally, students are introduced to the implementation of digital signal processors in embedded systems.

ECE 460L **CE 4th Year Project II** (4 cr.)

Prerequisite(s): ECE 410L

This course is the second semester of the Computer Engineering program capstone project. The course focuses on team development of a system that integrates software and hardware in a real-time environment. Emphasis is placed on communication and professional skills, such as interview preparation, project presentations, engineering management, testing and quality control, and statistical methods. The project includes component selection, design, testing, and implementation.

ECE 490 **CE Internship II** (4 cr.)

Prerequisite(s): ECE 390

An internship is any carefully monitored work or service experience in which an individual has intentional learning

goals and reflects actively on what is learned 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.

Department of Fine Arts

Art Courses

ART 101 **Language of Drawing I** (3 cr.)

Prerequisite(s): None

Credit may be received for ART 101 or ART 102, but not for 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 ART 101 or ART 102, but not for 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 111 **Introduction to Ceramics** (3 cr.)

Prerequisite(s): None

This course builds a foundation in ceramic arts. It provides the opportunity to learn basic techniques of the ceramic process, which include hand-building techniques, wheel throwing, and glazing.

ART 113 **Ceramics: Introductory Wheel Throwing** (3 cr.)

Prerequisite(s): None

Through exercises, demonstrations, and hands-on instruction this introductory course focuses on beginning wheel-throwing techniques. Topics include surface decoration, glazing and firing, form, balance, and other spatial concerns. Skills are developed through practice on the potter's wheel to produce simple forms such as cylinders, bowls, and plates.

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 may be 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 drawings, 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

Corequisite: 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 artistic influences on 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 222 **Ceramics: Hand Building** (3 cr.)

Prerequisite(s): ART 111

This course builds upon hand-building techniques learned in Introduction to Ceramics (ART 111). Surface texture techniques and basic mold-making will be explored, all while working in the certainty of 3D.

ART 223 **Ceramics: Wheel Throwing** (3 cr.)

Prerequisite(s): ART 111

This course focuses on building skills developed in Introduction to Ceramics (ART 111) to produce simple forms on the potter's wheel such as cylinders, bowls, and plates.

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): BIO 150 or ART 110 or ART 150, ART 101, ART 151

In this course, 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, concentrate on communicating visually what the model is doing and/or thinking. The course focuses on weight, depth, balance, tension, rhythm, and flow.

ART 228 **Figurative Sculpture** (3 cr.)

Prerequisite(s): ART 151, BIO 150

This course introduces the challenges of sculpting the human figure from life. It utilizes traditional techniques to build an armature and complete a sculpture in clay for the purpose of exploring the human form in 3D space. Emphasis is placed on gesture, proportion, and anatomy, as well as on developing a strong sense of form and volume.

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 air. 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 240 **Introduction to Graphic Design and Typography** (3 cr.)

Prerequisite(s): ART 125 or ART 126

This course will introduce fundamental visual design concepts, including composition and use of white space, identification and use of classic type families, creation and use of layout and grid construction, use of visual hierarchies, and effective usability strategies.

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 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): ART 201, ENG 116, 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

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 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.

ART 501 Advanced Figure Drawing (3 cr.)

Prerequisite(s): None

This advanced course integrates with the student's study of sculpture to express human anatomy artistically in two dimensions. Students will explore: kinetics by engaging in gesture drawing; use of line and value; figure in environment; figurative composition and sequential composition. Students will be encouraged to explore creativity and personal voice in their work.

ART 503 Gesture Drawing (3 cr.)

Prerequisite(s): None

This course focuses on drawing the figure in an interpretive manner, focusing on the action and intent of the pose. Whereas in traditional life drawing the focus is on reproduction of the figure, in this course the pose is the starting point rather than the end point. All aspects of drawing, including line, form, silhouette,

details, lighting, and most importantly line of action are directed to the purpose of visually communicating action and intent. Particular attention will be paid to distribution of weight, depth, balance, tension, rhythm, and flow.

ART 504 Storyboarding (3 cr.)

Prerequisite(s): None

This course explores the animation pre-production skills of storyboard art. Students learn to leverage their knowledge of storytelling and cinematography to create production and presentation storyboards. They also explore means of using drawing to create story flow, character development, mood, time and place. The course emphasizes professional applications, techniques, and standards of quality.

ART 511 Oil Painting: The Figure (3 cr.)

Prerequisite(s): ART 501

This course develops observational skills through painting from life and accurately rendering the human figure. Students are encouraged to explore their own themes and refine their individual voices and style.

ART 512 Plein Air Painting (3 cr.)

Prerequisite(s): None

Students focus on exploring and understanding lighting, atmospheric and space in the natural environment in both traditional and digital 2D media. Drawing, composition, color, orchestration, palette limitation, paint manipulation and edges, digital simulation, and color reproduction are examined. Studies taken from nature using critical on-location observation become the raw material leading to the creation of large studio canvases and/or digital environments.

ART 515 Art History: Classical to Renaissance (3 cr.)

Prerequisite(s): None

This course explores the roots of western culture in ancient Greece and Rome as well as the catalyzing effect of science and technology during the Renaissance. Students are exposed to a broad range of artists and techniques. They observe how artists from the past solved design problems and use their knowledge of anatomy, perspective, iconography, etc. as a springboard to create the foundations of western representational art.

ART 516 Art History: 19th to 21st Century (3 cr.)

Prerequisite(s): ART 515

Students study the rapid acceleration and expansion of artistic styles, cultural influences and media, starting with the industrial revolution and continuing into the digital age. They explore their own place in the historical continuum and how its legacy impacts new art forms such as animated films and video games.

ART 517 Art History: Research Seminar (3 cr.)

Prerequisite(s): ART 516

Students undertake research under faculty guidance into topics relating to their thesis project, examining in depth issues of technology, cultural limits and cultural interactions, iconography, religious, political and commercial symbolism, gender bias and stereotypes and historical context in relation to the specific goals of their final body of work. Students produce a written essay on their findings and how they have integrated them in their body of work.

ART 520 Conceptual Design and Illustration (3 cr.)

Prerequisite(s): CG 525

This course explores visual development and concept art and their use in a production environment. Story, composition, character, and environment are considered in both existing and original visual story materials. A variety of illustration techniques are utilized in the design process.

ART 522 Character Design (3 cr.)

Prerequisite(s): ART 501

This course focuses on the traditions of character design and the basic structural strategies for creating animation characters. Students explore simplification gradients relative to human, animal and inanimate object-based characters. They consider issues of costume, personality, props, story interaction, and—albeit obliquely—environments. The course emphasizes professional applications, techniques and standards of quality.

ART 528 Advanced Figure Sculpture (3 cr.)

Prerequisite(s): ART 501

This class builds on ART 501 by challenging students to apply their anatomical knowledge while sculpting from the live human figure. Using traditional techniques to build an armature and complete a sculpture in clay, students enhance their understanding of the human form in 3D space. Concepts of design, expression and personal voice will be stressed.

ART 550 Human Anatomy (3 cr.)

Prerequisite(s): None

Credit may be received for BIOX 500 or ART 550, but not for both.

This course explores the skeletal and muscular structures of the human body and techniques for rendering their visual form. Topics include identification of bones and muscles, anatomical terminology, concepts of body mechanics, kinetic function, and facial expressions.

ART 555 Anatomy: Ecorché (3 cr.)

Prerequisite(s): ART 550

This course involves the creation of a scale model of the internal human form starting with the skeletal system. Topics include identification of anatomical structures, skeletal proportion, the complex curves created by bones and muscles, and the spatial relationships between the individual forms.

ART 560 Animal Anatomy and Design (3 cr.)

Prerequisite(s): ART 550

Credit may be received for BIOX 550 or ART 560, but not for both.

This course examines the major skeletal and muscular structures of various animals and techniques for rendering their visual form. Structural comparisons between humans and other animals are considered and a systematic approach for the informed design of imaginary creatures is addressed.

ART 599 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 701 Art Research Methodology (3 cr.)

Prerequisite(s): None

This course explores the relationship between art, science, and technology through examples of artwork spanning from ancient cultures to the modern digital age. The course solves problems of design through observations and practices based on the interdisciplinary approaches of artists of the past, using anatomy, perspective, iconography, and other disciplines.

ART 702 **Thesis Pre-Production** (3 cr.)

Prerequisite(s): ART 701

This course facilitates the research, development, and refinement of a proposal for an MFA thesis topic. It covers production planning, including timeline, scoping, and milestones. The culmination is a proposal for the mid-point thesis review. Approval of the thesis proposal by the faculty thesis committee is a requirement for passing this course.

ART 703 **Thesis I** (6 cr.)

Prerequisite(s): ART 702

Permission of instructor required.

In this course, work is initiated on an approved thesis project under the guidance of the faculty thesis advisor.

ART 704 **Thesis II** (6 cr.)

Prerequisite(s): ART 703

In this course, work continues on an approved thesis project under the guidance of the faculty thesis advisor.

Department of Life Science

Biology Courses

BIO 150 **Human Muscular, Skeletal, and Kinetic Anatomy** (3 cr.)

Prerequisite(s): None

Concurrent Course(s): None

This course explores the skeletal and muscular structures of the human body. Students learn to identify skeletal and muscular forms from both live models and anatomical references. Additionally, students consider terminology, structural arrangement, and kinetic function. The course gives special emphasis to adapting this knowledge to the needs of artists and animators.

Department of Game Software Design and Production

Computer Science Projects Courses

CSP 200 **Computer Science Project II** (4 cr.)

Prerequisite(s): CS 170, CS 230, GAM 150

Credit may be received for only one of: CSP 200, GAM 200, GAM 205.

This course is the first semester of a two-semester project, which will be continued in CSP 250, and focuses on the creation of a useful software application or tool. It provides the opportunity to work together on teams of three or more members, to implement technical features required by their chosen projects.

CSP 250 **Computer Science Project II** (4 cr.)

Prerequisite(s): CSP 200

Credit may be received for only one of: CSP 250, GAM 250, GAM 255.

In this course, students work to complete and polish the projects they began in CSP 200.

CSP 300 **Computer Science Project III** (4 cr.)

Prerequisite(s): CS 280, CSP 250 or GAM 250

Credit may be received for only one of: CSP 300, GAM 300, GAM 302.

This course is the first semester of a two-semester project, which will be continued in CSP 350, and focuses on the creation of an advanced software application or tool. It provides the opportunity to work together on teams of three or more members, to implement technical features required by their chosen projects.

CSP 350 **Computer Science Project III** (4 cr.)

Prerequisite(s): CSP 300

Credit may be received for only one of: CSP 350, GAM 350, GAM 352.

In this course, students work to complete and polish the projects they began in CSP 300.

CSP 400 **Computer Science Project IV** (4 cr.)

Prerequisite(s): CSP 350 or GAM 350 or GAM 390

Credit may be received for only one of: CSP 400, GAM 400.

This course is the first semester of a two-semester project, which will be continued in CSP 450, and focuses on the creation of an innovative software application or tool. It provides the opportunity to work independently or in teams, as appropriate to the scope of the project, which could include continuing to expand and improve on an earlier project.

CSP 450 **Computer Science Project IV** (4 cr.)

Prerequisite(s): CSP 400

Credit may be received for only one of: CSP 450, GAM 450.

In this course, students work to complete and polish their project from CSP 400.

Game Projects Courses

GAM 100 **Project Introduction** (3 cr.)

Prerequisite(s): None

This course focuses on basic software development, concept development, and team dynamics. The central focus of the course is team development of a simple digital game or simulation. Industry history and practices will also be explored.

GAM 120 **Introduction to Digital Production** (3 cr.)

Prerequisite(s): DES 100, DES 101

Credit may be received for only one of: GAM 120, GAM 150, GAM 152.

This course introduces the workflows, methodologies, and best practices for working within a modern digital game development environment. Topics may include game editors, components, basic scripting, input processing, importing art and audio, level creation, and source control.

GAM 150 **Project I** (3 cr.)

Prerequisite(s): CS 120, GAM 100

Credit may be received for either GAM 150 or GAM 152, not both.

This course focuses on the team creation of a simple digital two-dimensional game or simulation. Techniques are introduced for working effectively on a team, following a development process, and using best practices in coding, design, communications, and team dynamics. Issues in game marketing and legal issues of game development are discussed.

GAM 200 **Project II** (4 cr.)

Prerequisite(s): GAM 120 or GAM 150, CS 170 or CS 175 or DES 105, CS 230 or DES 260

Credit may be received for only one of: CSP 200, GAM 200, GAM 205.

This course is the first semester of a two-semester project, which will be continued in GAM 250. Students will work together on teams of three or more to create a simple real-time two-dimensional game or simulation. Techniques are explored for working effectively on a team, following a development process, using discipline-based best practices, and applying core discipline-based skills to game development. This first semester focuses on pre-production to ensure the technology, tools, design, art, audio, and team are ready for full production in the following semester.

GAM 250 **Project II** (4 cr.)

Prerequisite(s): GAM 200

Credit may be received for only one of: CSP 250, GAM 250, GAM 255.

In this course, students work to complete the projects they began in GAM 200. Techniques are explored for iterating effectively, formal testing, tracking progress, and integrating design, art, and audio into a unified experience. This second semester focuses on production to bring the project to the point where the target audience finds it engaging.

GAM 300 **Project III** (4 cr.)

Prerequisite(s): GAM 250 or CSP 250, CS 280 or DES 301

Credit may be received for only one of: CSP 300, GAM 300, GAM 302.

This course is the first semester of a two- or three-semester project, which will be continued in GAM 350, and then in GAM 375 for a three-semester project. Students will work together on teams of three or more to create an advanced real-time game or simulation. Techniques are explored for creating high-performance teams, tuning development processes for specific projects, using advanced discipline-based best practices, and applying specialized discipline-based skills to game development. This first semester focuses on pre-production to ensure the technology, tools, design, art, audio, and team are ready for full production in the following semester.

GAM 350 **Project III** (4 cr.)

Prerequisite(s): GAM 300

Credit may be received for only one of: CSP 350, GAM 350, GAM 352.

In this course, students work to complete the projects they began in GAM 300. This second semester focuses on production to bring the project to the point where the target

audience finds it engaging. Furthermore, techniques are explored for creating effective resumes, interviewing, and pursuing internships. The project may be continued for a third semester in GAM 375.

GAM 375 **Project III** (4 cr.)

Prerequisite(s): GAM 350

This course is the final semester of the three-semester project begun in GAM 300 and continued in GAM 350. Techniques are explored for polishing design, art, and audio, creating effective marketing materials, and highlighting individual contributions to the project. This semester focuses on post-production and shipping a highly polished final project.

GAM 390 **Internship I** (4 cr.)

Prerequisite(s): GAM 250

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.

GAM 400 **Project IV** (4 cr.)

Prerequisite(s): GAM 350 or GAM 390 or CSP 350

Credit may be received for only one of: CSP 400, GAM 400.

In this course, students prepare their personal portfolio of projects in order to be ready for a professional job search. This can involve a new project to demonstrate a particular professional skill, or taking a previous project to very high level of quality.

GAM 450 **Project IV** (4 cr.)

Prerequisite(s): GAM 400

Credit may be received for only one of: CSP 450, GAM 450.

In this course, students prepare their personal portfolio of projects in order to be ready for a professional job search. This can involve a new project to demonstrate a particular professional skill, or working to complete a project they began in GAM 400.

GAM 490 **Internship II** (4 cr.)

Prerequisite(s): GAM 390

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.

GAM 541 **Masters Game Project** (3 cr.)

Prerequisite(s): CS 529

This project focuses on the creation of a real-time game or simulation. Students work together on teams of three to five members and implement technical features, such as audio effects, music playback, pattern movement, simple artificial intelligence, multiplayer, particle systems, scrolling, and simple 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 an overview of the game industry, effective team communication, planning, documentation, debugging, testing, and iterative software development techniques.

GAM 550 **Advanced Game Project** (3 cr.)

Prerequisite(s): GAM 541

This project is divided into two semesters and focuses on the creation of an advanced real-time game or simulation using the latest techniques in graphics, real-time physics, artificial intelligence, and networking. Students may use current software and hardware technologies with instructor approval, such as web technologies, gaming consoles, mobile devices, commercial physics engines, hands-free input devices, etc. Students work independently or in teams, as appropriate to the scope of their project. Additional topics may include team dynamics, formal playtesting, game pacing, and game balance.

GAM 551 **Advanced Game Project** (3 cr.)

Prerequisite(s): GAM 550

In this class, students work to complete the projects they began in GAM 550. Additional topics may include working in the industry, interviewing, resumes, professional networking, and career strategies.

GAM 590 **Internship I** (3 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.

GAM 591 **Internship II** (3 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.

GAMX 500 **Game Design, Development, and Production** (3 cr.)

Prerequisite(s): None

This class presents an overview of game design from concept to level through play balancing, as well as an overview of the business practices traditionally and currently common to the game industry. Students develop a small game using industry tools, focusing on basic game mechanics, verbal and nonverbal narrative development, play balancing, and basic level design fundamentals.

Design Courses

DES 100 **Introduction to Design Process** (4 cr.)

Prerequisite(s): None

This course introduces the design process as it applies to interactive experiences. Topics include exploration, research, proposals, prototypes, iteration, and polishing of an interactive experience.

DES 101 **Principles of Interactive Design** (4 cr.)

Prerequisite(s): None

Credit may be received for only one of: DES 101, GAT 110.

This course explores the principles of interactive design and how those principles are used to create engaging experiences. Topics include the nature of the design profession, how tension leads to engagement, complexity versus depth, and how to test interactive experiences effectively.

DES 105 **Game Design Process** (3 cr.)

Prerequisite(s): DES 100, DES 101, MAT 105 or MAT 340

Credit may be received for only one of: DES 105, DES 115, GAT 210.

This course covers the process of designing complete games through the creation of non-digital dice, card, and board games. Topics may include writing rules, playtesting, game state, randomness, hidden information, and game balance.

DES 115 **Introduction to Game Design** (3 cr.)

Prerequisite(s): None

Credit may be received for only one of: DES 105, DES 115, GAT 210.

This course is an introduction to game design theory and the process of designing games. Topics may include design principles, writing rules, playtesting, game state, randomness, hidden information, and game balance.

DES 212 **System Design Methods** (3 cr.)

Prerequisite(s): CS 115 or CS 116 or CS 120, DES 115

Credit may be received for only one of: DES 212, DES 220, GAT 211.

This course focuses on how to analyze and simulate game systems. Topics may include system analysis, system simulation, system balancing, combat systems, and economic systems.

DES 214 **Level Design Methods** (3 cr.)

Prerequisite(s): CS 120, DES 115

Credit may be received for only one of: DES 214, DES 240, GAT 240.

The course focuses on methods for creating spatial environments, along with the controls and camera systems needed to navigate those environments. Additional topics include guiding the player and controlling pacing through the placement of encounters.

DES 220 **Systems Design I** (3 cr.)

Prerequisite(s): DES 105

Credit may be received for only one of: DES 212, DES 220, GAT 211.

This course focuses on how to create interactive systems with the proper balance of complexity versus depth. Topics may include combat systems, economic systems, social systems, and system balancing.

DES 240 **Level Design I** (3 cr.)

Prerequisite(s): CS 116 or CS 120, DES 105

Credit may be received for only one of: DES 214, DES 240, GAT 240.

This course introduces the basic principles of level and encounter design. The course focuses on the design of spatial environments, player guidance techniques, and controlling pacing through encounter frequency and variety.

DES 260 **User Experience Design I** (3 cr.)

Prerequisite(s): DES 101, DES 115, or DES 116

Credit may be received for only one of: DES 260, GAT 260, ART 260.

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.

DES 270 **User Research I** (3 cr.)

Prerequisite(s): DES 101, and PSY 101

Credit may be received for only one of: DES 270, GAT 360.

This course introduces the basic principles of user research and formal testing methodologies based on the scientific method. Topics include selecting research methods, selecting test candidates, focus group testing, metrics-based analysis, and end-user research.

DES 301 **Game Design I** (3 cr.)

Prerequisite(s): CS 116 or CS 120, DES 270, DES 220

Credit may be received for only one of: DES 301, DES 315, GAT 250.

This course focuses on the design and implementation of engaging digital game prototypes. Topics may include building tension, effective feedback, teaching the player, and using interactive elements to create engagement through accomplishment, challenge, and connection.

DES 302 **Game Design II** (3 cr.)

Prerequisite(s): CS 165 or CS 170, DES 240, DES 301

Credit may be received for only one of: DES 302, GAT 251.

This course focuses on the design and implementation of engaging digital game prototypes. Topics may include using space effectively, kinesthetic flow, motivating through autonomy, and using interactive elements to create engagement through discovery, sensation, and fantasy.

DES 303 **Game Design III** (3 cr.)

Prerequisite(s): DES 302

Credit may be received for only one of: DES 303, GAT 315.

This course focuses on the design and implementation of highly original and engaging digital game prototypes. Topics may include originality in design, narrative engagement, motivating through connection, and using interactive elements to create engagement through fellowship, expression, and catharsis.

DES 315 **Technical Design Methods** (3 cr.)

Prerequisite(s): DES 212, DES 214

Credit may be received for only one of: DES 250, DES 301, DES 315, GAT 250.

This course focuses on designing and implementing digital game prototypes, with an emphasis on integrating mechanics, controls, and camera. Additional topics include building tension to create engagement and implementing player feedback techniques.

DES 335 **Role-Playing Game Design** (3 cr.)

Prerequisite(s): DES 212 or DES 220, ENG 110 or ENG 116

Credit may be received for only one of: DES 335, GAT 212.

This is a course on the design of non-digital role-playing games. Topics may include skill systems, conflict resolution, character creation, character advancement, equipment variety, world design, and adventure development.

DES 336 **Interactive Narrative Design** (3 cr.)

Prerequisite(s): DES 212 or DES 220, ENG 110 or ENG 116

Credit may be received for only one of: DES 336, GAT 330.

This course focuses on how to create characters and write stories that integrate with gameplay and mechanics to form an interactive narrative. Topics may include the design and structure of dialogue trees, mood parameters for dialogue choices, autonomous behaviors, emergent gameplay, addition of emotional depth through the use of character archetypes, and weaving theme and story together.

DES 365 **Game Feel** (3 cr.)

Prerequisite(s): DES 260

Credit may be received for only one of: DES 365, GAT 261.

This course explores how visuals, audio, programming, and design intersect to create immersive interactive experiences. Emphasis is placed on the implementation of dynamic user interfaces, intuitive real-time feedback, and immersive control systems.

DES 370 **User Research II** (3 cr.)

Prerequisite(s): DES 270

Credit may be received for only one of: DES 370, GAT 370.

This course covers advanced user research techniques with an emphasis on information visualization. Topics include methods for collecting and building data sets, assessing the quality of those data sets, selecting the optimal method for data visualization, and creating user research reports.

DES 400 Integrated Digital Design (3 cr.)
Prerequisite(s): CG 125, DES 303, DES 365, MUS 115
Credit may be received for only one of: DES 400, GAT 316.

This course focuses on designing and implementing an original digital experience that integrates sensory, narrative, and interactive elements into an engaging overall work that is suitable as a portfolio piece.

Management Courses

MGT 399 Special Topics in Management
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.

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.

MGT 500 Management for Art Directors (3 cr.)
Prerequisite(s): None

This course provides an in-depth examination of techniques and theories for project management of art, film, games and other artistic team projects. Lectures cover various aspects of managing creative teams. Topics may include leadership, communication, team building, marketing, budgeting, longrange project planning, contract negotiations and intellectual property considerations.

Department of Humanities and Social Sciences

College Success Courses

COL 101 College Life and Academic Skills (1 cr.)
Prerequisite(s): None

This course assists students in developing the classroom and communication skills necessary to succeed in both educational and professional situations.

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 235 College Success for Designers (1 cr.)
Prerequisite(s): DES 200, GAM 200 or CSP 200

This course introduces industry research and professional expectations, and helps identify student strengths, skills, and interests. This course also requires the creation of an academic plan focusing on skill development.

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 ethnic 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 graphic 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.

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 209 **Fundamentals of Psychological Research** (3 cr.)

Prerequisite(s): PSY 101

This course introduces major topics exploring research procedures and methodology in the behavioral and social sciences. Major topics include principles of the scientific method, fundamental research concepts, terminology, critical evaluation of methodological issues, and best practices for designing psychological testing and research. Differences

in qualitative and quantitative methodology, types of data collection, user experiences and design, and reporting results are also explored. Other topics include research ethics and best practices for data management and presentation.

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 180 **Race & Gender in Twenty-First Century America** (3 cr.)

Prerequisite(s): ENG 110

This course takes a close look at current debates on race, gender, and ethnicity in American society. It begins with an overview of definitions of race, gender, and ethnicity, exploring what they have meant in the past and what they mean now. Then the course examines the intersections between race, gender, and ethnicity, asking the following questions: How do race and ethnicity differ, and how are they related? What difference does race make? How are race and gender related? Where does sexual orientation fit into the discourse on gender, and how does it fit into discussions on race and ethnicity? Current debates on race, gender, and ethnicity were highlighted by the 2008 election of the first African-American president and the ever-growing prominence of women in the highest levels of American politics. Does this mean that we have entered a post-racial era? Where exactly do we stand on women and gender-related issues? What about the place of GLBT issues in the public domain? This course explores these themes and topics.

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 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 120 **Mathematics of Music and Sound** (3 cr.)

Prerequisite(s): None

This course explores the mathematical foundations of music and sound. Topics include scale systems, just and tempered intervals, oscillations and trigonometry, sound waves, and basic discrete mathematics.

MAT 140 **Linear Algebra and Geometry** (4 cr.)

Prerequisite(s): None

Credit may be received for either MAT 100 or MAT 140, but not 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 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 320 Mathematics of Digital Signal Processing I (3 cr.)

Prerequisite(s): MAT 200

Credit may be received for MAT 320 or MAT 220 but not both.

This course explores the mathematical foundations of digital signal processing, with applications to digital audio programming. Topics include: digital signals, sampling and quantization, complex numbers and phasors, complex functions, feedforward filters, feedback filters, frequency response and transfer functions, periodic signals and Fourier series, discrete Fourier transform and fast Fourier transform, comb and string filters, Z-transform and convolution.

MAT 321 Mathematics of Digital Signal Processing II (3 cr.)

Prerequisite(s): MAT 320

This course continues to explore the mathematical foundations of digital signal processing, with applications to digital audio programming. Topics include: Review of digital signals, Z-transforms and convolution, filter types, applications of fast Fourier transform, switching signals on and off, windowing, spectrograms, aliasing, digital to analog conversion, Nyquist Theorem, filter design, Butterworth filters, reverb, and the phase vocoder.

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 345 Introduction to Data Science (3 cr.)

Prerequisite(s): MAT 140, MAT 258

This course presents a variety of computational tools for modeling and understanding complex data. Topics include manipulating data, exploratory data analysis, statistical inference, spam filters and naïve Bayes, neural networks, and machine learning algorithms such as linear regression, k-nearest neighbors, and k-means. The course will focus on both understanding the mathematics underlying the computational methods and gaining hands-on experience in the application of these techniques to real datasets.

MAT 346 Predictive Modeling (3 cr.)

Prerequisite(s): MAT 250, MAT 340

This course focuses on the conceptual understanding of a core set of practical and effective statistical methods for modeling and analyzing complex data, and applies them to solve real world problems. Topics include linear and logistic regression, linear models for classification, deep learning and neural networks, support vector machines and kernel methods, unsupervised methods, classification trees, boosting, and random forests.

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 , k th 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 363 Partial Differential Equations and Fluid Dynamics (3 cr.)

Prerequisite(s): MAT 220 or MAT 250 or MAT 256, MAT 200

This course explores partial differential equations (PDEs) and fluid dynamics. Topics covered in this class include Fourier series, Fourier transforms, classification of PDEs, Poisson's equation, heat equation, wave equation, and introductory topics of fluid dynamics. Solution methods of initial and boundary value problems of various types will be investigated. Numerical methods, such as finite difference, finite volume, and finite element will be studied.

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 366 **Combinatorics** (3 cr.)

Prerequisite(s): MAT 258

This course covers the fundamental techniques and algorithms of counting. Topics include combinations, permutations, lists and strings, distributions, Stirling numbers, partitions, rearrangements and derangements, the principle of inclusion and exclusion, generating functions, and recursion. The course may include further topics such as the Polya-Redfield method, partially ordered sets, enumeration problems from graph theory, Ramsey's Theorem, block designs, codes, difference sets, finite geometries, Latin squares and Hadamard matrices.

MAT 399 **Special Topics in Mathematics** (3 cr.)

Prerequisite(s): None

Requirement: 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 \mathbb{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.

MAT 500 **Curves and Surfaces** (3 cr.)

Prerequisite(s): None

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 550 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 551 Quaternions, Interpolation, and Animation (3 cr.)

Prerequisite(s): MAT 500

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 552 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 553 Differential Geometry (3 cr.)

Prerequisite(s): MAT 500

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 554 Discrete and Computational Geometry (3 cr.)

Prerequisite(s): None

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 555 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 556 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 557 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 559 Computational Algebraic Geometry (3 cr.)

Prerequisite(s): MAT 300 or MAT 500

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 560 Advanced Algebra (3 cr.)

Prerequisite(s): None

This course explores topics in linear algebra and abstract algebra. Topics in linear algebra include: vector spaces, transformations, canonical forms, and complex inner product spaces. Topics in abstract algebra include: introduction to abstract groups, rings, fields, and algebras. Further topics may include: modules, multivariate polynomials, algebraic varieties, tensor products, and duality.

MAT 561 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 , k th 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 562 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 fuzzy groups. Students will also explore a number of applications, including approximate reasoning, fuzzy control, fuzzy behavior, and interaction in computer games.

MAT 563 Partial Differential Equations and Fluid Dynamics (3 cr.)

Prerequisite(s): None

This course explores partial differential equations (PDEs) and fluid dynamics. Topics covered in this class include Fourier series, Fourier transforms, classification of PDEs, Poisson's equation, heat equation, wave equation, and introductory topics of fluid dynamics. Solution methods of initial and boundary value problems of various types will be investigated. Numerical methods, such as finite difference, finite volume, and finite element will be studied.

MAT 564 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, impartial and partisan games, winning strategies outcome classes, algebra of games.

MAT 565 Introduction to Topology (3 cr.)

Prerequisite(s): MAT 250, MAT 258

This course is an introduction to topology and its applications. Topics 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 570 Real Analysis (3 cr.)

Prerequisite(s): None

This course explores topics in mathematical analysis of real numbers and functions of real variables. Topics covered in this course include: real numbers, metric spaces, topology of metric spaces, the contraction principle, continuity of functions on metric spaces, differentiability of real-valued functions, sequences and series of functions, continuity and

differentiability of functions of several variables, and Riemann integration. Additional topics may include Euclidean spaces, normed spaces, functions of bounded variation, and Riemann-Stieltjes integrals.

MAT 571 Functional Analysis (3 cr.)

Prerequisite(s): MAT 570

This course explores topics in measure theory and functional analysis. The topics covered in this course include: Lebesgue measure, Lebesgue integration, normed spaces, Banach spaces, Fourier series and wavelets, and Hilbert spaces, together with their applications. Additional topics may include Hahn-Banach theorem, bounded linear operators on Hilbert spaces, Riesz representation theorem, Sobolev spaces, and self-adjoint operators.

MAT 572 Complex Analysis (3 cr.)

Prerequisite(s): None

This course explores topics in complex analysis. Topics include: the complex number field and its geometry, complex functions, limits, complex differentiation, analytic functions, conformal mappings, contour integration, and Laurent series. Additional topics may include: Rouche's theorem, the maximum modulus theorem, Liouville's theorem, and applications.

MAT 580 Stochastic Processes (3 cr.)

Prerequisite(s): None

This course is a formal introduction to stochastic processes with applications. The main topics are discrete and continuous time Markov chains, Poisson processes, random walks, branching processes, first passage times, recurrence and transience, and stationary distributions. The course also covers Brownian motion and martingales. Other topics may include renewal processes, queues, optimal stopping theory, Monte Carlo methods, and stochastic integration.

MAT 581 Statistical Inference and Data Analysis (3 cr.)

Prerequisite(s): None

This course presents modern statistical concepts and methods developed in a mathematical framework. Topics include statistical inference, point and interval estimation, confidence intervals and hypothesis testing, sufficiency, Neyman-Pearson theory, maximum likelihood, Bayesian analysis, and large sample theory. Additional topics may include decision theory, linear models, and nonparametric statistics.

MAT 599 Special Topics in Mathematics (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 Music

Music Courses

MUS 103 Guitar Ensemble I (1 cr.)

Prerequisite(s): None

Permission of instructor required.

This course is a guitar ensemble workshop for the study of classical guitar performance practice and the rehearsal of guitar repertory in preparation for a public concert at the end of the semester.

MUS 104 Guitar Ensemble II (1 cr.)

Prerequisite(s): MUS 103

Permission of instructor required.

This course is a guitar ensemble workshop for the study of classical guitar performance practice and the rehearsal of guitar repertory in preparation for a public concert at the end of the semester.

MUS 110 Private Lessons I - Instrumental or Vocal (1 cr.)

Prerequisite(s): None

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on selected instruments, or voice. Topics vary.

MUS 111 Private Lessons II - Instrumental or Vocal (1 cr.)

Prerequisite(s): MUS 110

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 112 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 113 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 115 **Fundamentals of Music and Sound Design** (3 cr.)

Prerequisite(s): None

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.

MUS 116 **Jazz Ensemble I** (1 cr.)

Prerequisite(s): None

Permission of the instructor; audition required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation for a public concert at the end of the semester.

MUS 117 **Jazz Ensemble II** (1 cr.)

Prerequisite(s): None

Permission of Instructor Required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation for a public concert at the end of the semester.

MUS 118 **Chamber Singers I** (1 cr.)

Prerequisite(s): MUS 112 or MUS 113 or MUS 212 or MUS 213

Permission of instructor required.

This course is a small vocal ensemble workshop for the study of a cappella performance practice and the rehearsal of vocal repertory in preparation for a public concert at the end of the semester. Students participating in the Chamber Singers will also participate in the Vocal Ensemble.

MUS 119 **Chamber Singers II** (1 cr.)

Prerequisite(s): MUS 118

Concurrent Course(s): MUS 112 or MUS 113 or MUS 212 or MUS 213

This course is a small vocal ensemble workshop for the study of a cappella performance practice and the rehearsal of vocal repertory in preparation for a public concert at the end of the semester. Students participating in the Chamber Singers will also participate in the Vocal Ensemble.

MUS 120 **Music Theory and Musicianship I** (2 cr.)

Prerequisite(s): None

Concurrent Course(s): MUS 120L

This course offers an introduction to basic music theory and musicianship. Topics include pitch, intervals, scales, chord structure, keys, music notation, functional harmony, modes, simple analysis, sight singing, transcription, and ear training. Musical examples are drawn from various styles and periods.

MUS 120L **Music Theory and Musicianship I Lab** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): MUS 120

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 120.

MUS 121 **Music Theory and Musicianship II** (2 cr.)

Prerequisite(s): MUS 120

Concurrent Course(s): MUS 121L

This course is a continuation of MUS120, offering further studies in basic music theory and musicianship. Topics include modal and diatonic harmony, triads and inversions, modulation, four-part writing, sight-singing, transcription, and ear training.

MUS 121L **Music Theory and Musicianship II Lab** (1 cr.)

Prerequisite(s): MUS 120L

Concurrent Course(s): MUS 121

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 121.

MUS 150 **Sound Design Project I** (2 cr.)

Prerequisite(s): None

Concurrent Course(s): MUS 150L

Credit may be received for MUS 150 or for MUS 115, but not for both.

This course provides an introduction to digital audio recording, processing, and mixing. Students are introduced to software and

hardware components of the digital audio workstation, including microphones, mixers, MIDI sequencing and multitrack recording software. Further topics include fundamentals of acoustics, recording, sound synthesis, and MIDI.

MUS 150L **Sound Design Project I Lab** (2 cr.)

Prerequisite(s): None

Concurrent Course(s): MUS 150

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 150. Students will apply their knowledge and skills as sound designers and composers on one or more projects, including one game or animation project.

MUS 151 **Sound Design Project II** (2 cr.)

Prerequisite(s): MUS 150

Concurrent Course(s): MUS 151L

This course is a continuation of MUS 150, exploring in more detail the concepts and techniques of audio recording, processing and mixing. Topics include: fundamentals of acoustics, recording, sound synthesis, and the MIDI language; microphones; mixers; MIDI sequencing; multi-track recording software.

MUS 151L **Sound Design Project II Lab** (2 cr.)

Prerequisite(s): MUS 150L

Concurrent Course(s): MUS 151

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 151. Students will apply their knowledge and skills as sound designers and composers on one or more projects, including one game or animation project.

MUS 160 **American Popular Music** (3 cr.)

Prerequisite(s): MUS 121

This course provides a survey of American Popular Music from the 19th Century to the current day. Topics may include: the interaction of European American, African American, and Latin American traditions; the influence of mass media and technology (printing, recording, radio, video, and Internet); the role of popular music as a symbol of identity (race, class, gender, generation).

MUS 210 **Private Lessons III - Instrumental or Vocal** (1 cr.)

Prerequisite(s): MUS 111

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 211 **Private Lessons IV - Instrumental or Vocal** (1 cr.)

Prerequisite(s): MUS 210

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 212 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 213 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 216 **Jazz Ensemble III** (1 cr.)

Prerequisite(s): MUS 117 or Permission of Instructor

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation for a public concert at the end of the semester.

MUS 217 **Jazz Ensemble IV** (3 cr.)

Prerequisite(s): MUS 216 or Permission of Instructor

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation for a public concert at the end of the semester.

MUS 218 **Chamber Singers III** (1 cr.)

Prerequisite(s): MUS 119

Permission of instructor required. Students enrolled in MUS 218 must also be enrolled in Vocal Ensemble.

This course is a small vocal ensemble workshop for the study of a cappella performance practice and the rehearsal of vocal repertory in preparation for a public concert at the end of the semester.

MUS 219 **Chamber Singers IV** (1 cr.)

Prerequisite(s): MUS 218

Permission of instructor required. Students enrolled in MUS 219 must also be enrolled in Vocal Ensemble.

This course is a small vocal ensemble workshop for the study of a cappella performance practice and the rehearsal of vocal repertory in preparation for a public concert at the end of the semester.

MUS 220 **Music Theory and Musicianship III** (2 cr.)

Prerequisite(s): MUS 121

Concurrent Course(s): MUS 220L

This course explores topics in music theory, analysis, and ear-training, including diatonic harmony through secondary dominants and diminished sevenths, modulations to dominant and relative keys, and analysis of musical forms including binary, ternary, sonata-allegro, and variation technique.

MUS 220L **Music Theory and Musicianship III Lab** (1 cr.)

Prerequisite(s): MUS 121

Concurrent Course(s): MUS 220

This lab offers students hands-on experience in musicianship, applying the concepts and techniques presented in MUS 220.

MUS 221 **Music Theory and Musicianship IV** (2 cr.)

Prerequisite(s): MUS 220

Concurrent Course(s): MUS 221L

This course is a continuation of MUS 220, offering further studies in music theory, chromatic harmony and modulation. Topics include: impressionism, atonality, set theory, serialism, and minimalism.

MUS 221L **Music Theory and Musicianship IV Lab** (1 cr.)

Prerequisite(s): MUS 220L

Concurrent Course(s): MUS 221

This lab offers students hands-on experience in musicianship, applying the concepts and techniques presented in MUS 221.

MUS 230 **Composition I** (2 cr.)

Prerequisite(s): MUS 121

This course introduces counterpoint as a compositional tool. Topics include: five species of counterpoint, and compositional practices of the Renaissance and Baroque eras.

MUS 231 **Composition II** (2 cr.)

Prerequisite(s): MUS 230

This course continues the study of composition using polyphony and counterpoint, expanding on the principles explored in MUS 230. Topics may include: historical development polyphony and counterpoint, fugue and related forms, use of counterpoint in classical, romantic and modern music.

MUS 240 **Sound Design Collaborative Project I** (1 cr.)

Prerequisite(s): MUS 150

This course consists of a collaborative sound design project with a team of students working on a video game or animation. Evaluation of the contribution may come from faculty in several departments which oversee the team project.

MUS 241 **Sound Design Collaborative Project II** (1 cr.)

Prerequisite(s): MUS 151

This course consists of a collaborative sound design project with a team of students working on a video game or animation. Evaluation of the contribution may come from faculty in several departments which oversee the team project.

MUS 250 **Sound Design Project III** (1 cr.)

Prerequisite(s): MUS 151 , MUS 151L

Concurrent Course(s): MUS 250L

This course builds on MUS 151, with further exploration of the concepts and techniques of music and sound design for animation and video games. Topics include: multi-track audio recording; processing and mixing, with emphasis on MIDI sequencing; scoring; the use of virtual instruments and software synthesizers for the creation of music and soundscapes.

MUS 250L **Sound Design Project III Lab** (2 cr.)

Prerequisite(s): MUS 151L

Concurrent Course(s): MUS 250

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 250. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 251 **Sound Design Project IV** (1 cr.)

Prerequisite(s): MUS 250

Concurrent Course(s): MUS 251L

This course is a continuation of MUS 250, exploring in more detail the concepts and techniques of sound design for animation and video games. Emphasis is placed on MIDI sequencing and scoring, and the use of virtual instruments and software synthesizers for the creation of music and soundscapes.

MUS 251L **Sound Design Project IV Lab** (2 cr.)

Prerequisite(s): MUS 250L

Concurrent Course(s): MUS 251

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 251. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 260 **Music History and Literature I** (3 cr.)

Prerequisite(s): MUS 121

This course presents a survey of Western music from the Middle Ages through the Classical period. Representative compositions will be studied within their cultural contexts through the development of methods for analysis of musical style.

MUS 261 **Music History and Literature II** (3 cr.)

Prerequisite(s): MUS 260

This course is a continuation of MUS 260, presenting a survey of Western music from the Romantic period through the 20th century and beyond. Representative compositions will be studied within their cultural contexts through further development of methods for analysis of musical style.

MUS 270 **Survey of Jazz** (3 cr.)

Prerequisite(s): MUS 121

This course provides an overview of the most prominent jazz artists and literature from its early roots to the present. Additional study will include the musical elements of jazz styles within the cultural context of the times.

MUS 275 **Survey of Opera** (3 cr.)

Prerequisite(s): MUS 261

This course presents a survey of the history and development of Western Opera, including an in-depth study of a representative opera from the Baroque, Classical, Romantic, and Modern eras.

MUS 280 **World Music** (3 cr.)

Prerequisite(s): MUS 121

This course centers on folk, popular, and traditional musical genres, particularly those of the non-Western cultures, examining both elements of musical style and features of society that influence music.

MUS 285 **Music Notation and Scoring** (3 cr.)

Prerequisite(s): MUS 121

This course examines advanced orchestral scoring functions and musical notation systems available in current software applications.

MUS 290 **Percussion for Composers** (3 cr.)

Prerequisite(s): MUS 221, MUS 221L, MUS 231

This course provides instruction in composition for percussion instruments, including drum kit, Latin percussion, and orchestral percussion. Properties and performance techniques for various percussion instruments are explored through hands-on study of the instruments themselves. Principles of effective scoring for real and virtual percussion instruments are presented through a combination of study, listening, physical training, and composing.

MUS 306 **Jazz Ensemble V** (1 cr.)

Prerequisite(s): MUS 217

Permission of Instructor Required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation of a public concert at the end of the semester.

MUS 307 **Jazz Ensemble VI** (1 cr.)

Prerequisite(s): MUS 306

Permission of Instructor Required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation of a public concert at the end of the semester.

MUS 310 **Private Lessons V - Instrumental or Vocal** (1 cr.)

Prerequisite(s): MUS 211

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 311 Private Lessons VI - Instrumental or Vocal (1 cr.)

Prerequisite(s): MUS 310

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 312 Vocal Ensemble (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 313 Vocal Ensemble (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 315 Private Lessons - Music Composition I (1 cr.)

Prerequisite(s): MUS 211, MUS 221, MUS 221L, MUS 231

Permission of Instructor Required

This course consists of private lessons in music composition including both traditional and experimental styles. Emphasis is placed on developing an individual voice.

MUS 316 Private Lessons - Music Composition II (1 cr.)

Prerequisite(s): MUS 315

Permission of Instructor Required

This course consists of private lessons in music composition including both traditional and experimental styles. Emphasis is placed on developing individual voice.

MUS 320 Conducting and Instrumentation (2 cr.)

Prerequisite(s): MUS 221

This course explores the basics of conducting technique and instrumentation. Students will practice live conducting of small ensembles and also study the principles of conducting and instrumentation for full orchestra.

MUS 321 Introduction to Orchestration (3 cr.)

Prerequisite(s): MUS 231

This course introduces the principles of orchestration and arranging. Examples from classical through modern times will be explored and modeled in student compositions and arrangements.

MUS 322 Adaptive Music for Video Games (3 cr.)

Prerequisite(s): MUS 251

This course explores concepts and techniques for writing and producing dynamically interactive musical scores for video games. Topics include: the history of video game music, and methods for composing and prototyping adaptive musical scores.

MUS 330 Advanced Composition I (3 cr.)

Prerequisite(s): MUS 231

This course teaches the principles of creative composition through the process of composing in one's own style. Topics include: stimulating the musical imagination, current musical languages, analysis of contemporary scores, technical exercises, techniques for starting a composition, and approaches to composing for instruments and voices.

MUS 331 Advanced Composition II (3 cr.)

Prerequisite(s): MUS 330

This course develops the principles and techniques of creative composition presented in MUS 330, with a focus on original composition in various styles. Emphasis is on analysis and practice of compositional methods and techniques through a series of case studies, each focusing on a specific historical musical style.

MUS 332 Advanced MIDI Sequencing (3 cr.)

Prerequisite(s): MUS 251

This course explores advanced techniques in MIDI sequencing and the virtual orchestra, using current software techniques.

MUS 340 Sound Design Collaborative Project III (1 cr.)

Prerequisite(s): MUS 250

This course consists of a collaborative sound design project with a team of students working on a video game or animation. Evaluation of the contribution may come from faculty in several departments which oversee the team project.

MUS 341 **Sound Design Collaborative Project IV** (1 cr.)

Prerequisite(s): MUS 251

This course consists of a collaborative sound design project with a team of students working on a video game or animation. Evaluation of the contribution may come from faculty in several departments, which oversee the team project.

MUS 350 **Sound Design Project V** (1 cr.)

Prerequisite(s): MUS 251

Concurrent Course(s): MUS 350L

This course builds on MUS 251, with further exploration of music and sound design for animation and video games. Emphasis is placed on recording, editing, mixing and mastering for voice, acoustic and electric solo instruments, and ensembles.

MUS 350L **Sound Design Project V Lab** (2 cr.)

Prerequisite(s): MUS 251L

Concurrent Course(s): MUS 350

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 350. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 351 **Sound Design Project VI** (1 cr.)

Prerequisite(s): MUS 350

Concurrent Course(s): MUS 351L

This course builds on MUS 350, with further exploration of music and sound design for animation and video games. Topics include: foley recording; use of sound effects libraries; advanced editing and processing techniques for soundscape production.

MUS 351L **Sound Design Project VI Lab** (2 cr.)

Prerequisite(s): MUS 350L

Concurrent Course(s): MUS 351

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 351. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 360 **Advanced Sound Synthesis** (3 cr.)

Prerequisite(s): MUS 251

This course explores the principles and applications of oscillators, filters, amplifiers, and envelope generators found in software and hardware sound synthesizers. Topics include frequency modulation, additive synthesis, and granular synthesis.

MUS 370 **Audio Design Project I** (1 cr.)

Prerequisite(s): GAM 250

Concurrent Course(s): MUS 120, MUS 120L, MUS 370L

Credit maybe received for either MUS 150 or MUS 370, but not both.

This course is the first of a two-semester lecture and lab sequence providing instruction and practice in the tools and techniques for the recording, editing and implementation of music, sound and voice for video games. This course focuses on the desktop digital audio workstation for the production of music and audio assets. Topics include principles of digital audio, non-linear sound design, synthesis, MIDI sequencing, and desktop audio recording.

MUS 370L **Audio Design Project I Lab** (2 cr.)

Prerequisite(s): GAM 250

Concurrent Course(s): MUS 120, MUS 120L, MUS 370

Students may not receive credit for both MUS 150L and MUS 370L

This lab offers students hands-on experience in producing music and sound using a desktop digital audio workstation, applying the concepts and techniques presented in MUS 370. Students are required to apply knowledge and skills to produce original content and to implement it in a game project.

MUS 371 **Audio Design Project II** (1 cr.)

Prerequisite(s): MUS 370, MUS 370L

Concurrent Course(s): MUS 371L

This course focuses on the principles and operation of a multitrack digital recording studio while continuing to work with tools introduced in MUS 370. Topics include microphone techniques, tracking, mixing, mastering, foley, and field recording. This course is the second of a two-semester lecture and lab sequence providing instruction and practice in the tools and techniques for the recording, editing, and implementation of music, sound, and voice for video games.

MUS 371L **Audio Design Project II Lab** (2 cr.)

Prerequisite(s): MUS 370, MUS 370L

Concurrent Course(s): MUS 371

This lab offers students hands-on experience in producing music, sound effects, and voice recordings in a multitrack

digital recording studio, applying the concepts and techniques presented in MUS 371. Students are required to apply their knowledge and skills as sound designers and composers on one or more game projects.

MUS 390 **Sound Design Internship** (3 cr.)

Prerequisite(s): MUS 350

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.

MUS 399 **Special Topics in Music** (3 cr.)

Prerequisite(s): None

This course can cover topics which are of interest to faculty and students and may vary from semester to semester.

MUS 406 **Jazz Ensemble VII** (1 cr.)

Prerequisite(s): MUS 307

Permission of Instructor Required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation of a public concert at the end of the semester.

MUS 407 **Jazz Ensemble VIII** (1 cr.)

Prerequisite(s): MUS 406

Permission of Instructor Required

This course is a jazz ensemble workshop for the study of jazz performance practice and the rehearsal of repertory in preparation of a public concert at the end of the semester.

MUS 410 **Private Lessons VII - Instrumental or Vocal** (1 cr.)

Prerequisite(s): MUS 311

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 411 **Private Lessons VIII - Instrumental or Vocal** (1 cr.)

Prerequisite(s): MUS 410

Entrance to the BA in Music and Sound Design degree program required.

This course consists of private lessons on an individual instrument, or voice. Topics vary.

MUS 412 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 413 **Vocal Ensemble** (1 cr.)

Prerequisite(s): None

This course is a non-audition mixed chorus providing training in vocal technique and musicianship. The class performs in concert at the end of each semester.

MUS 415 **Private Lessons - Music Composition III** (1 cr.)

Prerequisite(s): MUS 316

Permission of Instructor Required

This course consists of private lessons in advanced music composition. Emphasis is placed on mastery of advanced techniques of composition in one particular area, such as electroacoustic music, algorithmic composition, film scoring, or adaptive music for video games.

MUS 416 **Private Lessons - Music Composition IV** (1 cr.)

Prerequisite(s): MUS 415

Permission of Instructor Required

This course is a continuation of MUS 415, and consists of private lessons in advanced music composition. Emphasis is placed on production of a larger work.

MUS 420 **Advanced Orchestration I** (3 cr.)

Prerequisite(s): MUS 321

This course explores advanced techniques of orchestration and arrangement. Topics include: ranges and characteristics of the instruments of the orchestra; transposing instruments; exercises in scoring and notation; techniques and software for sequencing.

MUS 421 Advanced Orchestration II (3 cr.)

Prerequisite(s): MUS 420

This course explores advanced topics in orchestration and arrangement, and applications to scoring for film and animation.

MUS 424 Procedural, Algorithmic and Stochastic Music Composition (3 cr.)

Prerequisite(s): MUS 321

This course introduces the theory and practice of procedural, stochastic, and algorithmic musical composition, explored by means of current software toolkits.

MUS 430 Film Scoring and Synchronization (3 cr.)

Prerequisite(s): MUS 321

This course explores advanced topics in film scoring. Topics may include: history of films, synchronizing animation and music tempo, synching music to pictures, and copyright and publishing.

MUS 450 Sound Design Project VII (1 cr.)

Prerequisite(s): MUS 351

Concurrent Course(s): MUS 450L

This course builds on MUS 351, with further exploration of music and sound design for animation and video games. Emphasis is placed on production of adaptive music and sound for video games.

MUS 450L Sound Design Project VII Lab (2 cr.)

Prerequisite(s): MUS 351L

Concurrent Course(s): MUS 450

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 450. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 451 Sound Design Project VIII (1 cr.)

Prerequisite(s): MUS 450

Concurrent Course(s): MUS 451L

This course builds on MUS 450, with further exploration of music and sound design for animation and video games. Advanced topics will vary in accordance with specifications of students' final projects.

MUS 451L Sound Design Project VIII Lab (2 cr.)

Prerequisite(s): MUS 450L

Concurrent Course(s): MUS 451

This lab offers students hands-on experience in a project studio, applying the concepts and techniques presented in MUS 451. Students will apply their knowledge and skills as sound designers and composers on one or more projects, which may include work on a production team to provide sound and music for game and/or animation projects.

MUS 470 Audio Design Project III (1 cr.)

Prerequisite(s): CS 246, MAT 321, MUS 371, MUS 371L

Concurrent Course(s): MUS 470L

This course explores advanced topics in audio design and implementation. Lectures address issues that come up in audio programming at several levels: low level algorithms, mid-level components such as plugins and graphs, and high-level programming such as user interfaces and interactive music. Lecture topics include audio engine design and implementation, spatial audio, and digital signal processing.

MUS 470L Audio Design Project III Lab (2 cr.)

Prerequisite(s): CS 246, MAT 321, MUS 371, MUS 371L

Concurrent Course(s): MUS 470

This course presents a guided lab environment to pursue project work in audio design and implementation. Particular topics and project work include: parametrized audio components with user interfaces, audio-plugin development, and audio algorithm implementation.

MUS 471 Audio Design Projects IV (1 cr.)

Prerequisite(s): MUS 470, MUS 470L

Concurrent Course(s): MUS 471L

This course continues to explore advanced topics in audio design and implementation. Lectures address issues that come up in audio programming at several levels: low level algorithms, mid-level components such as plugins and graphs, and high-level programming such as user interfaces and interactive music. Lecture topics include: audio engine design and implementation, spatial audio, and digital signal processing.

MUS 471L Audio Design Project IV Lab (2 cr.)

Prerequisite(s): MUS 470, MUS 470L

Concurrent Course(s): MUS 471

This course continues to present a guided lab environment to pursue project work in audio design and implementation. Particular topics and project work include: parametrized audio components with user interfaces, audio-plugin development, and audio algorithm implementation.

MUS 490 **Sound Design Internship** (3 cr.)

Prerequisite(s): MUS 350

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.

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 116 **Physics of Music and Sound** (3 cr.)

Prerequisite(s): PHY 115

This is an algebra based physics course that builds upon basic mechanics to examine the physics of music and sound, including interactions with human sensation and perception.

PHY 200 **Motion Dynamics** (4 cr.)

Prerequisite(s): MAT 150 or MAT 180

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

PHY 200L **Motion Dynamics Laboratory** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): PHY 200

This course presents the concepts of PHY 200 in the laboratory. The experiments allow the student to experience the laws

of basic physics involving linear motion, force, gravitation, conservation of energy, conservation of momentum, collisions, rotational motion, and springs. Error analysis and data reduction techniques are taught and required in experimental reports.

PHY 250 **Waves, Optics, and Thermodynamics** (4 cr.)

Prerequisite(s): MAT 200 or MAT 230, PHY 200

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

PHY 250L **Waves, Optics, and Thermodynamics Lab** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): PHY 250

This course presents the concepts of PHY 250 in the laboratory. The experiments allow students to experience the physical laws involving oscillations, waves, sound, interference, lift, drag, heat, optics, and entropy. Extended error analysis and statistics are taught and required in experimental reports.

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 270L **Electricity and Magnetism Lab** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): PHY 270

This course presents the concepts of PHY 270 in the laboratory. The experiments allow students to experience the physical laws involving electric fields, electric potential, electric current, electric charge, capacitance, current, resistance, inductance, circuits, and magnetism. Error analysis and statistics are taught and required in experimental reports.

PHY 290 **Modern Physics** (3 cr.)

Prerequisite(s): MAT 200 or MAT 230, PHY 250 or PHY 270, 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, with an emphasis placed on the problem-solving nature of physics. The class is a calculus-based scientific examination of topics from general relativity and quantum mechanics through nuclear physics, high energy physics and astrophysics.

PHY 290L Modern Physics Lab (1 cr.)

Prerequisite(s): None

Concurrent Course(s): PHY 290

This course presents the concepts of PHY 290 in the laboratory. The experiments allow students to experience the discoveries of the last 100 years. The Michelson-Morley interferometer, the photoelectric effect, the electron's charge to mass ratio, the Franck-Hertz experiments, electron diffraction and the thermal band-gap. Error analysis and statistics are taught and required in experimental reports.

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.

PHY 320 Acoustics I (3 cr.)

Prerequisite(s): PHY 250

This course uses fundamental physics to explore topics related to sound and vibration. The simple harmonic oscillator and the generic wave equation will be used to derive acoustic wave equations in three dimensions. Solutions to the acoustic wave equations will be explored.

PHY 321 Acoustics II (3 cr.)

Prerequisite(s): PHY 320

This course uses the tools of physics to explore sound generation, propagation, and detection. Particular attention is given to methods used by humans in each of these areas.

PHY 399 Special Topics in Physics (3 cr.)

Prerequisite(s): None

Prerequisite: 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.

PHY 500 Advanced Physically-Based Modeling (3 cr.)

Prerequisite(s): None

This class covers the topics in dynamics modeling techniques, including methods in the calculus of variations, Hamilton's principle, Lagrangian dynamics, Hamiltonian dynamics, motion in a non-inertial reference frame, dynamics of rigid bodies (moments of inertia, inertia tensor, and stability), collision resolution (impact parameters, scattering, and restitution), and physics of continuous bodies (elasticity, deformation, stress, and strain).

PHY 599 Special Topics in Physics (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.

PHYX 510 Physics for Animation and Modeling (3 cr.)

Prerequisite(s): None

This is an algebra-based physics course that explores kinematics, Newton's dynamics, and conservation of energy and momentum in three dimensions. Applications include particles, rigid bodies, and systems of bodies, with emphasis on topics relevant to modeling and animation.

Intensive English Preparation Course Requirements and Course Descriptions

Overview of the Intensive English Preparation Courses

The simulation, video game, hardware, software, and animation industries are some of the fastest growing in America and offer a wide variety of career opportunities; well-trained, talented computer scientists, programmers, designers, and artists are in high demand, and DigiPen Institute of Technology prepares students for these careers.

The Intensive English Preparation courses are designed for international students wishing to enter one of DigiPen's degree programs but whose language skills are insufficient to pass one of the required standardized language tests that fulfill DigiPen's admission requirements at the time of application. These courses are not vocational in nature and do not lead to initial employment. The Intensive English Preparation courses are secondary objectives of the school and are designed to prepare students to increase their English language proficiency so they can be successful in the degree programs.

International students enrolled in the Intensive English Preparation courses will learn and practice a broad range of skills, including oral communication, industry-specific vocabulary, and reading and writing complex material. This will equip them to communicate effectively in complex work and social situations. The Intensive English Preparation courses assist international students interested in attending DigiPen to adjust to the culture and the rigorous academic programs at DigiPen. Students will have the opportunity to interact with faculty, staff, and other students as they become familiar with the unique environment.

Students will also gain knowledge of American cultural practices through immersion in both the DigiPen community and the local area. They can improve their English language skills by engaging in conversations with people from many different cultures. Students may also participate in the full range of clubs that other students at the school enjoy, such as play-testing, dance, and anime.

Students who successfully complete the Intensive English Preparation courses will continue to take the degree program in which they were accepted, and have the opportunity to experience first-hand the dynamic environment of one of the world's premier game development institutions.

Intensive English Preparation Course Requirements

NUMBER OF CREDITS AND GPA

The Intensive English Preparation courses require completion of the minimum credits of the required level with a cumulative GPA of 2.0. Students will be placed to start at a specific level based on the outcome of a Placement Test to be taken after their acceptance into a DigiPen degree program. The minimum number of credits required for completion of each level is specified below:

- Placement Level I requires completion of at least 14 credits
- Placement Level II requires completion of at least 14 credits
- Placement Level III requires completion of at least 14 credits
- Placement in College Bridge requires completion of at least 16 credits

DURATION OF IEP COURSEWORK

Each level of IEP coursework takes one semester to complete. The fall and spring semesters are 15 weeks each; the summer semester is 12 weeks.

REQUIRED COURSES

Based on the IEP level placement, students will usually complete at least one of the following courses: IEP 001L, IEP 002L, IEP 003L, IEP 010, IEP 011, IEP 012, IEP 020, IEP 021, IEP 022, IEP 030, IEP 031, IEP 032, IEP 040, IEP 041, IEP 042 and IEP 043.

GRADE REQUIREMENT

Students must receive a grade of "C-" (or 1.7 quality points) or higher to pass all IEP courses. A grade of "D" (or 1.0 quality points) or below is a failing grade and the course must be repeated.

All courses are offered by the Department of Humanities and Social Sciences.

EXAM REQUIREMENT

After completing the required IEP coursework, students must take and pass one of the following tests with a minimum score of:

- TOEFL (paper exam): 550
- TOEFL (computer exam): 233
- TOEFL (Internet-Based Test): 80
- IELTS (paper exam): 6.5

FULL-TIME STATUS

To maintain full-time status, students must be enrolled in no fewer than 12 credits per semester.

Grading Policy

- A Excellent = 4.0 quality points
- A- Excellent = 3.7 quality points
- B+ Good = 3.3 quality points
- B Good = 3.0 quality points
- B- Good = 2.7 quality points
- C+ Fair = 2.3 quality points
- C Fair = 2.0 quality points
- C- Fair = 1.7 quality points; lowest passing grade for diploma.
- D Failure = 1.0 quality points; failing grade for diploma.
- F Failure = 0 quality points

Satisfactory Progress

MINIMUM GPA REQUIREMENT

While enrolled at DigiPen, students are required to maintain satisfactory academic progress (SAP) to remain in good standing in their program. SAP is based on the cumulative grade point average of all courses taken at DigiPen Institute of Technology to meet the qualitative standard. A student must maintain a cumulative GPA of 2.0 or better to maintain SAP. Failure to meet this standard will place a student on Academic Warning and may lead to the student's Administrative Withdrawal from the Institute.

FAILING TO MEET MINIMUM GPA REQUIREMENT

Students who fail to maintain the required minimum cumulative GPA will be placed on Academic Warning the semester following the one where their cumulative GPA falls below the minimum required. Students are removed from Academic Warning as soon as their cumulative GPA is above 2.0. Students who earn a 2.0 during their probationary semester but do not raise their cumulative GPA above the minimum requirement will continue on Academic Warning until their cumulative average reaches 2.0. While on Academic Warning, students will be restricted to a maximum course load of 15 credits. These students must achieve a GPA of 2.0 or higher during their probationary semester. Failure to satisfy these requirements will result in administrative withdrawal, and withdrawn students must wait 12 months before they can apply for readmission.

Academic Credential

Upon completion of each level of the Intensive English Preparation courses, students will be awarded a Certificate of Completion in Intensive English Preparation specifying the level completed.

Intensive English Preparation Curriculum Chart

LEVEL	SEMESTER	COURSE #	COURSE TITLE	CREDITS
Level 1	1	IEP 010	Reading & Grammar I	4
	1	IEP 011	Writing & Grammar I	4
	1	IEP 012	Listening & Speaking I	4
	1	IEP 001L	English Language Lab I	2
Level 2	2	IEP 020	Reading & Grammar II	4
	2	IEP 021	Writing & Grammar II	4
	2	IEP 022	Listening & Speaking II	4
	2	IEP 002L	English Language Lab II	2
Level 3	3	IEP 030	Reading & Grammar III	4
	3	IEP 031	Writing & Grammar III	4
	3	IEP 032	Listening & Speaking III	4
	3	IEP 003L	English Language Lab III	2
College Bridge	4	IEP 040	College Reading & Grammar IV	4
	4	IEP 041	Academic Writing & Grammar IV	4
	4	IEP 042	Lecture Comprehension & Presentation	4
	4	IEP 043	Professional Vocabulary	4

The following electives are offered to allow students to maintain their full-time status:

IEP Electives

	COURSE	TITLE	CREDITS
Electives	IEP 001L	English Language Lab I	2
	IEP 002L	English Language Lab II	2
	IEP 003L	English Language Lab III	2
	IEP 004L	English Language Lab IV	2
	IEP 005L	English Language Lab V	2
	IEP 050	English Slang	4
	IEP 051	Oral Communication	4
	IEP 052	Test Preparation	4
	IEP 053	American Culture	4
	IEP 054	Topics in Humanities	4
	IEP 055	Understanding Fiction	4
	IEP 056	Personal and Professional Development	4

Please note:

The entry point of a student into this course sequence may be changed based on the outcome of his/her placement test.

Students must remain enrolled in at least 12 credits to maintain full-time status.

Credits earned from the Intensive English Preparation courses do not count toward any degree programs offered within the institution.

Intensive English Preparation (IEP) Course Offerings

REQUIRED COURSES

IEP 001L English Language Lab I (2 cr.)
Prerequisite(s): None

This course reinforces English language skills through contact with the teacher and other students and includes practical applications of material taught in IEP classes.

IEP 002L English Language Lab II (2 cr.)
Prerequisite(s): IEP 001L

This course reinforces English language skills through contact with the teacher and other students and includes practical applications of material taught in IEP classes.

IEP 003L English Language Lab III (2 cr.)
Prerequisite(s): IEP 002L

This course reinforces English language skills through contact with the teacher and other students and includes practical applications of material taught in IEP classes.

IEP 010 Reading & Grammar I (4 cr.)
Prerequisite(s): None

This course focuses on developing proficiency in reading skills. Topics may include main ideas, key details, tone, organization, transitions, referents, writer's purpose, and vocabulary in context.

IEP 011 Writing & Grammar I (4 cr.)
Prerequisite(s): None

This course focuses on paragraph development and grammatical control, building from the sentence to the paragraph level. This includes an introduction to writing techniques and grammar.

IEP 012 Listening & Speaking I (4 cr.)
Prerequisite(s): None

This course focuses on understanding basic verbal and non-verbal communication in academic and real-life settings through short listening activities, and making brief oral presentations.

IEP 020 **Reading & Grammar II** (4 cr.)

Prerequisite(s): IEP 010

This course focuses on the development of reading comprehension, critical thinking, small group discussion, and academic research using a variety of different materials, such as library books, periodicals, encyclopedias, and the Internet.

IEP 021 **Writing & Grammar II** (4 cr.)

Prerequisite(s): IEP 011

This course focuses on paragraph-to-essay structure, including clear thesis statements, body paragraphs with clear topic sentences, and conclusions. Various rhetorical styles will be introduced, including expository, classification, and comparison and contrast.

IEP 022 **Listening & Speaking II** (4 cr.)

Prerequisite(s): IEP 012

This course focuses on the expansion of speaking and listening skills, including giving and getting information, instructions, opinions, and reasons.

IEP 030 **Reading & Grammar III** (4 cr.)

Prerequisite(s): IEP 020

This course focuses on reading a variety of higher-level materials and expands on research proficiency.

IEP 031 **Writing & Grammar III** (4 cr.)

Prerequisite(s): IEP 021

This course focuses on identifying and developing cause/effect, descriptive, analytical, and persuasive essays as well as editing writing from other sources.

IEP 032 **Listening & Speaking III** (4 cr.)

Prerequisite(s): IEP 022

This course focuses on improving listening and speaking abilities in complex communicative situations, both academic and social. It uses media to practice advanced language functions and develop competence with appropriate grammatical structures.

IEP 040 **College Reading & Grammar** (4 cr.)

Prerequisite(s): IEP 030

This course focuses on the development of reading skills that students are expected to use in college courses. These skills

include understanding complex reading selections, critical thinking, library research, and presentation of new material. Students will be required to pass a practicum in order to pass the course.

IEP 041 **Academic Writing & Grammar** (4 cr.)

Prerequisite(s): IEP 031

This course focuses on writing multi-paragraph research-based essays, with a strong thesis and citations, in a logically organized and error-free manner. Students will be required to pass a practicum in order to pass the course.

IEP 042 **Lecture Comprehension & Presentation** (4 cr.)

Prerequisite(s): IEP 032

This course focuses on speaking, listening, note-taking, and communication skills for college transition students. Students will be required to pass a practicum in order to pass the course.

IEP 043 **Professional Vocabulary** (4 cr.)

Prerequisite(s): IEP 032

This course focuses on the development of vocabulary specific to the technical, design, and artistic fields.

ELECTIVES

IEP 004L **English Language Lab IV** (2 cr.)

Prerequisite(s): IEP 003L

This course reinforces English language skills through contact with the teacher and other students and includes practical applications of material taught in IEP classes.

IEP 005L **English Language Lab V** (2 cr.)

Prerequisite(s): IEP 004L

This course reinforces English language skills through contact with the teacher and other students and includes practical applications of material taught in IEP classes.

IEP 050 **English Slang** (3 cr.)

Prerequisite(s): None

This course focuses on understanding the complex usage of informal English in both social and academic settings.

IEP 051 **Oral Communication** (3 cr.)

Prerequisite(s): None

This course focuses on developing speaking and listening skills, with emphasis on public speaking and presentations.

IEP 052 **Test Preparation** (3 cr.)

Prerequisite(s): None

This course focuses on preparing students for various types of tests, which may include standardized tests such as the TOEFL, and teacher-generated subject exams.

IEP 053 **American Culture** (3 cr.)

Prerequisite(s): None

This course focuses on understanding American culture and the behaviors and attitudes of Americans.

IEP 054 **Topics in Humanities** (3 cr.)

Prerequisite(s): None

This course focuses on understanding the influence of literature, art, philosophy, etc. on ancient and modern culture.

IEP 055 **Understanding Fiction** (3 cr.)

Prerequisite(s): None

This course focuses on understanding different genres of English fiction, including short stories, poems, and novels.

IEP 056 **Personal and Professional Development** (3 cr.)

Prerequisite(s): None

This course focuses on developing individual and group skills needed for success in a professional environment.

Standards of Progress

Semester Credit Hour

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

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.” Students taking courses over the summer should be aware that the total number of hours for a course is compressed into fewer weeks, but is not reduced. The number of courses that a student is recommended to take during the shorter summer semester is therefore fewer than the fall or spring semesters.

Grade Level Progression

CREDIT AMOUNT	CLASS STANDING
less than 30 earned credits*	Freshman class standing
30 earned credits or greater	Sophomore class standing
60 earned credits or greater	Junior class standing
90 earned credits or greater	Senior class standing

*an earned credit is defined as a credit that is awarded a passing final grade and counts towards the program in which the student is currently enrolled.

Grading System

The following system applies to undergraduate students; for information on the grading system for graduate programs, please refer to the *Master of Science in Computer Science* and the *Master of Fine Arts in Digital Arts* program sections.

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	minimum grade required to earn credit for graduate students
C-	Fair	1.7	minimum grade required to earn credit for undergraduate students
D	Failure	1	
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 their Student Success Advisor 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 Office of the Registrar no later

than the first Friday of the following semester for the Fall and Spring semesters, and August 15th for the Summer semester. Should the make-up work not be completed within the agreed-upon time frame, the Instructor will supply the Office of the Registrar with a final grade, and it will be computed as a failing grade in the cumulative GPA.

These Incomplete 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 grade of “F” and it will be computed as a failing grade in the cumulative GPA.

W—WITHDRAWAL

“W” indicates withdrawal from the course between the 15th day of the semester and before the end of the eighth week of classes or withdrawal from the Institute. 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.

NP—NO PASS

“NP” is given for courses where a letter grade is not required. “NP” means that the student has not successfully completed the requirements of the course, but there is no impact on the GPA.

M - MISSING

This indicates that the grade was not available from the Instructor at the time the transcript was printed. The “M” grade is ignored in credit and grade computations.

Assessment Process

DigiPen 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 Accounting, 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. If multiple attempts were made for the same course, only the grade earned in the most recently-completed attempt is calculated in the cumulative GPA. Course grades of “AU,” “I,” “W,” “P,” and “NP” 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 - Financial Aid

The Office of Financial Aid is required by federal and state regulations to determine if students receiving financial aid are making Satisfactory Academic Progress (SAP). The SAP policy is published and disseminated through DigiPen's course catalog. To maintain eligibility, students must meet DigiPen's academic progress standard for institutional aid recipients, Washing State standards for State aid recipients, and the US Department of Education's satisfactory academic progress standard for federal aid recipients. Please review the federal policy and WA State standards that the Office of Financial Aid uses below.

Federal Policy

All students receiving federal financial aid must meet the following SAP standards in order to maintain eligibility: Qualitative Standard, Quantitative Standard and the Maximum Timeframe. Failure to comply with DigiPen's policy will lead to the student's loss of eligibility for federal financial aid.

ELIGIBILITY REVIEW POLICY

SAP eligibility is reviewed each term. All periods of attendance count toward the fulfillment of each requirement (e.g., terms that a student must fund due to failure to make SAP and students who have previously attended the school without Title IV aid and who now apply for aid). Students not making SAP will be notified by the Office of Financial Aid via email at the end of each term.

QUALITATIVE STANDARD (GPA)-UNDERGRADUATE

Undergraduate students must maintain at least a 2.0 cumulative GPA.

QUANTITATIVE STANDARD (PACE)-UNDERGRADUATE

All students must successfully complete two-thirds (67%) of total hours attempted (known as PACE: Percent of Attempted Credits Earned). For example, a student who has attempted 45 credit hours must have successfully completed at least 30 credit hours: $30/45 = 0.667$ or 67%. All attempted grades/credits count toward PACE.

MAXIMUM TIMEFRAME-UNDERGRADUATE

Undergraduate students may attempt no more than 150% of the maximum credits required to complete an academic program.

QUALITATIVE STANDARD (GPA)-GRADUATE

Graduate students must maintain at least a 3.0 cumulative GPA.

QUANTITATIVE STANDARD (MAXIMUM TIMEFRAME & PACE)-GRADUATE

Graduate students must complete at least 50% of attempted credits each semester and finish the Master's program within the maximum timeframe (eight years).

Federal SAP Statuses:

GOOD STANDING

Students are considered in "good standing" if at the end of the semester they meet all of the SAP requirements defined in this policy. Students in good standing are not notified at the end of each semester.

FINANCIAL AID WARNING

Students who do not meet the prescribed components of his policy and have not already been placed on warning in the immediate term prior will first be placed on warning for the following term and notified via email. Students can receive federal financial aid during the warning term. No appeal is necessary. This is an opportunity for the student to bring their academic performance back into SAP compliance.

FINANCIAL AID TERMINATED/INELIGIBLE

If after the Warning term the student is not making SAP standards, the student will have their eligibility for federal financial aid terminated and becomes ineligible for disbursement of funds.

FINANCIAL AID PROBATION

During the probation period, the student has appealed and regained federal financial aid eligibility. At the end of the probation semester, the student is either expected to meet the SAP standards or meet the conditions of the SAP Academic Plan. If the SAP standards or the SAP Academic Plan conditions are not met at the end of the probation period, the student will be placed back into ineligible status. In this scenario, students will take following applicable steps:

- In the event that the SAP standards are not met by the end of the probationary semester, the student will be required to obtain approval of a new appeal along with an academic plan
- In the event that the conditions of the SAP Academic Plan were not met, the student will be required to obtain approval for a new appeal and a new SAP Academic Plan.

How to Re-establish Eligibility for Termination

Following the guidelines described below, the student will have to appeal to the Office of Financial Aid if they wish to re-establish for federal aid.

APPEAL

Appeals must be submitted in writing to the Office of Financial Aid outlining any extenuating circumstance(s) that influenced the student's academic performance.

Extenuating circumstances are those events that are beyond the student's control (i.e. serious injury, illness or mental health

condition, death of an immediate family member, etc.). The appeal should be typed and include:

- A description of the extenuating circumstance
- Documentation of circumstance
- The manner by which the deficiency will be resolved
- Signature and current contact information

An appeal without supporting documentation will not be considered. Each appeal will be considered on a case-by-case basis. Please note, financial aid cannot be reinstated for a prior semester.

The Financial Aid Appeals Committee will review the appeal within two weeks of its receipt. Students filing an appeal will be advised in writing of the decision via the contact information provided and their student e-mail account. The committee's decision is final and it cannot be appealed to a higher level. The student is encouraged to take advantage of counseling, tutoring, and the academic support center.

If the appeal is approved the student will be placed on probation and receive financial aid for the term in which the appeal is submitted only, their academic performance will be reviewed at the end of that semester for continued eligibility.

ACADEMIC PLAN

If the student will not meet the SAP standards by the end of the initial probation semester, the student will be asked to develop a SAP Academic Plan with the assistance of Student Success Advisor (SSA) that will ensure Financial Aid SAP standards are met at a specific point in time and submit this in a new appeal.

If this appeal and the SAP Academic Plan are approved by the Office of Financial Aid, the student will be placed back on probation for one term. At the end of each term, the Office of Financial Aid will confirm the fulfillment of the conditions of the Academic Plan with the SSA. If the student fails to meet these conditions they will have their eligibility for financial aid terminated.

If a student in on a SAP Academic Plan and the conditions of the plan are not met at the end of the probationary period due to the new circumstance, a new SAP appeal should be submitted. Approval of subsequent appeals will require a new SAP Academic Plan if a SAP Academic Plan was previously approved and its conditions not met.

The timeframe to review a SAP appeal and render a decision varies throughout the course of the semester. After an appeal is submitted, students will be contacted via email with an expected timeframe for review. Generally, the review can take up to two weeks. Students will be notified of the appeal decision via email.

Special Considerations

TRANSFER CREDITS

Transfer credits accepted by DigiPen are included in the maximum timeframe and the pace of completion policy. Transfer hours accepted towards completion of a student's program count as both credits attempted and credits earned. Transfer credits are not included in the cumulative and major GPA.

MAJOR OR DEGREE CHANGES

A student may change from one degree to another during attendance at DigiPen. Students who change from one major to another are still expected to maintain Satisfactory Academic Progress and complete the course work within the time frame or hours. All attempted hours from a prior major are included in the total attempted hours.

INCOMPLETE GRADES

An incomplete grade indicates that a student has not finished all course-work required for a grade and is not included in the cumulative credits attempted. An incomplete will count toward attempted credit but not as credits earned until a final grade is posted in the Office of the Registrar. Incomplete grades, however do not impact GPA calculations.

COURSE REPETITIONS

A student who has received a failing grade in a course at DigiPen may attempt the course up to two more times in an effort to receive a passing grade. A student who attempts a course without passing three times will be placed on Academic Warning. Upon completing the fourth attempt of a course the student will be academically withdrawn unless they pass the course.

Students (undergraduate and graduate) may only receive federal financial aid for one additional attempt (repeat) of a previously passed course. All attempted courses (including withdrawals) are included in the total attempted hours for SAP evaluation.

WITHDRAWING FROM COURSES & 'W' GRADES

A "W" grade is considered an attempted and unearned grade and impacts Maximum Timeframe and PACE when determining if a student is making SAP.

RETURNING FROM OFFICIAL WITHDRAWAL (READMITS)

Students returning to DigiPen after an official withdrawal who were considered "SAP ineligible" for the term in which they withdrew will need to submit an appeal to the Office of Financial Aid in order to be considered for federal and state aid.

SECOND BACHELOR

If a student is completing a second bachelor at DigiPen, only the courses pertaining to that degree will be considered when manually calculating the Maximum Timeframe and Pace of Completion SAP calculation. Transfer credits including DigiPen credits from a previous bachelor degree will not be included in the cumulative and major GPA. The student should

communicate to the Office of Financial Aid of their enrollment in a second bachelor degree program.

$$(\text{Cumulative credits earned} / \text{Cumulative credits attempted}) \times 100 = \text{Pace (\%)}$$

See the following chart for a sample pace calculation.

COURSE	CREDITS	FINAL GRADE	GRADE POINTS
ANI 350	3	A-	11.10 (3x3.7)
ART 228	3	F	0.00
CG 305	3	W	0.00
INT 390	5	P	0.00
SOS 115	3	C+	6.90 (3x2.3)
	17		18.00
Cumulative semester attempted credits (for GPA)			9.00
Cumulative semester attempted credits (for PACE)			17.00
Cumulative Credits Earned			11.00
Grade Points			18.00
GPA			2.00

Earned credits include: A-, C+ and P

Attempted Credits for Pace included: A-, F, W, P, and C+

$$(11.00 / 17.00) \times 100 = \mathbf{64.7\%}$$

The calculation of pace is based on the total cumulative credits earned divided by cumulative credits attempted. Therefore, the pace calculation for the above example is 11 earned credits divided by 17 attempted credits, resulting in 64.7% pace.

Students failing to maintain satisfactory pace for their program will be placed on Academic Warning. Such students will work with their Student Success Advisor to establish an academic plan to help them get back on pace to graduate within 150% of the published length of the educational program, as measured in semester credit hours. Failure to meet the terms of this academic plan may result in Administrative Withdrawal and the student would not be eligible to apply for readmission for 12 months. For financial aid recipients, please also refer the *SAP Policy for Financial Aid* section in the *Financial Assistance* chapter for more information.

Please contact the Office of Student Affairs with any questions regarding how pace is calculated or to determine if you are making satisfactory pace for the program in which you enrolled.

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, 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 if a satisfactory resolution is not achieved.

Repeating Courses

A student may attempt a course up to three times in an effort to earn a passing grade. If a student fails to pass the course within three attempts, the student will be placed on academic warning. Upon completing the fourth attempt of a course, the student will be academically withdrawn unless they pass the course. Withdrawals from courses are considered attempts. All grades and attempted courses remain on a student's transcript. However, only the grade earned in the most recent attempt of a course is calculated in a student's Cumulative GPA. *(Students in degree plans prior to Fall 2019 catalog year, may not withdraw and reapply for another catalog year in an attempt to apply this policy to their GPA.)*

Course Overload

During a given semester students may be enrolled in a maximum of 21 credits. 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 Student Success 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.

Withdrawals *(Initiated by Student)*

FROM INDIVIDUAL COURSES

To withdraw from individual courses, a student must complete the appropriate withdrawal form, either in person or online.

FROM THE INSTITUTE

To formally withdraw from the Institute, a student must submit a completed Institutional Withdrawal Packet to the assigned Student Success Advisor, Student Affairs staff member, or Office of the Registrar. Institutional Withdrawal Packets may be obtained from the student's assigned Student Success Advisor or from the Office of Student Affairs.

Upon withdrawing from DigiPen, 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 four conditions prevents a student from completing all courses: death of a close family member, severe/terminal illness in the family, a physical or mental health issue(s) that incapacitates the student, or a significant life altering event. Hardship withdrawals may be sought any time during the semester, but not after all materials for a course have been completed (i.e., after submitting the final exam or final assignment). Students seeking a Hardship Withdrawal must meet with their Student Success Advisor to receive the form and review the procedure. 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, or letter from an individual who is familiar with the student's situation) must be provided to support all Hardship Withdrawal requests. Students requesting a partial hardship withdrawal must have documentation that explains why they are able to complete a portion of their classes, but not all. Once Hardship Withdrawal forms are completed by students, they must submit the forms to their Student Success Advisors, who will then review and submit them to the Office of the Registrar.

If the Office of the Registrar grants a hardship withdrawal, the student will receive "W" grades in all approved courses. If a student receives a Hardship Withdrawal for all courses, the student will be withdrawn from DigiPen, effective the student's last day of attendance. Regular refund and all Financial Aid policies apply. Students seeking readmission must abide by DigiPen's readmission policy.

Administrative Withdrawals

(Initiated by the Institute)

Students will be Administratively withdrawn from the institution if they:

1. Fail to maintain satisfactory Pace.
2. Fail to maintain the minimum required GPA while on Academic Warning.
3. Fail to pass a class on the 4th attempt.
4. Fail to complete their program within 1.5 times the credit hours required to complete the program.
5. Violate the attendance policy.
6. Violate the Code of Student Conduct and DigiPen's policies.

7. Fail to maintain matriculated status by not registering for any courses in either the Fall or Spring semesters.

The "W" Grade

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

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 Office of the Registrar will assign a final grade of "W" for each course in which the student was enrolled.
3. After the 56th calendar day of the semester, students who withdraw or are academically withdrawn (other than Hardship and Military Duty) will receive a "F" grade for every course they have withdrawn from.

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"], and 2.0 [or "C"]) in credit-bearing courses are counted for eligibility.
5. No failing grades: a grade of "D" (or 1.0 quality points), and "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 and Internship credits are excluded.
9. Pass/No Pass 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.

Process for Grievances and Appeals

CONCERNS OVER ACADEMIC STANDING

Students who would like to file an appeal against a decision regarding their academic standing in a particular course should discuss the matter with their instructor. If a satisfactory resolution is unattainable, students may file an appeal with the Department Chair for that course. If the resultant solution is still unsatisfactory, then students may file an appeal with the Dean of Faculty. Students may appeal grades and review exams no later than two weeks after grade reports are issued. The Institute reserves the right to destroy any examination papers after the two-week appeal period. However, academic records will be kept indefinitely.

APPEAL FOR REFUND OF TUITION

Students who would like to file an appeal against a decision regarding their tuition refund shall file a written request to the Accounting Department. If dissatisfied with the decision of the Accounting Department, students may file a second appeal with the Chief Operating Officer—International. If they are still dissatisfied, students may appeal to the President of the Institute.

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.

FILING A COMPLAINT WITH AN EXTERNAL PARTY

A student may file a complaint with an external party should they feel that the institution has not adequately addressed a complaint or concern after they have followed the institution’s Process for Grievances and Appeals.

WASHINGTON STUDENT ACHIEVEMENT COUNCIL

The Washington Student Achievement Council (WSAC) has authority to investigate student complaints against specific schools. WSAC may not be able to investigate every student complaint. Visit wsac.wa.gov/student-complaints for information regarding the WSAC complaint process.

ACCREDITING COMMISSION OF CAREER SCHOOLS AND COLLEGES

Schools accredited by the Accrediting Commission of Career Schools and Colleges must have a procedure and operational plan for handling student complaints. If students do not feel that the Institute has adequately addressed a complaint or concern, they may consider contacting the Accrediting Commission.

All complaints considered by the Commission must be in written form, with permission from the complainant(s) 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
www.accsc.org

A copy of the Commission’s Complaint Form is available at the Institute and may be obtained by contacting Mandy Wong, Executive Director, Institutional Effectiveness or online at www.accsc.org.

If students are unsure of whom to speak to regarding a complaint, they may contact Mandy Wong at the following address:

Mandy Wong
Executive Director, Institutional Effectiveness
DigiPen Institute of Technology
9931 Willows Road NE
Redmond, WA 98052
Tel: (425) 558-0299
Email: mandy.wong@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 issuance of the student’s official transcripts. Students with any questions may contact the Office of the Registrar at (425) 558-0299.

To request an official transcript, students should complete a Transcript Request form (available online at digipen.edu) and either mail, scan, or fax it to the Office of the Registrar. Requests are usually processed within three 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 in writing 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 Office of 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 Office 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 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 is committed to maintaining a diverse community in an atmosphere of mutual respect for and appreciation of differences.

DigiPen Institute of Technology does not discriminate in its educational and employment policies on the basis of race, color, creed, religion, national/ethnic origin, sex, gender identity, sexual orientation, age, or with regard to the basis outlined in the Veterans' Readjustment Act and the Americans with Disabilities Act, as amended.

Religious Accommodation

DigiPen Institute of Technology provides reasonable accommodations to students who, due to the observance of religious holidays, expect to be absent or endure a significant hardship during certain days of the course or program. These holidays or observances must be part of a religious denomination, church, or religious organization, and the course instructor must be notified in writing during the first two weeks of the course. The institute's policy for grievances is published in the course catalog.

Accreditation History

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.

The Bachelor of Science in Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, abet.org. This accreditation action extends retroactively from October 1, 2012.

The Bachelor of Science in Computer Science in Real-Time Interactive Simulation program (offered at the Redmond campus) is accredited by the Computing Accreditation Commission of

ABET, abet.org. This accreditation action extends retroactively from October 1, 2015.

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.
- 2015: DigiPen's Bachelor of Science in Computer Engineering program was accredited by the Engineering Accreditation Commission of ABET, abet.org.

- 2016: DigiPen was granted approval to change the program name from the Bachelor of Science in Engineering and Sound Design to the Bachelor of Science in Computer Science and Digital Audio.
- 2016: DigiPen was granted approval for its substantive changes to the Master of Fine Arts in Digital Arts program.
- 2017: DigiPen's Bachelor of Science in Computer Science in Real-Time Interactive Simulation program was accredited by the Computing Accreditation Commission of ABET, *abet.org*.
- 2018: DigiPen was granted approval for its Bachelor of Science in Computer Science in Machine Learning degree program by ACCSC.
- 2018: DigiPen (Singapore) was granted ACCSC renewal of accreditation for five years.
- 2019: DigiPen (Singapore) was granted approval to change the program name from Bachelor of Engineering with Honours in Systems Engineering (ElectroMechanical Systems) to Bachelor of Engineering in Systems Engineering (ElectroMechanical Systems).

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 www.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 (previously Bachelor of Fine Arts in Production Animation). In 2008, DigiPen added two more degree programs: the Bachelor of Science in Computer Science and Game Design (previously Bachelor of Science in 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 (previously Bachelor of 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 Computer Science and Digital Audio (previously 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's Bachelor of Science in Computer Engineering degree program was accredited by the Engineering Accreditation Commission of ABET, abet.org.

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

In 2017, DigiPen's Bachelor of Science in Computer Science in Real-Time Interactive Simulation degree program was accredited by the Engineering Accreditation Commission of ABET, abet.org.

In 2018, DigiPen added a new program: the BS in Computer Science in Machine Learning degree program. The first cohort is scheduled to start in Fall 2019.

In 2018, B.Eng. in Systems Engineering (ElectroMechanical Systems) Program sought the provisional accreditation by the Engineering Accreditation Board (EAB) of IES for a term of three years for students entering the program from Academic Year 2014/2015. Full accreditation will be sought in Academic Year 2020/2021 when the program has graduated two batches of students.

**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.*

Student Right to Know Act and Campus Crime Act Disclosure Notice

In compliance with the Higher Education Act of 1965, as amended, and the Student Right to Know Act, DigiPen is pleased to provide copies of the retention, graduation, and employment rates as well as campus crime reports to prospective and current students upon request. Please send a request to the Office of Admissions (admissions@digipen.edu) or the Office of the Registrar (registrar.us@digipen.edu) to have copies of either report provided.

Continuing Education Program

DigiPen Institute of Technology offers a series of continuing education courses each semester and during the summer session. Courses are taught at DigiPen's Redmond campus and some are also offered online. Please visit digipen.edu/academics/continuing-education/ for more information about specific courses offered, cost, admissions information, and registration.

Please note that the continuing education courses are not transferable to any of DigiPen's degree programs and do not fall within the scope of ACCSC accreditation.

Voter Registration

For detailed information about voter registration in Washington state and to download a voter registration form, visit sos.wa.gov/elections/register.aspx.

Vaccination Policy

DigiPen does not require specific immunization or vaccinations for its students.

The state of Washington requires DigiPen to educate its students about Meningococcal disease and vaccination. Information related to the causes, symptoms, mortality, treatment, and prevention (including vaccination) of Meningococcal disease is available to download from the American College Health Association's website at acha.org. This information is also available in the Office of Student Affairs.

U.S. Military Active Duty Policies for Students and U.S. Military Dependents

WITHDRAWAL AND READMISSION PROCEDURES FOR STUDENTS CALLED TO U.S. MILITARY ACTIVE DUTY

WITHDRAWAL

Students who are called to active duty should bring a copy of their activation orders and submit the Institutional Withdrawals forms to their Student Success Advisors, who will then review and submit them to the Office of the Registrar.

- If students are called to active military duty before the end of the second week of instruction, no course entries will appear on their transcripts for that semester and they will be eligible for a full tuition refund.
- If students are called to active military duty after the end of the second week of instruction and before the end of the

eighth week of instruction, they will receive a “W” for each course enrolled, and they will be eligible for a full tuition refund.

- If students are called to active military duty after the end of the eighth week of instruction, they will receive a “W” for each course enrolled, and they will be eligible for a full tuition refund. Students who have completed a substantial amount of their course work may request an “I” grade. An “I” will revert to a “W” if the student’s active duty period is extended beyond the agreed-upon length of the original agreement.

FINANCIAL AID

If students are receiving financial aid during the semester in which they are called to active duty, financial aid must be repaid according to federal and state guidelines before a refund will be issued by DigiPen. The rules regarding financial aid are not necessarily within the control of the Institute. Students should consult with the Office of Financial Aid concerning the impact of military call-up on financial aid conditions and eligibility. The U.S. Department of Education has directed the Direct Loan Program and colleges to provide relief from student loan obligations by postponing student loan payments for borrowers during the period of the borrower’s active duty service.

If a veteran receiving Post 9/11 benefits withdraws before the semester is completed, all funding received from the U.S. Department of Veterans Affairs would be returned to the student, and it is the student’s responsibility to return any funds to the U.S. Department of Veterans Affairs and pay any balance owed to DigiPen.

READMISSION

In compliance with the Higher Education Authorization Act, matriculated students who are called to active duty shall be entitled to readmission provided that the student followed the appropriate steps as outlined in the *Withdrawal and Readmission Procedures for Students Called to U.S. Military Active Duty* section. This is provided that the cumulative length of the absence and of all previous absences from the Institute, by reason of service in the uniformed services, does not exceed five years, and, except as otherwise provided in this section, the student submits a notification of intent to re-enroll in the Institute.

The readmission fee is waived for students returning to DigiPen from United States military active duty.

WITHDRAWAL PROCEDURES FOR STUDENTS WHO ARE MILITARY DEPENDENTS WHOSE FAMILIES MUST MOVE DUE TO REDEPLOYMENT/RELOCATION

WITHDRAWAL

Students who are military dependents and whose families must move due to redeployment or relocation must provide a copy of their family members’ deployment/relocation orders and submit the Institutional Withdrawal forms to their Student Success

Advisors, who will then review and submit them to the Office of the Registrar.

- Students who must move before the end of the second week of instruction shall receive no course entry on their transcript and will receive a 100% refund.
- Students who must move after the end of the second week of instruction and before the end of the eighth week of instruction shall receive a “W” for each course enrolled and receive a 100% refund.
- Students who must move after the end of the eighth week of instruction will receive a “W” for each course enrolled and receive a 100% refund.

FINANCIAL AID

Military redeployment/relocation may also affect a student’s financial aid. Military dependents receiving financial aid during the semester in which they are required to move must repay their financial aid according to federal and state guidelines before a refund will be issued by DigiPen. The rules regarding financial aid may not necessarily be within the control of the Institute. Students should consult with the Office of Financial Aid concerning the impact of military redeployment/relocation on financial aid conditions and eligibility.

About DigiPen’s Facilities

DigiPen Institute of Technology’s 150,000 sq. ft. campus features auditoriums, classrooms, and open lab areas with dedicated game production suites, conference rooms, art labs, a music production studio, a ceramics lab, an Academic Support Lab, a Student Affairs Office, a Housing Office, a library, staff and faculty offices, a commercial software engineering research and development lab, a game console software development lab, and a professional kitchen and cafeteria.

Weekly student access to the DigiPen campus is usually from 6 a.m. to midnight, daily. On certain holidays, lab hours are from 12 p.m. to 8 p.m. Core office hours for the administration staff are from 9 a.m. to 5 p.m., Monday through Friday.

The computer workstations provided at DigiPen are selected to meet or exceed the hardware specifications for required educational software. All computers are on an internal network and have access to printers, servers, and archival media. DigiPen upgrades the computer equipment on a regular basis. Many classrooms are equipped with microphones and either DLP or LCD high-definition projection systems. Presentation materials may be shown on a variety of formats, including Blu-ray and DVD players, VCRs, document cameras, and CD players.

Classrooms vary in size from a large auditorium accommodating up to 263 students to small classrooms for 12 students. Our two multidisciplinary student game production suites, Edison and Tesla, are 11,000 sq. ft. and 6,500 sq. ft. in respective size and

seat 758 in total at workstation table and chair arrangements configured as team spaces. Students specializing as game designers, game programmers, game artists, game musicians, and computer engineers apply and integrate the academic theory from their respective disciplines into projects of varying genres. DigiPen's student-to-faculty ratio is 10 to 1 as reported in the Integrated Postsecondary Education Data System (IPEDS).

Description of the Library Facilities and Internet Access

LIBRARY SERVICES

DigiPen's library aims to support the Institute's curriculum, students, faculty, and staff. Students have access to a variety of resources such as books, video games, e-books, DVDs, board games, sound effects, 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, computer engineering, and animation. Furthermore, the DigiPen library allocates an annual budget for updating the contents of the library. The 1,164 square foot library currently holds over 5,000 books, over 130,000 e-books, over 1,000 videos and video games, and over 20 subscriptions to industry magazines and journals (print and electronic), with access to many more available in the online databases. The library also loans out video games, consoles, and other equipment. The librarian provides reference services, information literacy instruction, and materials through inter-library loan. In addition to these curriculum-related resources, the library has a collection of career-oriented materials, including books on resumes, cover letters, and interviews. The library hosts a free book and textbook exchange.

Library hours change from term to term. For current hours, please refer to the library's webpage or contact the library staff by email at library@digipen.edu or by phone at (425) 895-4420.

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 *Student Network and Internet Usage Policy* (see the following section).

Student Network and Internet Usage Policy

GENERAL POLICIES

DigiPen's computer and network resources are provided exclusively for educational purposes. To ensure that these resources remain available for legitimate academic usage, DigiPen requires compliance with the following policies:

- Students are required to respect DigiPen property. Students may not abuse, damage, vandalize, steal, or in

any way alter DigiPen property in any manner that would prevent another student from using it.

- Students may not install software, drivers, patches, or any other program on DigiPen computers. Additional software may be requested through an instructor; it is the sole responsibility of DigiPen 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 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 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 computer or network resources is expressly and strictly forbidden. Any commercial activity will result in legal action against the offender.

DigiPen 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 DigiPen's network and subject to disciplinary action.

INTERNET FILTER POLICY

Internet access through DigiPen'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'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 the IT staff by email at helpdesk@digipen.edu.

COPYRIGHT INFRINGEMENT AND PEER-TO-PEER FILE SHARING

DigiPen prohibits copyright infringement in any form, including the illegal downloading and uploading of copyrighted works through peer-to-peer file sharing as defined by Title 17 of the United States Code.

Copyright infringement may result in civil and criminal penalties, including damages of up to \$150,000 per infringed work, imprisonment of up to five years, and fines of up to \$250,000 per offense. For more information, please see the website of the

U.S. Copyright Office at copyright.gov, especially the FAQs at copyright.gov/help/faq.

In addition to the civil and criminal penalties outlined above, students who engage in illegal downloading or unauthorized distribution of copyrighted materials using DigiPen's network will also be referred to DigiPen's Appeals and Disciplinary Committee and be subject to disciplinary sanctions, up to and including expulsion from the Institute, under the *Regulation of Conduct and Disciplinary Procedures*.

Applying to DigiPen

Visiting DigiPen

DigiPen offers regular Preview Days both on campus and online for the general public. Anyone interested in finding out more about DigiPen Institute of Technology and its programs is welcome to attend. For information on dates and times for these events, please visit our website at digipen.edu or email admissions@digipen.edu.

Visitors interested in learning about DigiPen'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 Office of Admissions at admissions@digipen.edu at least one week before your intended visit.

One of the best ways to find out what DigiPen is like as a student is to spend a day on campus, attending classes and meeting students, faculty, and staff. During the fall, spring, and summer semesters, the Office of Admissions can help prospective students arrange to shadow a current student. Most visitors will combine a student shadow with a one-on-one admissions or financial aid meeting. Student shadow requests should be made at least two weeks in advance. To learn more about this program and to schedule a time for your visit, please contact the Office of Admissions at admissions@digipen.edu.

Policy on the Admission of Students with Disabilities

DigiPen makes no pre-admission inquiry about an applicant's disability. Applicants may share information about their disability on their application for admission, if they choose. DigiPen recognizes the decision to self-identify any disability is a personal one and we respect an applicant's decision not to do so.

DigiPen Institute of Technology is committed to providing equal opportunity and access to prospective students with disabilities in completing and submitting an application for admission.

Applicants who experience disability and would like to request accommodations in completing their application for admission should contact: admissions@digipen.edu.

Some examples of reasonable accommodation in the admissions process include:

- Use of print or electronic materials
- Use of auxiliary aids
- Assistance in reviewing the application guidelines and criteria

Contacting the Office of Admissions for disability-related assistance is confidential. Information about an applicant's disability will be kept private in accordance with federal and state law, and not shared with admission review committee members.

Undergraduate Application Process

DigiPen Institute of Technology works on a rolling admissions basis and enrolls new students in the fall semester that begins each September. DigiPen begins accepting applications for the following fall as early as September, and the Institute will evaluate applications as they are completed and submitted.

DigiPen encourages new applicants to apply by February 1 of each year, but the Institute will continue to accept qualified applicants after that date until all programs have reached maximum enrollment. Applicants should submit all application materials within four weeks of their initial application submission. Applicants who need additional time should request an extension, after submitting their initial application, by contacting the Office of Admissions at admissions@digipen.edu. Applicants normally receive a decision within two to four weeks after their application with all required materials has been submitted.

Applicants choose their preferred major at the time of application, however during the review process, DigiPen may determine that an applicant fits more appropriately into another degree program and may admit an applicant into another program. Additionally, DigiPen may sometimes determine that an applicant qualifies for admission to several programs and notes this on the acceptance letter.

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

1. DigiPen Institute of Technology's Online Application for Admission. This application form is available at: management.digipen.edu/srs-app/applicationmenu.aspx.
2. \$60.00 application fee.
3. Official high school transcripts or official GED test scores, if applicable. International students should submit attested copies or certified-true copies of all academic records. See more about this requirement in the *International (Non-U.S. Resident) Applicants* section if an applicant has transcripts and other official documentation in languages other than English.

DigiPen requires all applicants to have completed grade 12 or the equivalent with a recommended minimum 2.5 cumulative GPA; for international students, DigiPen will determine the minimum academic performance standards based on the educational system of the individual applicant. Students in their final year may submit current transcripts for evaluation purposes and must submit final

transcripts showing completion of grade 12, or equivalent, prior to beginning classes.

- a. Applicants who have earned their GED should submit sealed transcripts for the time that they attended high school, in addition to their GED test scores.
 - b. For home-schooled applicants, please see the *Home-Schooled Applicant Admission Requirements* section below.
 - c. Applicants who have completed a bachelor's degree at an accredited institution are not required to submit high school transcripts, but final transcripts from their college or university will be required along with official transcripts from ALL post-secondary institutes attended.
4. Official transcripts from ALL post-secondary institutes attended, if applicable. International students should submit attested copies or certified-true copies of all academic records. Again, see more about this requirement in the *International (Non-U.S. Resident) Applicants* section if an applicant has transcripts and other official documentation in languages other than English. This includes transcripts for high school concurrent enrollment programs. Transcripts must be sent by the issuing school directly to DigiPen. Alternatively, they may be sent by the applicant if they are SEALED in an envelope prepared by the issuing school and stamped over the seal by the Office of the Registrar, showing that they have not been opened.
 5. Official SAT or ACT exam scores. DigiPen requires completion of the SAT or ACT test and submission of these scores from all undergraduate applicants who have attended high school in the U.S. International applicants are strongly encouraged to submit SAT scores, but they are not mandatory. Applicants to DigiPen's undergraduate degree programs do not need to submit scores if they have already graduated from high school and have at least one full-time year (or 24 semester credits, 45 quarter credits) of college experience or if they graduated from high school more than 10 years ago. Applicants with college-level equivalent credits earned during military service should contact the Office of Admissions for waiver confirmation. Any applicant coming directly from high school will need to submit SAT/ACT scores regardless of whether or not the applicant has taken some college courses. There is no minimum score requirement for either test. SAT or ACT test scores must be sent directly to DigiPen by the issuing organization. DigiPen also accepts them on official high school transcripts. SAT code: 4138; ACT code: 6659.
 6. Application essays. Please review the requirements and recommendations about completing this important component of the application online at digipen.edu/admissions/undergraduate-admissions/undergraduate-admissions-requirements/application-essays/

7. Letters of recommendation (optional). Two letters of recommendation from individuals familiar with the applicant's academic background and/or work ethic, e.g. an instructor, guidance counselor, or employer. Recommendation letters from family members will not be considered. Applicants may choose to enter the contact information for their reference in the online application. The form will email the reference a link to an electronic recommendation form. Applicants should notify the authors of their recommendation letters prior to entering names. For hard copy submissions, each letter MUST be signed and dated by the author, and each must contain a contact phone number. Recommendation letter templates are available for download online at management.digipen.edu/srs-app/. Alternatively, references may write their own letters of recommendation without using the templates. Please note that these letters are NOT REQUIRED for applicants to DigiPen's undergraduate degree programs.
8. Other official documentation, if applicable. This includes, but is not limited to, official proof of proficiency in the English language (see more about this requirement in the *Proof of Proficiency in the English Language* section), copy of Permanent Resident card, and a financial responsibility form for international students.
9. Art Portfolio. This is only required for applicants to the Bachelor of Fine Arts in Digital Art and Animation degree program. Guidelines for the Art Portfolio are available online at digipen.edu/admissions/undergraduate-admissions/undergraduate-admissions-requirements/bfa-art-portfolio/
10. Performance Portfolio. This is only required for applicants to the Bachelor of Arts in Music and Sound Design degree program. Guidelines for the Performance Portfolio are available online at [digipen.edu/admissions/undergraduate-admissions-requirements/bamsd-performance-portfolio/](http://digipen.edu/admissions/undergraduate-admissions/undergraduate-admissions-requirements/bamsd-performance-portfolio/)
11. Design Portfolio. This is only required for applicants to the Bachelor of Arts in Game Design degree program. Guidelines for the Design Portfolio are available online at digipen.edu/admissions/undergraduate-admissions/undergraduate-admissions-requirements/bagd-design-portfolio/

HOME-SCHOOLED APPLICANT ADMISSION REQUIREMENTS

DigiPen welcomes applicants from all types of educational backgrounds and encourages home-schooled students to apply. DigiPen evaluates all applicants on an individual basis and considers all aspects of their application materials.

HOME-SCHOOLED APPLICANTS WHO ARE WASHINGTON RESIDENTS

In addition to the standard admission requirements, home-schooled applicants who are from Washington state should

submit as much information as possible about their home-schooled experience, including a detailed home-school transcript that provides course titles, a brief description of each course's content, a grade or performance assessment for each course, details about the duration of study, and their graduation or expected graduation date.

HOME-SCHOOLED APPLICANTS FROM STATES OTHER THAN WASHINGTON

Due to the diverse nature of home-schooled requirements from one state to the next, DigiPen would prefer:

- Transcripts from a nationally accredited home-school program, OR;
- Detailed home-school transcripts, as described AND passing GED test scores as proof of high school graduation.

Other forms of proof of high school equivalence will be considered on a case-by-case basis; however, these alternative forms of proof should be approved in advance by contacting the Office of Admissions at admissions@digipen.edu.

MATH AND SCIENCE REQUIREMENTS FOR BACHELOR OF SCIENCE DEGREE PROGRAMS

In addition to the requirements listed for all undergraduate applicants, those applying to any of the Bachelor of Science programs must have completed grade 12 or more recent coursework with a recommended "B" or better average in mathematics.

At a minimum, applicants to any of DigiPen's Bachelor of Science programs and the Bachelor of Arts in Game Design program should have completed coursework in algebra and geometry. Moreover, Bachelor of Science applicants need to have completed precalculus – or be in the midst of completing it – before we can evaluate their application. Please note that if an applicant is currently enrolled in precalculus, the applicant must submit the first quarter/semester grade for this course. Although not required, DigiPen strongly encourages Bachelor of Art in Game Design applicants to complete math through precalculus.

An applicant's current grade in precalculus will be considered during the application evaluation process for those applying to the Bachelor of Science programs and the Bachelor of Arts in Game Design program. Applicants who have not completed precalculus or are not currently enrolled in a precalculus course should contact admissions@digipen.edu for recommendations on fulfilling this requirement.

Additionally, applicants to the Bachelor of Science programs are encouraged to take calculus, physics, computer science, and related AP courses before coming to DigiPen.

Graduate Application Process

ADMISSIONS REQUIREMENTS FOR MS IN COMPUTER SCIENCE

All Master of Science in Computer Science applicants should complete their application by July 1 to guarantee timely evaluation of their application. Any applications completed after July 1 may not be evaluated for the current application year. All graduate applicants must submit the following:

1. DigiPen Institute of Technology's Online Application for Admission. This application form is available at: management.digipen.edu/srs-app/applicationmenu.aspx.
2. \$60.00 application fee.
3. Official Graduate Record Examination (GRE) scores for the General Test. All graduate applicants* must complete the GRE General Test and arrange for the testing agency to send those scores directly to DigiPen. GRE code: 4193.
 - » Applicants to the Master of Science in Computer Science degree program should note that the preferred combined GRE verbal and math scores should be in the 60th percentile or better.
4. Applicants to the Master of Science in Computer Science program with an undergraduate degree in any major other than Computer Science or Computer Engineering are required to take DigiPen's Computer Science Exam. A score of 70% is the preferred minimum acceptable score. Please note that achieving an acceptable score on the DigiPen Computer Science Exam does not guarantee admission. For more information on the DigiPen Computer Science Exam, please email admissions@digipen.edu to be directed to the testing services coordinator.
5. Official transcripts from ALL colleges and universities attended. International students must provide attested copies or certified-true copies of all academic records. See more about this requirement in the *International (Non-U.S. Resident) Applicants* section if an applicant has transcripts and other official documentation in languages other than English.
 - » Official transcripts from all colleges and universities attended must be sent directly by the issuing institutions. Alternatively, applicants may send their transcripts if they are SEALED in envelopes and STAMPED across the seal by the Office of the Registrar.
 - » Applicants must provide evidence of their completion of a bachelor's degree with a recommended minimum 2.5 cumulative GPA; for international students, DigiPen will determine the minimum academic

performance standards based on the educational system of the individual applicant.

6. Two letters of recommendation. These MUST be from individuals familiar with the applicant's academic background and/or work ethic, i.e. an instructor, guidance counselor, or employer. Recommendation letters from family members will not be considered. Applicants may choose to enter the contact information for their recommenders in the online application. The form will email the recommender a link to an electronic recommendation form. Applicants should notify the authors of their recommendation letters prior to entering names. For hard copy submissions, each letter MUST be sealed, signed, and dated by the author, and each must contain a contact phone number. Please download the recommendation letter templates online at management.digipen.edu/srs-app/applicationmenu.aspx. Alternatively, references may write their own letters without using the templates.
7. Statement of Purpose. Guidelines for the Statement of Purpose are available online at digipen.edu/admissions/graduate-admissions/requirements/statement-of-purpose/
8. Other official documentation, if applicable. This includes, but is not limited to, official proof of proficiency in the English language (See more about this requirement in the *Proof of Proficiency in the English Language* section), copy of Permanent Resident card, and a financial responsibility form for international students.

**Effective September 2016, graduates of any of DigiPen's Bachelor of Science degree programs are no longer required to complete the GRE to apply to the Master of Science in Computer Science program.*

ADMISSIONS REQUIREMENTS FOR MFA IN DIGITAL ARTS

All Master of Fine Arts in Digital Arts applicants should complete their application by July 1 to guarantee timely evaluation of their application. Any applications completed after July 1 may not be evaluated for the current application year. All graduate applicants must submit the following:

1. DigiPen Institute of Technology online Application for Admission. This application form is available at: management.digipen.edu/srs-app/applicationmenu.aspx.
2. \$60.00 application fee.
3. Official transcripts from ALL colleges and universities attended. International students must provide attested copies or certified-true copies of all academic records. See more about this requirement in the *International (Non-U.S. Resident) Applicants* section if an applicant has transcripts and other official documentation in languages other than English.
 - » Official transcripts from all colleges and universities attended must be sent directly by the issuing

institutions. Alternatively, applicants may send their transcripts if they are SEALED in envelopes and STAMPED across the seal by the Office of the Registrar.

- » Applicants must provide evidence of their completion of a bachelor's degree with a recommended minimum of 3.0 cumulative GPA; for international students, DigiPen will determine the minimum academic performance standards based on the educational system of the individual applicant.
- 4. Two letters of recommendation. These MUST be from individuals familiar with the applicant's academic background and/or work ethic, i.e. an instructor, guidance counselor, or employer. Applicants may choose to enter the contact information for their recommenders in the online application. The form will email the recommender a link to an electronic recommendation form. Applicants should notify the authors of their recommendation letters prior to entering names. For hard copy submissions, each letter MUST note how the author knows the applicant and for how long, be sealed, signed, and dated by the author, and each must contain a phone number. Please download the recommendation letter templates online at management.digipen.edu/srs-app/applicationmenu.aspx. Alternatively, references may write their own letters without using the templates.
- 5. Statement of Purpose. Guidelines for the Statement of Purpose are available online at digipen.edu/admissions/graduate-admissions/requirements/statement-of-purpose/
- 6. Art Portfolio. DigiPen's intent in reviewing applicants' portfolios is to ensure that they have appropriate foundational skills relative to the degree program to which they are applying. Guidelines for the Portfolio are available online at digipen.edu/admissions/graduate-admissions/requirements/mfa-art-portfolio/
- 7. Interviews. An interview may be required of selected students. This will be arranged on an as-needed basis.
- 8. Other official documentation, if applicable. This includes, but is not limited to, official proof of proficiency in the English language (See more about this requirement in the *Proof of Proficiency in the English Language* section), copy of Permanent Resident card, and a financial responsibility form for international students.

International (Non-U.S. Resident) Applicants

DigiPen welcomes students from all countries and cultures. Because of language and educational differences, DigiPen does require some additional information from international applicants

in order to ensure a successful experience for students. International applicants are asked to complete the application process early, preferably well before July 1, to guarantee timely evaluation of their application and to allow time to process required documents for the U.S. Immigration and Customs Enforcement (ICE). DigiPen will continue to accept International applications after July 1, however applications completed after July 1 may not allow enough lead-time for documentation processing.

In addition to attested or certified-true copies of all academic records and any other degree-specific requirements found under the undergraduate or graduate admission requirements, all international applicants must meet the following minimum requirements:

1. Proficiency in the English Language (see the *Proof of Proficiency in the English Language* section).
2. Financial Responsibility. Evidence indicating that sufficient funds are available for the eight-month period of study and living expenses must be submitted to DigiPen and made available to the U.S. ICE upon entry into the United States. The Financial Responsibility Form and supporting documentation must be submitted, regardless of whether or not a student is living in the U.S.

International students intending to study at DigiPen must obtain an F-1 visa from the U.S. ICE. An F-1 student is a non-immigrant who is pursuing a full course of study towards a specific educational or professional objective at a school in the United States. Once that objective has been attained, the F-1 student is expected to return to residence abroad. International students should note their citizenship on the application form for admission. If accepted, DigiPen will send a Form I-20 (Certificate of Eligibility for Nonimmigrant [F-1] Student Status). Applicants who are accepted but do not receive a Form I-20 in their acceptance packets should contact the Office of Admissions.

Once applicants receive their form I-20 they can take it to their nearest U.S. consulate to obtain a student visa. The visa process may take several months to complete, so DigiPen recommends that applicants complete the admissions process before July 1. Applicants must also take copies of the Financial Responsibility Form and supporting documents to prove they have sufficient financial resources for their education and stay in the United States. For more information on the F-1 visa process, please consult the Homeland Security Study in the States web page: studyinthestates.dhs.gov/. International students transferring to DigiPen from another institution within the U.S. must provide DigiPen with a completed Transfer-In Form to ensure that their I-20s are updated accordingly. Transfer-In Forms can be obtained on DigiPen's website or by contacting admissions@digipen.edu. International students who will be bringing a dependent with them to the U.S., such as a child or spouse, will need to complete the appropriate sections of the Financial Responsibility form to ensure that an I-20 can be issued to their dependent.

Applicants who are Permanent Residents of the United States do not need a student visa; however, they must prove their immigration status by submitting a copy of their permanent residency card and marking the appropriate citizenship status on the application for admission. The copy of the permanent residency card confirms that a student is a legal resident and that the student may pursue studies at DigiPen. Permanent Residents are subject to the same rights, services, and rates as U.S. citizens.

INTERNATIONAL STUDENTS WITH TRANSCRIPTS IN LANGUAGES OTHER THAN ENGLISH

Applicants with credentials issued in a language other than English, must submit them in both the original language and English. Please do not have your grades converted or interpreted in any way. For information on qualified translators, please contact the American Translators Association (atanet.org) or another recognized translation service (i.e., a certified translator, certified court interpreter, an authorized government official, and/or official from the school where you obtained the degree). Proof of the translator's credentials must accompany each translation. Please note that self-translated copies are not acceptable. All transcripts and diplomas must be issued by a bona fide, legitimate degree-granting university. If the issuing school provides official documents in English, an additional English translation is not required.

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: 4138.
- 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 in the United States at an English-speaking school, or an International School where the primary language of instruction is English.
- Completion of a four-year, post-secondary degree in the United States at an English-speaking school, or an International School where the primary language of instruction is English.

Note: Applicants who meet all of the admission requirements for their degree program, except for the English language proficiency requirements, may be considered to participate in the Intensive English Preparation (IEP)

courses. Please refer to the section about the Intensive English Preparation (IEP) Courses.

Intensive English Preparation (IEP) Admission Process

Students eligible for the Intensive English Preparation (IEP) courses must have applied to and demonstrated eligibility for, except for the language proficiency requirements (see the *Proof of Proficiency in the English Language* section) admission into the specific degree program in which the student intends to enroll upon completion of the IEP courses.

Students who meet the following minimum English language proficiency will be eligible to take the IEP courses:

- TOEFL (paper exam) 450
- TOEFL (computer exam) 133
- TOEFL (internet-based test) 45
- IELTS (paper exam) 4.0
- Cambridge (paper exam) PET lev. B1

Students who are required to take the IEP courses must do the following:

- Sign an enrollment agreement acknowledging intent to participate in the IEP—this must be done for each semester if the student is unable to provide evidence of meeting the language requirements for the degree program.
- Successfully complete the Intensive English Preparation coursework with a cumulative GPA of 2.0 or higher.
- Submit test scores for at least one of the following: TOEFL, IELTS, Cambridge to exit the program. The exiting score must match the English language requirement for admission into DigiPen's degree-granting programs.

There is no additional application fee for the IEP courses once an applicant has paid the fee to apply to the degree program of the applicant's choice.

Admission/Denial to DigiPen's Programs

DigiPen 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 and graduate applicants will receive an acceptance packet via standard mail. This packet will include an official letter of acceptance, information on financial aid, student affairs information, and, if applicable, a request to furnish proof of high school graduation 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, proof of graduation, and the enrollment fee, 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. By attending classes after the close of the seventh calendar day from the beginning of the semester, an applicant's status converts to 'matriculated student.'

Applicants who are not accepted to the Institute will receive a letter of denial by mail. When possible, DigiPen 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 re-apply for a future year. By improving the areas suggested on the original decision letters (e.g. improving grades by taking community college courses, devoting more time and energy to any required portfolios, etc.) many individuals re-applying for admission are accepted. To re-apply, applicants should submit a new application form and indicate that they have applied previously for admission. The Office of Admissions retains all materials submitted by applicants for a period of six years. Therefore, some items such as transcripts, letters of recommendation (optional for applicants to DigiPen's undergraduate degree programs), and test scores may be transferred from an applicant's original file to the new application file. After submitting a new application, applicants are encouraged to contact the Office of Admissions by email at admissions@digipen.edu to confirm whether any additional materials are needed for the completion of their application.

Readmission Information

Any student who wishes to return to DigiPen after an absence may apply to do so by completing a Readmission Application and submitting a non-refundable application fee of \$25.00, official transcripts from all institutions attended since last attending DigiPen, 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 studies. Additionally, it should describe any special needs the student may require upon returning to the Institute.

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 are not eligible to apply for readmission until at least one year has passed since the formal dismissal from the Institute. It is highly recommended that students take the time away to raise their cumulative 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 a Student Success Advisor or Program Director 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.

READMISSION AFTER U.S. MILITARY SERVICE

In compliance with the Higher Education Authorization Act, any student whose absence from the Institute is required by reason of service in the uniformed services shall be entitled to readmission to the Institute if the student (or an appropriate officer of the Armed Forces or official of the Department of Defense) gives advance written or verbal notice of such service to the Office of the Registrar. This is provided that the cumulative length of the absence and of all previous absences from the Institute, by reason of service in the uniformed services, does not exceed five years, and, except as otherwise provided in this section, the student submits a notification of intent to re-enroll in the Institute.

READMISSION INTO A NEW DEGREE PROGRAM

Readmission applicants who would like to return to DigiPen as a student but enter into a new degree program must submit any additional materials required for entrance into the degree program (e.g. art portfolio, performance portfolio, etc.). To review the exact requirements for each degree program, please view the Change of Major information online or in the Course Catalog or contact the Office of Admissions at admissions@digipen.edu.

Deadline for Readmission Applications: Students interested in applying for readmission must submit their completed applications by the deadlines listed in the Academic Calendar and on DigiPen's website, according to the semester they are applying to attend.

Exceptions to these requirements will only be made on a case-by-case basis at the discretion of the Institute.

SUBMISSION OF OFFICIAL TRANSCRIPTS

All readmission applicants to DigiPen must request an official transcript from DigiPen's Office of the Registrar to be sent to the Office of Admissions as part of their application. Additionally, if you have taken courses from another college since leaving DigiPen, you must also have any and ALL official transcripts forwarded to the Office of Admissions from the registrar of each institution attended. The transcripts should show all academic work until the last semester or quarter you completed. If you are approved for readmission with coursework in progress, your admission status will be provisional, pending receipt of your 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 in the *Undergraduate Admissions* section.

- Approval from instructor must be obtained with an override form to attend courses.
- Entering into a course is determined on a course by course basis; not all courses are available for non-degree seeking studies.
- Students must maintain a minimum 2.0 cumulative GPA in order to remain enrolled in non-degree seeking studies.
- Enrollment is on a continuous basis unless students do not register for classes for a required semester.

For non-degree seeking applicants who may want to enroll in a degree-seeking program in the future, please review the transfer credit policy.

Non-Degree Seeking Studies

Non-degree seeking applicants who are interested in taking individual courses may register for them based on the desired semester's course offerings, and availability. Applicants will be handled on a first-come, first-served basis.

Courses taken as non-degree seeking do not lead to a degree and are not applicable to earning a professional certificate from DigiPen.

PREREQUISITES

Applicants interested in non-degree seeking studies must:

- Provide official transcripts indicating evidence of graduation from high school and, if applicable, official transcripts from all post-secondary institutions. Applicants should have a recommended minimum 2.5 cumulative GPA in their most recent studies.
- Non-native English speakers must provide Proof of English Language proficiency. digipen.edu/admissions/international-applicants/#c39444

To apply for non-degree seeking studies at DigiPen, fill out an Application for Admission and select Non-Degree Seeking. Please direct any questions to the Office of Admissions. Please note: DigiPen Students on academic or other probation are not eligible for non-degree seeking studies until the conclusion of the probationary period.

ONCE ADMITTED FOR NON-DEGREE SEEKING STUDIES:

- Students must pass or show proof of having passed prerequisite courses before they are able to register for more advanced courses.

Waiver Credit, Advanced Placement Examinations, CLEP

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. 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 are processed at \$25.00 per credit once a student is matriculated at DigiPen Institute of Technology.

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, and they may not be repeated.

Students have the opportunity to waive designated 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 course, the student should make contact with their Student Success Advisor, submit a transcript or photocopy of transcript with relevant coursework highlighted, to the Department Chair. Once submitted, waiver requests need to be approved by the department appropriate to the courses. The department then submits the form to the Office of Registrar. For waiver requests received by July 1, students will receive notification by August 1. Waiver requests arriving in the Office of the Registrar after July 1 will be handled on a rolling basis, as faculty schedules allow. Results of waiver requests received after July 1 deadline are not guaranteed to be available before the start of classes.

It is not possible to predict the results of faculty review of course waiver requests. 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 be currently enrolled before a waiver examination can be recorded on the permanent record.
2. A maximum of 15 semester hours may be waived toward a bachelor degree.
3. Examinations may not be repeated.
4. Repeat course work and “F” grades (or 0 quality points) or “NP” grades are not open to waiver requests.
5. 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 Office of the Registrar before course waivers or transfers are granted.

DigiPen course credits may be waived or transferred if a student obtained the minimum score on the AP examination corresponding to the DigiPen course (as listed below), and these may be applied to satisfy DigiPen’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
Macroeconomics and Microeconomics	4	ECN 100
Statistics	4	MAT 105
Calcab Subscore	4	MAT 150
Mathematics – Calculus AB	4	MAT 150
Mathematics – Calculus BC	4	MAT 200
Music Theory	4	MUS 120/L
Physics 1 – Introduction	4	PHY 115

AP EXAM	MINIMUM SCORE	DIGIPEN COURSE
Physics C – Mechanical	4	PHY 200/L
Physics C – Electricity and Magnetism	4	PHY 270/L
Psychology	4	PSY 101

College-Level Examination Program (CLEP)

There are two types of CLEP examinations: General and Subject. DigiPen 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 Office of the Registrar.

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 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 within the last 10 years may be transferred, provided such credit meets the guidelines used by DigiPen Institute of Technology. For undergraduate programs, a student must take a minimum of 50% of the entire program at DigiPen (unless the student attended an institution with which DigiPen has established an articulation agreement). Graduate programs allow a maximum of 15 transfer credits from other colleges and other DigiPen programs. Due to the rigorous nature and subject specificity of the programs at DigiPen, students transferring in to DigiPen should usually expect that no more than 25% of credits will transfer.

The Office of the Registrar will evaluate college credits earned elsewhere with respect to graduation requirements at DigiPen.

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 an accredited institution, approved by the 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 rests with DigiPen.
2. The course(s) must be comparable in outcomes, competencies, and academic quality to DigiPen courses; transfer credit will be denied for courses not meeting this standard. Accordingly, current students are strongly urged to seek transfer approval from the Office of the Registrar 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 better is recorded.
4. Courses will be considered only if taken and passed within the last 10 years.
5. Courses transferred to a student's major may also require a validation examination in order to be accepted.
6. "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 DigiPen grade point average. However, grades transferred for courses taken in residence at institutions with which DigiPen has articulation agreements are exempt from this policy and will be recorded. Courses transferred in may not be used to substitute improved grades for passing grades earned at DigiPen.

Intercampus Transfer Policy

Intercampus Transfers are students who have enrolled in a DigiPen degree program and wish to permanently transfer to another DigiPen campus. Students who intend to complete an intercampus transfer should first meet with their current campus Office of the Registrar to request official transcripts and to discuss the transfer requirements. Then the student should submit a completed Application for Campus Transfer to the Office of Admissions for the campus to which they wish to transfer. This application should include the application form, an essay on why they wish to transfer, and a completed transfer checklist. Students who wish to transfer should start the process as early as possible to allow enough time for materials transfer

and preparing appropriate visa paperwork. Applications must be submitted by the following deadlines:

TRANSFER SEMESTER	DEADLINE
Fall	April 1
Spring	July 1

Students will be notified by the Office of Admissions of the transfer campus whether the applications are approved or denied.

Students are eligible to apply for intercampus transfers any time after matriculation and prior to the completion of 75% of the entire program in which they enrolled. A minimum cumulative GPA of 2.0 is required for intercampus transfer. In order to earn an undergraduate degree from the DigiPen campus to which students wish to transfer, the following conditions must be satisfied (in addition to the program and graduation requirements):

1. Students should complete a minimum of twenty-five percent (25%) of the credits required for the undergraduate degree program at the DigiPen campus awarding the degree;
2. At a minimum, students must maintain matriculated status for at least one academic year and complete the final semester at the campus awarding the degree.

Students may contact the Office of the Registrar at their current campus for more information on transfer requirements, deadlines, and any other special procedures.

Articulation Agreements

Credits from a college with an articulation agreement with DigiPen Institute of Technology will be accepted and grades earned will be included in students' DigiPen transcripts. Please contact the Office of the Registrar for a list of colleges with articulation agreements.

Credit Evaluation Request

Challenge and waiver examinations may be requested from the Office of the Registrar. A student must have approval for an exam from a Department Chair prior to taking it.

Transferability of Credits to Other Institutions

A student wishing to transfer DigiPen 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 credits.

Granting Credits for Work Experience

DigiPen does not grant credit for work experience.

Tuition and Fees

All tuition and fees are in U.S. dollars.

Application Fee

A \$60.00 application fee must accompany the application form. The application fee is refundable if the applicant requests a refund within three days after submitting the application fee and cancels the application. This fee can be waived for students who demonstrate financial need through an SAT fee-waiver program or for participation in a similar need-based program.

Readmission Fee

A \$25.00 non-refundable application fee must accompany the readmission application form. The readmission fee is waived for students returning to DigiPen from United States military active duty.

Enrollment Fee

Upon acceptance into a degree program, a \$150 enrollment fee must be paid to confirm enrollment. If a student cancels enrollment, the student may request a refund of the enrollment fee within three days after signing the enrollment agreement and making an initial payment.

Tuition Fee Payment

Please see the payment schedule in the Student Enrollment Agreement for dates and amounts due. The payment of tuition and all associated fees is the sole responsibility and obligation of the registering student. Tuition increases will be announced six months before taking effect.

Payment of tuition and fees can be made by credit card, personal check, electronic fund transfer (eCheck), wire transfer, or cash.

To pay by wire transfer, visit flywire.com/pay/digipen.

DigiPen accepts credit card payments (VISA, MasterCard, American Express, and Discover) online with a 2.75% convenience fee charge.

Separate payments are required for tuition and housing invoices. To process a credit card payment, the Office of Accounting will need:

- Student's full name
- Student's DigiPen ID number
- Credit card information
- Amount of payment

To process an electronic fund transfer or eCheck with no convenience fee, you will need:

- Bank routing number
- Bank account number

To pay online by eCheck or credit card, visit digipen.edu/departments/accounting/making-tuition-payments.

All payments made by personal check should be sent to:

DigiPen Institute of Technology
Office of Accounting: Accounts Receivable
9931 Willows Road NE
Redmond, WA 98052

Tuition*

The flat-rate fee structure at DigiPen is determined based on the number of credit hours the student takes per term. In order for an undergraduate student to complete the degree program in the typical four years, the student must take an average of 16-20 credits per semester, and two semesters per school year.

For the cohorts that began in 2011 or later, the current year's tuition rates are listed below.

2020-21 UNDERGRADUATE TUITION

CREDITS PER SEMESTER	U.S. CITIZENS AND RESIDENTS	NON-U.S. RESIDENTS
Fewer than 16	\$1,087/credit	\$1,206/credit
16-22 Credit Flat Rate	\$16,850	\$18,515

2020-21 GRADUATE TUITION

CREDITS PER SEMESTER	U.S. CITIZENS AND RESIDENTS	NON-U.S. RESIDENTS
Fewer than 12	\$1,170/credit	\$1,274/credit
12-18 Credit Flat Rate	\$14,040	\$15,185

Intensive English Preparatory courses are charged the undergraduate non-U.S. resident per credit hour rate for both graduate and undergraduate students.

**Tuition is subject to change with six months' notice.*

Students re-registering for a course that needs to be retaken must pay the regular course fees and are responsible for re-registering in the course.

Students auditing a course must pay the regular course fee.

Washington State Residency Policy

As of July 1, 2003, Washington state law changed the definition of "resident student." The law makes certain students, including international students, eligible for resident student status—and eligible to pay resident tuition rates—when they attend

public colleges and universities in this state. Although DigiPen Institute of Technology is a private college, it will honor this law under the same terms and conditions. Please note that the law does not make students eligible to receive need-based state or federal financial aid. International students who meet the following conditions and complete an affidavit/declaration/certification form found at: [digipen.edu/fileadmin/website_data/admissions/2012/Tuition_Affidavit_Form.pdf](https://www.digipen.edu/fileadmin/website_data/admissions/2012/Tuition_Affidavit_Form.pdf) may qualify for U.S. Citizen and Resident tuition rates at DigiPen:

1. Resided in Washington state for three years immediately prior to receiving a high school diploma, and completed the full senior year at a Washington high school; or
2. Completed the equivalent of a high school diploma and resided in Washington state for the three years immediately before receiving the equivalent of the diploma; or
3. Continuously resided in Washington state since earning the high school diploma or its equivalent.

Students must meet the above conditions and complete an affidavit/declaration/certification form found at: <https://www.digipen.edu/sites/default/files/public/docs/digipen-admissions-resident-tuition-affadavit-form.pdf>. Students must submit the original copy of the completed affidavit to the Office of Admissions. Faxed or emailed forms, or forms without an original signature, are not acceptable.

This policy came into effect September 21, 2009. Tuition Affidavit forms may not be retroactively applied to tuition payable prior to September 21, 2009.

Late Registration Fee

Students are responsible for registering for courses, and re-registering for courses that need to be retaken, each semester by the posted date. All late class registrations will cost an additional \$100 to cover administrative fees. Please refer to the *Academic Calendar* for academic deadlines.

Books and Supplies

Estimated cost for textbooks and supplies is \$1,050 per year. This cost is not included as a part of the cost of tuition.

Administrative Fee

This fee covers a limited number of transcript requests, add/drop requests, and enrollment verifications. This fee is \$50.00 per semester for all students.

Alumni Audit Fees

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.

Delinquent Account Fee

A monthly service fee of \$50 assessed on delinquent accounts. A student's account is considered delinquent if the student has a balance due on the first day of the month following the start of the semester.

Graduation Fee

There is no graduation fee. You will be notified of the cost of regalia at the time you submit your graduation application.

Name Change Fee

Students may submit two preferred name change at no cost. However, any preferred name change requests after the initial two will incur a \$75 fee to cover administrative and material costs. Reverting to current legal name or officially changing legal name will not incur a fee.

Replacement Diploma Fee

Replacement diplomas requested are processed at \$20.00 per diploma.

Technology Fee

This fee covers paper and toner for the student-use printers and maintenance costs associated with the upkeep of the equipment. This fee is \$50.00 per semester for all students.

Transcript Fee

Official transcripts are processed at \$5.00 per transcript. Unofficial transcripts are processed at \$3.00 per transcript. Transcript requests are free for current students.

Transfer and Waiver Fees

Course transfers and waivers for matriculated students are processed at \$25.00 per credit.

Course Fees

Some courses may require lab or material fees. Please refer to course descriptions on SRS.

Additional Courses

Students registered in an undergraduate degree program at DigiPen may register for graduate-level classes. Tuition for these credits will be assessed at the undergraduate rate.

Note: Please refer to the Master of Science in Computer Science degree program section and Master of Fine Arts in Digital Arts degree program section for more information about transfer credits at the graduate level.

Cancellation and Refund Policies

Cancellation Policies

- Applicants who have not visited the school prior to enrollment will have the opportunity to withdraw without penalty within three 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.
- All monies paid by an applicant who cancels must be refunded if requested within three days after signing an enrollment agreement and making an initial payment.
- An applicant requesting cancellation more than three days after signing an enrollment agreement and making an initial payment, but prior to entering the school (i.e., prior to attending classes on or after the start date as noted on the enrollment agreement), is entitled to a refund of all monies paid minus an enrollment fee of \$150.

Tuition Refund Schedule

A student who drops a course, who submits an official withdrawal in writing, or who is determined by the Institute to have withdrawn from the Institute shall be refunded as follows:

- Before the close of the 11th calendar day from the beginning of the semester: Students receive a 100% tuition refund.
- Before the close of the 12th calendar day through the 30th calendar day from the beginning of the semester: Students receive a 50% tuition refund.
- After the 30th calendar day from the beginning of the semester: Students are required to pay 100% of the tuition and no refund is available.

Except for the enrollment fee, all other assessed fees are refunded on the same schedule as tuition payments.

Tuition Account Reimbursement

REIMBURSEMENT REQUESTS

Except for excess Title IV federal student aid, any credit balance left on a student account is applied to future charges unless the student requests a reimbursement check by signing a Reimbursement Request Form. Excess Title IV federal funds are automatically released to the student and/or parent borrower under federal student aid regulations.

REIMBURSEMENT CHECK

A reimbursement check is made payable to the student, unless otherwise instructed by the student on the Reimbursement Request Form. A reimbursement check may be picked up from the Office of Accounting or mailed to the address specified on the Reimbursement Request Form. A reimbursement check may be issued within two to four weeks from the date the request

was received or the credit balance appeared on the student account, whichever is later.

INACTIVE STUDENT ACCOUNTS

Except for excess Title IV funds, any credit balance left on a student account that becomes inactive through graduation, withdrawal, or any other event is automatically reimbursed to the student within 60 days of the account's change of status. A reimbursement check is made to the student and mailed to the student's last-known billing address. If a student wishes to have the Institute return the credit balance to a lender of a federal or alternative student loan, the student must complete the appropriate paperwork with the Office of Financial Aid at the time of graduation or withdrawal from the Institute.

TERMINATION DATE

For refund purposes, the termination date for institutional withdrawal is the last date of actual attendance at the Institute by the student or the date of determination in accordance with the Institute's withdrawal policy. Similarly, the termination date for withdrawal from individual classes is the date of receipt of the appropriate withdrawal form. Notice of cancellation or withdrawal should be given by completing the appropriate withdrawal form, whether it is withdrawal from the Institute or from specific classes for which the student registered.

If the student's account remains delinquent for over 30 days, the Institute reserves the right to cancel the student's registration.

SPECIAL CASES

In the documented event of prolonged illness or accident, death in the family, or other special circumstances that make it impractical to complete the program in which the student is enrolled, the Institute shall make a settlement that is reasonable and fair to both parties. These will be determined on a case-by-case basis.

APPLICATION OF POLICY

Any monies due to the student shall be refunded within 60 days from the Date of Determination when the Institute determines that a student is considered as withdrawn or within 60 days from the receipt of payment or credit memo, in the event that the date of such receipt is occurred after the Date of Determination.

If a student's financial obligation is not fulfilled, the Institute is authorized to do the following until the owed monies are paid:

- Withhold the release of the student's academic records or any information based upon the records.
- Withhold the issuance of the student's transcripts.

DigiPen's Institutional Refund Policy operates independently from the Return of Title IV Funds Policy required for Title IV federal student aid recipients.

Financial Assistance

The Role of the Office of Financial Aid

The primary objective of the Office of Financial Aid is to assist students and their families in meeting basic educational costs. The Office of Financial Aid's goal is to provide financial assistance to eligible students by utilizing all federal, state, community, and on-campus resources for those who qualify. We strive to provide comprehensive information about all financial aid programs and to deliver student financial assistance in a timely and efficient manner.

DigiPen administers all financial aid programs in accordance with established federal, state, and institutional regulations and policies. Please contact the Office of Financial Aid or visit digipen.edu for the most up-to-date eligibility criteria and award amounts for the aid programs outlined below.

Who Can Apply

To be eligible to apply for financial aid at DigiPen, students must meet the following requirements:

- Be a citizen of the United States or an eligible non-citizen;
- Have a valid Social Security number;
- Be enrolled in a degree program
- Not owe a repayment on a grant or be in default on a student loan;
- Be registered with Selective Service, if required and if male;
- Be making Satisfactory Academic Progress (if a returning DigiPen student). For more information, please see the *Satisfactory Academic Progress* section.

Other types of financial aid, such as the Washington State Need Grant, Veterans Benefits, and Private Loans, have additional eligibility criteria.

How to Apply

To apply for financial aid, go to fafsa.gov and complete the Free Application for Federal Student Aid (FAFSA). The FAFSA will be available October 1 of each calendar year. Please be sure to include DigiPen Institute of Technology federal school code: 037243. It is important to file the FAFSA as early as possible so that the student's financial aid award can be finalized and the academic year can be planned. Please know that some funds

are limited and are awarded on a first-come, first-served basis. Applying early is advisable.

Types of Financial Aid

Financial aid is available to those who qualify.

Grants

Grants are a form of financial aid that do not need to be repaid and are ordinarily awarded on the basis of financial need.

FEDERAL PELL GRANT PROGRAM

The Federal Pell Grant program provides grants for low-income students. This need-based grant is awarded to undergraduate students who qualify and is based upon completion of the FAFSA. Grants can be used for tuition, fees, and living expenses. The grant amount depends on the family's financial need and on the student's enrollment status. Students who have already earned a bachelor's degree, master's degree, or other professional degree do not qualify for Pell Grants.

FEDERAL SUPPLEMENTAL EDUCATIONAL OPPORTUNITY GRANT (FSEOG)

The FSEOG program provides grants for students who demonstrate exceptional financial need. This need-based grant is awarded to undergraduate students who qualify and is based upon completion of the FAFSA. Funds are limited for the program, and grants are made to Pell Grant recipients first.

IRAQ AND AFGHANISTAN SERVICE GRANT (IASG)

The Iraq and Afghanistan Service Grant is a non-need-based grant available to any undergraduate student whose parent or guardian died as a result of military service in Iraq or Afghanistan after September 11, 2001. Recipients must either have been less than 24 years of age or enrolled in an institution of higher education at the time of their parent or guardian's death. If a student is not eligible for the Pell Grant, the IASG entitles the student to receive an amount equal to the maximum Pell Grant; if the student is eligible for a partial Pell grant, the IASG may qualify the student for an increase in funds up to the maximum Pell Grant.

Washington State Funding

Students who are residents of Washington state may qualify for the following based on their financial need.

WASHINGTON STATE NEED GRANT PROGRAM (WSNG)

The Washington State Need Grant helps the state's lowest-income undergraduate students pursue degrees, hone their skills, or retrain for new careers. Like the Pell Grant, this grant is dependent on the student's financial need. All eligible students who submit the FAFSA will be considered for this grant. Funds are limited in this program and eligible students are awarded

on a first-come, first-served basis. For a full list of eligibility requirements, visit digipen.edu/financial-aid.

COLLEGE BOUND SCHOLARSHIP

Students may use a Washington State College Bound Scholarship at DigiPen, which they applied for in grades 7 and 8 in high school. The scholarship amount will cover a percentage of tuition predetermined by the state. Please contact the Office of Financial Aid for specific amounts each year or refer to DigiPen's website.

OPPORTUNITY GRANT (WASHINGTON STATE)

The Opportunity Grant helps low-income adults reach the educational tipping point and beyond in high-wage, high-demand careers. This grant can be applied to tuition, fees, and up to \$1,000 per year for books and supplies. To qualify for this grant, students must demonstrate financial need based on their FAFSA and submit a separate Opportunity Grant application. Funds are limited in this program, and eligible students are awarded on a first-come, first-served basis. For eligibility requirements and a link to the application, visit digipen.edu/financial-aid.

STATE GRANT ASSISTANCE FROM OTHER STATES

There may be state grant availability to students who are residents of other states. Please check your state's local authorizing agency.

Scholarships

Scholarships are available to those who qualify.

Scholarships are a form of financial aid that do not need to be repaid. Scholarships can be awarded based on merit or financial need or a combination of both.

DIGIPEN SCHOLARSHIPS:

DigiPen offers need-based and merit-based scholarships. We are committed to helping students who exhibit financial need, and we recognize the importance of rewarding excellence. Some of DigiPen's scholarships require a separate application, so please visit our website for specific instructions at digipen.edu/financial-aid/scholarship-information/.

List of the scholarships DigiPen offers:

MERIT SCHOLARSHIP

For new undergraduate and graduate students who exhibit exceptionally strong academic performance and/or artistic or musical talent.

THE BRIDGE SCHOLARSHIP

For new undergraduate and graduate students who demonstrate considerable financial need.

JIM JOHNSON MEMORIAL SCHOLARSHIP

For new and continuing undergraduate and graduate students in either the BFA in Digital Art and Animation or MFA in Digital Arts programs who demonstrate talent, creativity, and a sense of adventure and courage in pursuit of a degree in digital art. This scholarship is offered once every four years.

CONTINUED STUDENT ACADEMIC SUCCESS SCHOLARSHIP

For continuing undergraduate and graduate students who demonstrate academic success during their time at DigiPen.

FINANCIAL STIMULUS SCHOLARSHIP

For continuing undergraduate and graduate students who demonstrate financial need.

CAMPUS LEADERSHIP SCHOLARSHIP

For continuing undergraduate and graduate students who have proven to be valued members of the DigiPen community by actively participating in campus organizations and activities.

Veterans Benefits

Selected programs of study at DigiPen Institute of Technology are approved by the Washington Student Achievement Council's State Approving Agency (WSAC/SAA) for enrollment of persons eligible to receive Veterans Affairs (VA) educational benefits. The following VA educational assistance benefits are available at DigiPen:

- Chapter 30 (Title 38, U.S. Code)—Montgomery GI Bill® for Active Duty and Veterans
- Chapter 32 (Title 38, U.S. Code)—Veterans Educational Assistance Program
- Chapter 33 (Title 38, U.S. Code)—Post 9/11 GI Bill®

DigiPen participates in the Yellow Ribbon program for those students who may be eligible.

- Chapter 35 (Title 38, U.S. Code)—Dependents of Disabled/Deceased Veterans
- Chapter 1606 (Title 10, U.S. Code)—Montgomery GI Bill® for National Guard & Selected Reserves

Eligibility for the various VA educational benefits programs is determined, in part, by the student's date of enlistment, and the student must be a degree-seeking student with a declared major at DigiPen. In all cases, the Department of Veterans Affairs makes the final determination of eligibility. Application forms for VA benefits are available at va.gov.

Prospective students who believe they might be eligible for VA educational benefits should contact DigiPen's Office of Financial Aid for more information and to begin the application process. The Office of Financial Aid may assist veterans in seeking

other sources of financial aid in addition to their VA educational benefits.

CERTIFICATION

In order to start the initial certification process, students will need to provide the School Certifying Official with a copy of their Certificate of Eligibility (obtained from the VA), copy of DD-214 (if a veteran), and complete DigiPen's VA Benefits Certification Request Form.

The Office of Financial Aid will send out an email with the VA Benefits Certification Request Form attached each semester for completion. Students will not be certified for the semester until the VA Benefits Certification Request Form is return, completed with all necessary signatures. Submitting the VA Benefits Certification Request Form indicates a student's interest in being certified for the semester as well as show the student's courses they are registered for count towards their degree progression.

VA BENEFITS & LATE CERTIFICATION

All chapter 31 or 33 VA students who have submitted a copy of their Certificate of Eligibility to the School Certifying Official by the first day of classes will not receive a late fee, be denied access to classes, libraries, or other institutional facilities, have their account frozen or be required to cover any VA covered portion of their financial obligation due to delayed disbursement funding from the VA.

Loans

Loans are a form of financial aid that is borrowed and that must be repaid. An education loan is money borrowed to pay educational expenses.

FEDERAL DIRECT LOAN PROGRAM

This program is also referred to as the William D. Ford Federal Direct Loan Program. Eligible students and parents borrow directly from the U.S. Department of Education. Direct Loans consist of Subsidized and Unsubsidized Loans, Federal Direct PLUS Loans and Federal Direct Consolidation Loans. DigiPen Institute of Technology awards these loans, but students and parents repay them directly to the federal government.

DIRECT SUBSIDIZED LOANS

This is a fixed interest loan awarded to undergraduate students based on financial need. This loan is subsidized, meaning the interest is paid by the federal government during enrollment and other eligible periods. Interest on this loan begins to accrue once the student graduates, leaves school, or enrolls as less than a half-time student. Direct subsidized loans for students who are a first-time borrower on or after July 1, 2013, may only be able to borrow up to 150% of the published length of their program. This is called the maximum eligibility period. For most students this means that they can borrow subsidized loans for 6 years. This eligibility can also be affected based on transferring programs.

FEDERAL DIRECT UNSUBSIDIZED LOANS

This is a fixed interest loan awarded to undergraduate and graduate students regardless of financial need.

This loan is unsubsidized during enrollment. Students can opt to either pay the interest as it accrues, or defer payment, in which case the interest is capitalized.

FEDERAL DIRECT PARENT LOAN FOR UNDERGRADUATE STUDENTS (DIRECT PLUS LOANS)

This is a fixed interest loan parents can obtain for their dependent undergraduate students. These loans are unsubsidized, non-need-based loans awarded to parents of dependent undergraduate students. PLUS loans can cover a large portion of educational costs. The borrower must not have adverse credit history.

FEDERAL DIRECT GRADUATE PLUS LOANS

This is a fixed interest loan awarded to graduate students. This loan can cover a large portion of educational costs. The borrower must not have adverse credit history.

PRIVATE LOANS

Private Education Loans, also known as Alternative Education Loans, are student loans offered by private banks or other financial institutions. These loans are credit-based and may have variable interest rates. DigiPen Institute of Technology does not participate in any preferred lender arrangements, nor does it endorse any lenders.

Enrollment Requirements for Financial Aid Eligibility

Full-time enrollment for traditional undergraduate students consists of 12 or more credits per semester. For graduate students, it is nine or more credits per semester or as required for the program. Undergraduate and graduate students must be enrolled at least half-time in order to be eligible for federal loans. Changes in a student's enrollment may require an adjustment and/or repayment of financial aid funds that have been awarded.

Study Abroad for Federal Student Aid Eligibility

DigiPen does not offer study abroad programs that are eligible for Federal Student Aid at this time.

DigiPen's Financial Aid Code of Conduct

In response to the enactment of the Higher Education Opportunity Act in August of 2008, DigiPen's Office of Financial Aid has adopted the following NASFAA (National Association of Student Financial Aid Administrators) Code of Conduct to help ensure ethical behavior and the highest level of professional practices. All DigiPen staff members responsible for the administration of federal and private educational loans are subject to these guidelines.

NASFAA STATEMENT OF ETHICAL PRINCIPLES

The primary goal of the financial aid professional is to help students achieve their educational goals through financial support and resources. NASFAA members are required to exemplify the highest level of ethical behavior and demonstrate the highest level of professionalism. The following guidelines were last updated by NASFAA's Board of Directors in March 2014.

We, financial aid professionals, declare our commitment to the following Statement of Ethical Principles.

Financial aid administrators shall:

Advocate for students

Remain aware of issues affecting students and continually advocate for their interests at the institutional, state and federal levels.

Support federal, state and institutional efforts to encourage students, as early as the elementary grades, to aspire to and plan for education beyond high school.

Manifest the highest level of integrity

Commit to the highest level of ethical behavior and refrain from conflict of interest or the perception thereof.

Deal with others honestly and fairly, abiding by our commitments and always acting in a manner that merits the trust and confidence others have placed in us.

Protect the privacy of individual student financial records.

Promote the free expression of ideas and opinions, and foster respect for diverse viewpoints within the profession.

Support student access and success

Commit to removing financial barriers for those who want to pursue postsecondary learning and support each student admitted to our institution.

Without charge, assist students in applying for financial aid funds.

Provide services and apply principles that do not discriminate on the basis of race, gender, ethnicity, sexual orientation, religion, disability, age, or economic status.

Understand the need for financial education and commit to educate students and families on how to responsibly manage expenses and debt.

Comply with federal and state laws

Adhere to all applicable laws and regulations governing federal, state, and institutional financial aid programs.

Actively participate in ongoing professional development and continuing education programs to ensure ample understanding of statutes, regulations, and best practices governing the financial aid programs.

Encourage colleagues to participate in the financial aid professional associations available to them at the state, regional, or national level and offer assistance to other aid professionals as needed.

Strive for transparency and clarity

Provide our students and parents with the information they need to make good decisions about attending and paying for college.

Educate students and families through quality information that is consumer-tested when possible. This includes (but is not limited to) transparency and full disclosure on award notices.

Ensure equity by applying all need-analysis formulas consistently across the institution's full population of student financial aid applicants.

Inform institutions, students, and parents of any changes in financial aid programs that could affect their student aid eligibility.

Protect the privacy of financial aid applicants

Ensure that student and parent private information provided to the financial aid office by financial aid applicants is protected in accordance with all state and federal statutes and regulations, including FERPA and the Higher Education Act, Section 483(a)(3) (E) (20 U.S.C. 1090).

Protect the information on the FAFSA from inappropriate use by ensuring that this information is only used for the application, award, and administration of aid awarded under Title IV of the Higher Education Act, state aid, or aid awarded by eligible institutions.

NASFAA CODE OF CONDUCT FOR INSTITUTIONAL FINANCIAL AID PROFESSIONALS

The following Code of Conduct was last updated by NASFAA's Board of Directors in March 2014. Institutional members of NASFAA will ensure that:

1. No action will be taken by financial aid staff that is for their personal benefit or could be perceived to be a conflict of interest.
 - a. Employees within the financial aid office will not award aid to themselves or their immediate family members. Staff will reserve this task to an institutionally designated person, to avoid the appearance of a conflict of interest.
 - b. If a preferred lender list is provided, it will be compiled without prejudice and for the sole benefit of the students attending the institution. The information included about lenders and loan terms will be transparent, complete, and accurate. The complete process through which preferred lenders are selected will be fully and publicly disclosed. Borrowers will not be auto-assigned to any particular lender.
 - c. A borrower's choice of a lender will not be denied, impeded, or unnecessarily delayed by the institution, even if that lender is not included on the institution's preferred lender list.
 - d. No amount of cash, gift, or benefit in excess of a de minimis amount shall be accepted by a financial aid staff member from any financial aid applicant (or his/her family), or from any entity doing business with or seeking to do business with the Institute (including service on advisory committees or boards beyond reimbursement for reasonable expenses directly associated with such service).
2. Information provided by the Office of Financial Aid is accurate, unbiased, and does not reflect preference arising from actual or potential personal gain.
3. Institutional award notifications and/or other institutionally provided materials shall include the following:
 - a. A breakdown of individual components of the institution's Cost of Attendance, designating all potential billable charges.
 - b. Clear identification of each award, indicating type of aid, i.e. gift aid (grant, scholarship), work, or loan.
 - c. Standard terminology and definitions, using NASFAA's glossary of award letter terms.
 - d. Renewal requirements for each award.
4. All required consumer information is displayed in a prominent location on the institutional web site(s) and in any printed materials, easily identified and found, and labeled as "Consumer Information."

5. Financial aid professionals will disclose to their institution any involvement, interest in, or potential conflict of interest with any entity with which the institution has a business relationship.

DigiPen Institute of Technology does not and will not provide any commission, bonus, or other incentive payment based directly or indirectly on success in securing enrollment or financial aid to any persons or entities engaged in any student recruiting or admissions activities or in making decisions regarding the award of student financial assistance.

Drug Convictions and Financial Aid Eligibility

A federal or state drug conviction can disqualify a student for Federal Student Aid funds. Convictions count against a student for an offense that occurred during a period of enrollment for which the student was receiving Federal Student Aid. Drug or other convictions can also disqualify students for DigiPen institutional scholarships and grants.

Please refer to the *Policies and Consumer Information* section at: digipen.edu/financial-aid.

Student Affairs

The Office of Student Affairs provides services to all degree-seeking students in order to support their academic, professional, and personal development. The Student Handbook provides information on the services and procedures that a student will need in their life at DigiPen and beyond, including:

- » Academic Advising
- » Academic Support Lab
- » Alumni Services
- » Campus Life
- » Dining Services
- » Housing
- » Lockers
- » Parking/Transportation
- » Career Services
- » Counseling Services
- » Disability Support Services
- » International Student Services
- » Student Activities & Organization
- » Student Programs
- » First-Year Seminar
- » Graduation
- » New Student Orientation

The sections below detail some aspects of the services provided by the Office of Student Affairs.

Student Advising

DigiPen Institute of Technology has adopted a dual advising system for students. Each student is assigned both a Student Success Advisor and a Faculty Mentor upon matriculation at DigiPen.

Student Success Advisors are full-time Student Affairs staff members who specialize in supporting students through setting and working towards academic goals. Students should see their Student Success Advisors about issues related to academic and school policies, scheduling and course selection, Course Registration Override Request forms, alternate schedules, degree audits and graduation, classroom success, mentoring, and referrals to other resources.

The Faculty Mentor is either a full-time faculty member within the students' degree program, or a full-time staff or faculty member familiar with the students' program. Students should meet with their Faculty Mentor to discuss career advising and further technical skill development towards their field of study.

It is recommended that students meet with both their Student Success Advisor and Faculty Mentor at least once a year and

when applying for graduation. This ensures that students are enrolling in the correct classes and are making satisfactory academic progress through their degree program. For additional advising information, please contact studentsuccess@digipen.edu.

Academic Support Lab

Peer tutoring is available for most 100 and 200 level courses in the Academic Support Lab. For further information please contact studentsuccess@digipen.edu.

Career Services

DigiPen's Career Services staff provides a variety of resources for matriculated 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 industry professionals, online tools and on-campus facilities to connect students with prospective employers, and professional development workshops. Additionally, students have access to one-on-one appointments with a Career Services staff member to review application materials (e.g., resumes, cover letters, websites) and discuss various career development strategies.

The Career Services staff coordinates a variety of on-campus events for students. For example, Career Services arranges for recruiters to meet with all students to offer insight into their companies, review resumes and student work, and interview potential hires at weekly Company Day presentations. Career Services also hosts an annual Career Fair every spring semester for all graduating students to showcase their projects and portfolios to employers and recruiters from across the country. Additionally, Career Services hosts an annual Internship Fair for students interested in internship opportunities. DigiPen's Career Services staff also works closely with faculty to host guest lectures by industry professionals on campus.

DigiPen's Career Services staff establishes relationships with potential employers and maintains an online Job Portal for students and alumni. The Career Services staff also posts available job and internship opportunities for students and alumni. DigiPen attends industry events, such as the Game Developers Conference, to promote the Institute's programs and students. The Career Services staff also posts available job and internship opportunities for students and alumni through exclusive and active social networking groups.

For further information, please email the Career Services staff at careerservices@digipen.edu. Please note that employment upon graduation is not guaranteed, nor is DigiPen obligated to secure employment on behalf of students.

Disability Support Services

DigiPen Institute of Technology ("DigiPen") is committed to providing equal access to all of its programs, courses, activities, events, and services. As required by the Americans with Disabilities Act of 1990 (the "ADA") as amended and Section 504 of the Rehabilitation Act of 1973 (P.L. 93-112) as amended (P.L. 93-16), DigiPen will provide reasonable accommodations to qualified students with disabilities.

DigiPen's Disability Support Services Office ("DSS Office") and its staff are appointed by the President of DigiPen to practice the authority to review student documentation and determine the needs for any reasonable accommodations to be provided by DigiPen to ensure equal access. 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.

DSS Office staff will engage in a collaborative effort with students to assure equal access for students with disabilities. The DSS Office will also work with departments, faculty, and staff in the broader DigiPen community to prevent and eradicate discrimination on the basis of disability.

Current and prospective students who would like more information on DSS should contact the DSS Office at dss@digipen.edu.

Counseling Services

DigiPen Counseling Center provides resources to students dealing with a variety of personal issues, from short-term individual counseling to crisis intervention. All services offered by the DigiPen Counseling Center are overseen by Washington state-licensed mental health counselors and are completely free to DigiPen students. Current and prospective students who would like more information on DigiPen's counseling services should contact the center by emailing counseling@digipen.edu or calling (425) 629-5015.

Alumni Relations

The Institute maintains a database of all graduates, and DigiPen alumni are encouraged to report back regarding changes to their professional status. DigiPen hosts annual alumni events at the Game Developers Conference and PAX, as well as other networking and community building events for alumni to connect with one another. DigiPen 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 10 calendar years

of graduation. Participating alumni must review and sign an Alumni Audit Enrollment Agreement prior to attending courses.

Housing

The following services are available to assist students with relocation and housing:

DIGIPEN HOUSING LLC

DigiPen Housing LLC (“DHL”) offers a Residence Life Program with apartment-style housing each year to a limited number of first-year and continuing DigiPen students. Assignments are based on application deadlines and availability. DHL does not guarantee housing for all applicants; deposits will be returned if space is not available. Application deadlines, costs and a list of amenities are available at digipen.edu/housing.

OTHER HOUSING OPTIONS

For students not seeking housing through DHL, DigiPen offers the following housing resources:

RELOCATION RESOURCES

DigiPen offers multiple guides and resources regarding apartment living and relocating to Redmond, including a “Moving to Redmond Checklist,” “Redmond Relocation Guide,” and a sample roommate agreement. These resources can be accessed in the “OFF-CAMPUS LIVING RESOURCES” section of the DHL website at digipen.edu/housing.

Regulation of Conduct and Disciplinary Procedures

DigiPen Institute of Technology is an academic institution that strives to ensure all students have a safe and effective learning environment free of harassment, which supports collaborative and cooperative education. To this end, students will comport themselves in a professional manner when dealing with instructors, faculty, administrators, and/or other students. They are expected to dress and manage personal hygiene in a way that does not cause undue offense to other students, faculty, or staff of the Institute, and to refrain from verbal or physical intimidation of others. 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.

Code of Student Conduct

The Code of Student Conduct is to embody the mission and the core values of DigiPen Institute of Technology through actions and behaviors, and adhere to campus policies and procedures.

This Code applies to all undergraduate students, all graduate students, and all students participating in academic or professional programs on campus. The Code generally applies to conduct that occurs on DigiPen’s campus or at DigiPen-related events and activities. Behavior conducted off-campus may also result in disciplinary action against students when, in the judgment of DigiPen’s administration, the conduct is considered in violation of the Code. The Code requires students to cooperate with a reasonable request by DigiPen staff or faculty members (or emergency response or law enforcement personnel) acting in good faith and within the scope of their duties, including but not limited to, failure to cease the prohibited conduct, failure to produce identification, or interference with or failure to cooperate with an investigation by DigiPen.

Students are responsible for being informed about DigiPen Institute of Technology’s Code of Student Conduct. DigiPen reserves the right without prior notice to change the rules, policies, or information in the Code of Student Conduct. New policies will be enforced 24 hours after notification of the change to students through email.

DigiPen Institute of Technology adheres to the belief that students learn and develop by taking responsibility for their actions. The disciplinary process is designed to help students understand how to succeed and recognize their impact as a part of a larger community. These skills are vital to becoming a professional leader in any industry. The Chief Operating Officer or designee and Student Affairs administration, acting on behalf of DigiPen Institute of Technology, determine whether or not

an incident warrants disciplinary action. For further information regarding rules, regulations, policies governing student actions, the disciplinary process, and appeals process, please refer to the DigiPen Institute of Technology Student Handbook. The Student Handbook can be found online or a copy can be retrieved from the Office of Student Affairs.

Academic Dishonesty

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 should not 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.

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.

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.

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.

Disciplinary Process

1. Student Affairs is notified of the alleged student misconduct.
2. Student Affairs will gather information to determine if the allegations are warranted, what, if any, policies were violated, and the extent of the violations.
3. Student Affairs 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 Affairs.
5. Based on the severity of the alleged violation, a Student Affairs Officer will determine during the meeting if the student will have the disciplinary meeting with:
 - a. Student Affairs 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).
 - c. The Appeals and Disciplinary Committee consists of faculty, staff, and students 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, Student Affairs or the Appeals and Disciplinary Committee will determine the appropriate sanction, which can include, but is not limited to, community service, a failing grade, or expulsion from DigiPen.
8. The student will be notified in writing of the decision and of any possible sanctions.
9. Student Affairs 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 Dean of Students.

Warnings

1. The penalty for plagiarism or for cheating is normally suspension from the Institute.
2. Charges filed under federal or state law or the commencement of civil 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. Withdrawal from the Institute for a specified period of time or indefinitely. Students will not receive credit for courses taken at another institution during a withdrawal.
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 (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 (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 (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 (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 (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 students who:

- a. Fail to maintain satisfactory Pace.
- b. Fail to maintain the minimum required cumulative GPA of 2.0 or 3.0 in undergraduate and graduate programs, respectively, while on Academic Warning.
- c. Fail to pass a class on the 4th attempt.
- d. Fail to complete their program within 1.5 times the credit hours required to complete the program.
- e. Violate the attendance policy.
- f. Violate the Code of Student Conduct and DigiPen's policies.

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. In the event of dismissal, tuition and fees, if any, shall be refunded in accordance with the refund schedule, as it may be amended from time to time.

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.

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.

General Information Regarding 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 within the industry.
- 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.

More detailed information about student internships can be found in the Internship Guidelines available in the Office of Career and Alumni Development.

Change of Major and Graduation

Requesting a Change of Major

To apply for a change of major, the following steps must be completed:

1. Submit a Request for Change of Major through the Student Record System portal. The Office of Admissions will print an unofficial grade report to include with the Change of Major Application.
2. Request a meeting with your Student Success Advisor and Financial Aid Advisor.
 - » Applicants who are a recipient of federal financial aid could potentially lose some or all of their financial aid eligibility by changing majors. Students considering a change of major must meet with the Office of Financial Aid.
 - » Students considering a change of major must meet with their Student Success Advisor to determine what changes need to be made to their schedules or recommended course sequences.
3. 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.
4. Submit any additional materials required for the degree program to which you would like to change. This information is available at digipen.edu/academics/change-of-major/

Art portfolios should be submitted in hard copy or electronic format, as originals will not be returned. Detailed information about additional materials and the change of major process can be accessed online at digipen.edu/academics/change-of-major/

Once meetings are completed and all relevant materials have been received, the application will be sent to evaluation. The student will be contacted by the Program Director for a meeting regarding the change of major request. Once the decision is finalized, a decision will be sent via email. Students approved for a change of major will be emailed an Enrollment Agreement corresponding to their new program. The student must either sign this agreement electronically through DocuSign or print, sign, and return it to the Office of Admissions before the change can take effect.

IMPORTANT INFORMATION REGARDING CHANGE OF MAJOR REQUESTS

- Changes of major will only take effect on the first day of the next semester during which the student is enrolled in courses. To be considered, requests must be submitted at least fifteen working days before the end of the current semester; requests submitted after the deadline may be considered for the semester following the next semester or canceled. Specific deadlines for submitting a Request for Change of Major form are listed on the Academic Calendar.
- Students requesting a change of major should remember to consider add/drop deadlines. Requesting a change of major does not exempt students from the add/drop policies at DigiPen.
- Students may register for courses in any major prior to the deadline for adding a course but it is recommended that they speak with their Student Success Advisor and Program Director if they have not yet had their request for change of major approved.
- Students considering a change of major should speak to the degree program faculty if they have specific questions about the differences between programs. Any questions about the status of a request for change of major or about this process should be directed to the Office of Admissions or to the Office of Student Affairs.

Graduation Requirements

Degrees will be granted at the end of the semester in which students complete:

1. All program course requirements and minimum number of credits required for their program within 1.5 times the attempted credits.
 - a. 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 to complete the program. 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.
2. GPA and Pace requirements for graduation.
 - a. All undergraduate students must have a cumulative GPA of at least 2.0 to graduate.
 - b. All graduate students have a cumulative GPA of 3.0 to graduate.

3. Fulfillment of financial aid obligations to the school.

Note: 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.

Applying for Graduation

The Institute sets minimum requirements for all students seeking undergraduate degrees. DigiPen 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 DigiPen. 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 Student Success Advisor and/or the Office of the Registrar. Students are responsible for notifying the Office of the Registrar of any changes in their proposed programs and for resolving any questions prior to registering for their final term at DigiPen.

All Incomplete grades and conditions affecting graduation must be removed from the student’s record by the last regular class period of the term. All credit course work affecting graduation must be completed by the regular class period of the term. A letter of instruction is mailed to degree candidates in March 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 Office of the Registrar.

Graduation Application Process

GRADUATION DATE	GRADUATION APPLICATION DUE DATE
April	December 1
July	April 1
December	July 1

1. The student completes the Graduation Application and submits the \$100 graduation fee by the deadlines stated in the table above.
2. The Student Success Advisor or administrator will review the most recent transcript or degree plan to verify progress and will notify the student 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 Office of the Registrar informed of address changes so that degrees will be mailed to the correct address.

Graduating with Academic Honors

DigiPen Institute of Technology recognizes and commends students whose cumulative GPA indicates distinguished academic accomplishment upon the completion of the program.

Graduate students who graduate with a cumulative GPA of 3.7 or above are recognized as Graduating with Distinction.

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.

Family Educational Rights and Privacy Act (FERPA)

Students' Rights to Their Academic Records

The Family Educational Rights and Privacy Act (FERPA) affords eligible students certain rights with respect to their education records. (An "eligible student" under FERPA is a student who is 18 years of age or older or who attends a postsecondary institution at any age.) These rights include:

1. The right to inspect and review the student's education records within 45 days after the day the Institute receives a request for access. A student should submit to the Office of the Registrar, Dean, or head of the academic department a written request that identifies the record(s) the student wishes 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, misleading, or otherwise in violation of the student's privacy rights under FERPA.

A student who wishes to ask the school to amend a record should write the school official responsible for the record, clearly identify the part of the record the student wants changed, and specify why it should be changed.

If the Institute decides not to amend the record as requested, the Institute will notify the student in writing of the decision and the student's 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 provide written consent before the Institute discloses personally identifiable information (PII) from the student's education records, except to the extent that FERPA authorizes disclosure without consent.

The Institute discloses education records without a student's prior written consent under the FERPA exception for disclosure to school officials with legitimate educational interests. A school official typically includes a person employed by the Institute in an administrative, supervisory, academic, research, or support staff position (including law enforcement unit personnel and health staff); a person serving on the Board of Trustees; or a

student serving on an official committee, such as a disciplinary or grievance committee. A school official also may include a volunteer or contractor outside of the Institute who performs an institutional service or function for which the school would otherwise use its own employees and who is under the direct control of the school with respect to the use and maintenance of PII from education records, such as an attorney, auditor, or collection agent or a student volunteering to assist another school official in performing his or her tasks. A school official typically has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibilities for the Institute.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the Institute to comply with the requirements of FERPA. The name and address of the office that administers FERPA is:

Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue, SW
Washington, DC 20202

See the list below of the disclosures that postsecondary institutions may make without consent.

FERPA permits the disclosure of PII from students' education records, without consent of the student, if the disclosure meets certain conditions found in § 99.31 of the FERPA regulations. Except for disclosures to school officials, disclosures related to some judicial orders or lawfully issued subpoenas, disclosures of directory information, and disclosures to the student, § 99.32 of FERPA regulations requires the institution to record the disclosure. Eligible students have a right to inspect and review the record of disclosures. A postsecondary institution may disclose PII from the education records without obtaining prior written consent of the student —

- To other school officials, including teachers, within DigiPen whom the school has determined to have legitimate educational interests. This includes contractors, consultants, volunteers, or other parties to whom the school has outsourced institutional services or functions, provided that the conditions listed in § 99.31(a)(1)(i)(B)(1) - (a)(1)(i)(B)(3) are met. (§ 99.31(a)(1))
- To officials of another school where the student seeks or intends to enroll, or where the student is already enrolled if the disclosure is for purposes related to the student's enrollment or transfer, subject to the requirements of § 99.34. (§ 99.31(a)(2))
- To authorized representatives of the U. S. Comptroller General, the U.S. Attorney General, the U.S. Secretary of Education, or State and local educational authorities, such as a State postsecondary authority that is responsible for supervising the university's State-supported education programs. Disclosures under this provision may be made,

subject to the requirements of §99.35, in connection with an audit or evaluation of Federal- or State-supported education programs, or for the enforcement of or compliance with Federal legal requirements that relate to those programs. These entities may make further disclosures of PII to outside entities that are designated by them as their authorized representatives to conduct any audit, evaluation, or enforcement or compliance activity on their behalf. (§§ 99.31(a)(3) and 99.35)

- In connection with financial aid for which the student has applied or which the student has received, if the information is necessary to determine eligibility for the aid, determine the amount of the aid, determine the conditions of the aid, or enforce the terms and conditions of the aid. (§ 99.31(a)(4))
- To organizations conducting studies for, or on behalf of, the school, in order to: (a) develop, validate, or administer predictive tests; (b) administer student aid programs; or (c) improve instruction. (§ 99.31(a)(6))
- To accrediting organizations to carry out their accrediting functions. (§ 99.31(a)(7))
- To parents of an eligible student if the student is a dependent for IRS tax purposes. (§ 99.31(a)(8))
- To comply with a judicial order or lawfully issued subpoena. (§ 99.31(a)(9))
- To appropriate officials in connection with a health or safety emergency, subject to § 99.36. (§ 99.31(a)(10))
- Information the school has designated as "directory information" under § 99.37. (§ 99.31(a)(11))
- To a victim of an alleged perpetrator of a crime of violence or a non-forcible sex offense, subject to the requirements of § 99.39. The disclosure may only include the final results of the disciplinary proceeding with respect to that alleged crime or offense, regardless of the finding. (§ 99.31(a)(13))
- To the general public, the final results of a disciplinary proceeding, subject to the requirements of § 99.39, if the school determines the student is an alleged perpetrator of a crime of violence or non-forcible sex offense and the student has committed a violation of the school's rules or policies with respect to the allegation made against him or her. (§ 99.31(a)(14))
- To parents of a student regarding the student's violation of any Federal, State, or local law, or of any rule or policy of the school, governing the use or possession of alcohol or a controlled substance if the school determines the student committed a disciplinary violation and the student is under the age of 21. (§99.31(a)(15))

Release of Student Directory Information

The Family Educational Rights and Privacy Act (FERPA) of 1974 protects the privacy of students' education records. However, the following information is considered public or directory information and may be released to anyone unless a student informs the Office of the Registrar that the student does not wish any information released:

1. Name
2. Primary telephone number
3. Institute email address (*This is a DIT policy, whereas FERPA does not limit to institute emails only.*)
4. Major field of studies
5. Dates of attendance
6. Degrees and awards received
7. Full-time or part-time enrollment status
8. Number of credits for which a student is registered each semester.
9. Educational institutions attended

Declining Release of Information

If a student does not wish to have the Institute release any directory information and/or does not want directory information to appear in any published or electronic student directory, the student may restrict access through SRS. No information will be released on students or to students who have restricted release of directory information, including degrees awarded and dates of attendance.

Allowing Release of Information

If a student restricted the release of directory information and now wishes to allow this information to be released, the student must go to the Office of the Registrar and present photo identification and a completed and signed Release/Restrict of Directory Authorization form.

Faculty Roster

Rosters

Management

TITLE	NAME
Founder, President and Chief Executive Officer	Claude Comair
Chief Operating Officer, International	Jason Chu
Chief Operating Officer	Christopher Comair
Chief Financial Officer	John Bauer
Co-Founder, Senior Executive Vice President	Michele Comair
Senior Vice President	Raymond Yan
Chief Technology Officer, International	Samir Abou Samra
Senior Vice President and Chief Technology Officer, Asia-Pacific	Prasanna Ghali
Senior Vice President of Academic Affairs	Xin Li
Senior Vice President of Facilities Management	Melvin Gonsalvez
Senior Vice President, External Affairs	Angela Kugler
Vice President of Software Production	Ben Ellinger
Dean of Faculty	Erik Mohrmann
Vice President of Institutional Advancement and Strategic Initiatives	Charles Duba
Executive Director, Institutional Effectiveness	Mandy Wong

Academic Leadership

NAME	POSITION
Xin Li	Senior Vice President of Academic Affairs
Erik Mohrmann	Dean of Faculty
Jen Sward	Associate Dean of Instruction
Vanessa Hemovich	Assistant Dean of Faculty Development
Marshall Traverse	Dean of Students
Prasanna Ghali	Program Director - Bachelor of Science in Computer Science in Real-Time Interactive Simulation
Benjamin Ellinger	Program Director - Bachelor of Science in Computer Science and Game Design
Lawrence Schwedler	Program Director - Bachelor of Science in Computer Science and Digital Audio
Barnabus Bede	Program Director - Bachelor of Science in Computer Science in Machine Learning
Prasanna Ghali	Program Director - Bachelor of Science in Computer Science
Jeremy Thomas	Program Director - Bachelor of Science in Computer Engineering
Jazno Francoeur	Program Director - Bachelor of Fine Arts in Digital Art and Animation
Jeremy Holcomb	Program Director - Bachelor of Arts in Game Design
Lawrence Schwedler	Program Director - Bachelor of Arts in Music and Sound Design
Dmitri Volper	Program Director - Master of Science in Computer Science
Mark Henne	Program Director - Master of Fine Arts in Digital Art

Department of Computer Science

NAME	DEGREE	INSTITUTION
Pushpak Karnick*	B.Eng in Computer Engineering PhD in Computer Science	University of Pune Arizona State University
Claude Comair	Le diplome d'ingenier Archit. M. Eng	L'Universite Du Saint Esprit (Lebanon) Osaka University (Japan)
Christopher Comair	BS in Real-Time Interactive Simulation	DigiPen Institute of Technology
Xin Li	BS in Computer Science MS in Computer Science PhD in Computer Science	Northwest University (P.R. of China) Academic Sinica (P.R. of China) University of Central Florida
Jason Hanson	MS in Physics MA in Mathematics PhD in Mathematics	University of Virginia Columbia University University of Hawaii
Matthew Mead	BS in Computer Science MS in Computer Science	Portland State University Portland State University
Gary Herron	BA in Mathematics PhD in Mathematics	Northern Michigan University University of Utah
Steven Rabin	BS in Computer Engineering MS Computer Science	University of Washington University of Washington
Dmitri Volper	BS in Mathematics and Computer Science MS in Math and Computer Info Science PhD in Mathematics	Omsk State University Syracuse University, NY Syracuse University, NY
Ola Amayri	BS in Computer Engineering MS in Information Systems Security PhD in Electrical & Computer Engineering	Jordan University, Jordan Concordia University, Canada Concordia University, Canada
Antoine Abi Chacra	BS in Real Time Interactive Simulation MS in Computer Science	DigiPen Institute of Technology DigiPen Institute of Technology
Joshua Davis	MS in Computer Science	DigiPen Institute of Technology

Department of Electrical and Computer Engineering

NAME	DEGREE	INSTITUTION
Jeremy Thomas*	BA in Physics MS in Physics PhD in Earth and Space Sciences	Bard College University of Washington University of Washington
Blanca Villarreal Guerra	PhD in Information Technologies	Instituto Tecnologico, Monterrey
Christian Hassard	BS in Electronics Engineering PhD in Information and Communications Technologies	Instituto Tecnologico, Hermosillo Instituto Tecnologico, Monterrey
Christopher Theriault	BS Computer Engineering	DigiPen Institute of Technology

Department of Animation and Production

NAME	DEGREE	INSTITUTION
Dan Daly*	BA in English	Whitman College
Jazno Francoeur	BFA in Illustration	Kansas City Art Institute
Peter Moehrle	Associate Degree in Fine Art	Ontario College of Art
Antony De Fato	BA in Art BSHE in Housing Design	University of Missouri University of Missouri
Pamela Mathues	BFA in Illustration/Fine Art	Columbus College of Art and Design
Christopher Mosio	BA in Cinema/Television Production	University of Southern California
Richard Morgan	BFA in Fine Art/Illustration	Ringling College of Art and Design
Matthew Brunner	BFA in Studio Arts MS in Visualization Science	University of Colorado Texas A&M University
Bradley Bradbury	BFA in Illustration MFA in 3D Animation	Kansas City Art Institute, Kansas City, Academy of Art University
Richard Sullivan	BA in Art	University of Washington

Department of Fine Arts

NAME	DEGREE	INSTITUTION
Robert Kmiec*	BFA in Illustration, Master of Arts in Illustration	Massachusetts College of Art Syracuse University, Independent Study D
Alecia Rossano	BA in Studio Art MFA in Sculpture	Scripps College New York Academy of Art
John Thacker	BFA in Production Animation	DigiPen Institute of Technology
Douglas Parry	BFA in Printmaking MFA in Fine Arts Painting	University of Washington Pratt Institute, Brooklyn, NY
Michael Lorefice	BA in Political Science MFA in Studio Arts	Colgate University Memphis College of Art
Steffon Moody	BFA in Painting	Washington University, St. Louis
Kenneth Turner Jr	Associative Arts	Peninsula Community College
Bill Hooper	BFA in Fine Arts	Maryland Institute College of Art
Ryan Finnerty	BFA in Painting MFA in Drawing and Painting	Savannah College of Art and Design University of Washington
Randi Ganulin	BFA in Communication Design MFA in Fine Art/Photography and Mixed Media	Otis College of Art and Design Otis College of Art and Design
Michael Longo	BFA in Illustration	Pratt Institute, NYC
Lisa Dyson-Meighan	Bachelor of Architecture	Oregon School of Design

Department of Digital Arts

NAME	DEGREE	INSTITUTION
Alain Schneuwly*	Diploma, Computer Analyst and Programmer Federal Diploma of Commerce Certificate of Recommendation in 3D Computer Graphics Animation and 3D Design	IEPIGE (Switzerland) Superior Commercial School (Switzerland) Vancouver Film School/DigiPen Applied Computer Graphics School
Matthew Dudley	BFA in Illustration	Cornish College of the Arts
Suzanne Kaufman	BA in Art	University of Wisconsin
Douglas Magruder	Associates of Arts and Animation	Art Institute of Seattle
John Andrist	BFA in Production Animation	DigiPen Institute of Technology
Brigitte Aline Samson	BA in Visual Arts Associate Degree in Flute	University of Quebec, Montreal College of Music Vincent D Indy, Outremo
Mark Henne	BS in Computer Science MS in Computer Science	University of New Mexico University of California, Santa Cruz
Mark Nelson	BFA in Painting and Drawing MFA in Painting and Drawing	Art Institute of Chicago University of Washington
Randy Briley	BFA in Visual Communications	Northern Arizona University
Christopher Poplin	BA in Motion Picture Technology	University of Central Florida
Floyd Bishop	BFA in Communication Design	Kutztown University
Kamal Siegel	AAA in Computer Animation	Art Institute of Seattle
Ronald Kury	BFA in Production Animation	DigiPen Institute of Technology
Lawrence Ruelos	AAA in Visual Communications	Art Institute of Seattle

Department of Game Software Design and Production

NAME	DEGREE	INSTITUTION
Douglas Schilling*	BS in Computer Science	Pacific Lutheran University, Tacoma, WA
Richard Rowan*	BA in Gaming Systems and Applications	Western Washington University
Jennifer Sward	BS in Electrical Eng. and Computer Science	UC Davis
Benjamin Ellinger	BS in Kinesiology	University of Texas at Austin
Jami Lukins	BFA in Fine Arts and Production Animation	DigiPen Institute of Technology
Rachel Rutherford	BA in Rhetoric	U.C. Berkeley, CA
William Morrison	Diploma in Computer Programming	The Chubb Institute
Jeremy Holcomb	BA in Communications	University of Washington
Ellen Beeman	BA in Political Science	University of California at Santa Cruz
Christopher Orth	AA in Animation and Graphics	Bellevue Community College
Boyan Radakovich	BS in Physiological Psychology	University of California, San Diego
Justin Chambers	BS in Computer Science RTIS	DigiPen Institute of Technology
Angie Hoffman	BA in Psychology MFA in Creative Writing for Entertainment	Western State College of Colorado Full Sail University

Department of Humanities and Social Sciences

NAME	DEGREE	INSTITUTION
Fara Nizamani*	BS in Education Master of Arts in Illustration Doctor of Philosophy	University of Miami Barry University, Miami, FL City University, Los Angeles, CA
Claire Joly	Master in American Studies MA in Theater PhD in Comparative Cultures	La Sorbonne, France Smith College University of California at Irvine
Sonia Michaels	BA in English MA in English	University of Washington University of Washington
Vanessa Hemovich	BA in Psychology MA in Psychology and Program Evaluation PhD in Social Psychology	University of Washington Claremont Graduate University Claremont Graduate University
Yuka Ruscha	BA in International Language and Culture AAS in Construction Engineering Drafting MA in Education, Curriculum Instruction	Setsunan University, Osaka, Japan North Seattle Community College Seattle University
Matthew Muth	BA in Language, Literature and Writing MFA in Creative Writing	Eastern Michigan University University of Washington
Liliana Lawrence	MA in Public Policy PhD in Economics	National University of Singapore CUNY Graduate Center
Thomas Hendrickson	BS in Civil/Environment Juris Doctorate	University of Southern California Seattle University School of Law
Grace Choi	BA in Communication MA in Media and Cinema Studies PhD in Communication	University of Illinois DePaul University University of Missouri
Christopher Hawk	BA in Psychology MA in Psychology PhD in Psychology	Washington & Jefferson College Cleveland State University Brigham Young University

Department of Mathematics

NAME	DEGREE	INSTITUTION
Barnabas Bede*	B.Sc. in Mathematics and Physics M.Sc. in Mathematics PhD in Mathematics	University of Oradea, Romania University of Oradea, Romania Babes-Bolyai University, Cluj-Napoca, Romania
Matthew Klassen	BS in Mathematics PhD in Mathematics	University of Arizona University of Arizona
Antonie Boerkoel	BS in Mathematics MS in Mathematics PhD in Mathematics	University of Leiden University of Leiden, Netherlands University of Texas, Austin, Texas
Andy Demetre	BA in Mathematics MS in Mathematics	Reed College University of Washington
Brigitta Vermesi	BA in Mathematics & French Literature MS in Mathematics PhD in Mathematics	Rutgers University Cornell University Cornell University
Alexander Young	BS in Mathematics PhD in Mathematics	Brown University U.C. San Diego
Thomas Kraft	BS in Aeronautics and Astronautics MS in Applied Mathematics	University of Washington University of Washington

Department of Music

NAME	DEGREE	INSTITUTION
Bruce Stark*	Bachelor of Music Degree in Composition Master Degree in Composition	California State University The Juilliard School
Lawrence Schwedler	BA in Music	U.C. Los Angeles
Steven Saulls	BA in Performance (guitar) Master of Music in Performance (Guitar) DMA in Guitar Performance	Western Washington University University of Arizona School of Music University of Arizona School of Music
Timothy Brown	Bachelor of Music Performance	University of Michigan
Brian Schmidt	Bachelor of Music BS in Computer Science Master of Science in Computer Science	Northwestern University Northwestern University Northwestern University
Gregory Dixon	Bachelor of Music in Music Engineering Tech Master of Music in Composition PhD Composition in Computer Music	Ball State University Ball State University University of North Texas
John Kim	Bachelor of Music in Violin Performance Master of Music in Orchestral Performance	Cleveland Institute of Music Manhattan School of Music

Department of Physics

NAME	DEGREE	INSTITUTION
Natalia Solorzano*	BS in Physics MS in Meteorology PhD in Space Geophysics	Federal University of the State of Minas Gerais, Brazil National Institute for Space Research, Brazil National Institute for Space Research, Brazil
Erik Mohrmann	BS in Physics MS in Physics PhD in Nuclear Physics	Rensselaer Polytechnic Institute University of Washington University of Washington
Brandon Roberson	BS, in Physics PhD in Earth and Space Sciences	University of Washington University of Washington
Anand Thirumalai	M.A.Sc. in Materials Engineering M.Sc. in Physics PhD in Physics	University of British Columbia University of British Columbia University of British Columbia, Vancouver
Abhay Shah	B.Sc in Physics PhD in Physics	University of Mumbai, India University of Wisconsin-Milwaukee

* *Department Chairs*

Research and Development Division

NAME	TITLE
Samir Abou Samra	Chief Technology Officer, International
Antoine Abi Chacra	Lead Senior Software Engineer 3
Haya Al Nmeir	Software Engineer Level 3
Jayasree Ammanabrolu	Full Stack Software Engineer
Nathan Carlson	Lead Senior Software Engineer 1
Victor Cecci	Software Engineer 1
Joshua Claeys	Lead Senior Software Engineer 1
Joshua Davis	Lead Senior Software Engineer 1
Ryan Davison	Lead Senior Software Engineer 1
Andrea Ellinger	Associate Software Engineer
Zahra Haghiri	Artist Level 1
Michelle Lu	Principal Artist
Alain Schneuwly	Lead Principal Artist
Anusha Ravi Shankar	Full Stack Software Engineer
Charles Yaacoubian	Principal Software Engineer