



COURSE CATALOG

2015–2016

Published: November, 2014

Notices

Authorization

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

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.

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

The course offerings and requirements of DigiPen Institute of Technology are under continual examination and revision. This catalog is not a contract; it merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will not change. The Institute specifically reserves the right to change requirements for any major during any particular year. The individual student assumes full responsibility for compliance with all current academic requirements. Current course offerings may be obtained from the 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.*

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Rules and Policies for the Academic Year 2015–2016

General Information

Name of the School

DigiPen Institute of Technology

Contact Information

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Redmond, WA 98052
USA

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Facsimile: (425) 558-0378

Email: info@digipen.edu

Web: www.digipen.edu

Campus List

DigiPen Institute of Technology
9931 Willows Road NE
Redmond, WA 98052
USA

DigiPen Institute of Technology Singapore
PIXEL Building, 10 Central Exchange Green, #01-01
Singapore, 138649

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

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

Degree Authorization

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

Accreditation

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

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

- 2002: DigiPen was granted initial accreditation by ACCSC, including the approval for the Bachelor of Science in Real-Time Interactive Simulation degree program.
- 2002: DigiPen received ACCSC approval for the Bachelor of Fine Arts in Production Animation degree program.

- 2003: DigiPen received ACCSC approval for the Bachelor of Science in Computer Engineering degree program.
- 2005: DigiPen was granted a renewal of accreditation by ACCSC.
- 2006: DigiPen was granted approval for its Master of Science in Computer Science degree program by ACCSC.
- 2008: DigiPen was granted approval for its Bachelor of Arts in Game Design and Bachelor of Science in Game Design degree programs by ACCSC.
- 2010: DigiPen was granted approval for its relocation to its current facility by ACCSC.
- 2010: DigiPen received ACCSC approval allowing DigiPen Institute of Technology 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 Institute of Technology Singapore was granted accreditation by ACCSC as a branch campus of the main school located in Redmond, Washington, USA.
- 2011: DigiPen was granted approval for its Master of Fine Arts in Digital Arts degree program by ACCSC.
- 2012: DigiPen 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 Institute of Technology 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.

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

History of DigiPen Institute of Technology

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

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

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

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

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

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

That same year, DigiPen relocated its U.S. campus to its current location at 9931 Willows Road Northeast in Redmond, Washington. In addition to uniting DigiPen's BFA and BS programs under one roof, the larger campus provides more spaces for students to learn, meet, and collaborate on group projects.

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, to forty students.

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

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

In 2014, DigiPen added a new degree program: the Bachelor of Science in Computer Science.

**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.*

Awards

DigiPen students have consistently excelled in both national and international game development competitions. Since 2001, the annual Independent Games Festival (IGF) in San Francisco, California has granted 46 awards to 34 DigiPen student games. In 2007, 2008, and 2009, DigiPen projects also won the coveted Best Student Game award (for Toblo, Synaesthete, and Tag: The Power of Paint, respectively). In the IGF Main Competition, five DigiPen student games have been nominated for awards in various professional categories, and in 2004 Bontago won the "Innovation in Game Design" award while competing against professional developers. In 2011, the Independent Games Festival China, part of the annual Game Developers Conference China, selected three DigiPen games for its Student Competition which honors six of the top regional student games. DigiPen Singapore student game Pixi won the "Excellent Student Winner" award, while DigiPen Singapore student game Void won the "Best Student Game" award, as well as the "Excellence in Technology" award in IGF China's Main Competition.

Other competition highlights for DigiPen students include five finalist positions at the Slamdance Guerrilla Gamemaker Competition with two of those games winning their award categories, wins at the Northwest Games Festival, the Intel Games Demo, the IndieCade International Festival of Independent Games, and the PAX 10, as well as wins at the Indie Game Challenge, which in 2010 awarded the \$100,000 nonprofessional Grand Prize to the DigiPen student game

GEAR and in 2012 gave the Gamer's Choice Award to the DigiPen game Nitronic Rush. In 2011 at the Tokyo Game Show, only two of the 10 games showcased at the annual Sense of Wonder Night were from North America, with one of those, Solstice, being a DigiPen student project. Additionally, DigiPen students have won numerous awards at the Austin Game Developers Conference in Game Narrative Reviews and Poster Competitions.

Continuing Education Program

Authorized by the Washington Workforce Training Board to grant Continuing Education Units, DigiPen Institute of Technology offers a series of continuing education courses each semester and during the summer session. These courses are designed for individuals looking to explore the world of digital interactive entertainment production or to enhance their overall knowledge in game development topics such as programming, production art, and game design. 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.

Pre-College Program

DigiPen's Pre-College Program is a challenging four-week program for students who have completed their sophomore, junior, or senior year of high school. This program is designed to provide a preparatory experience for high school students interested in a potential career in the field of game programming, production art, or game design, music sound design, and sound design, or computer engineering. For students who have strong academic potential and who may be considering entering one of DigiPen's degree programs, this rigorous, fast-paced program will provide a true taste of the college experience at DigiPen. Taught by DigiPen's faculty, students will be exposed to college-level content, as well as gaining insight into the collaborative environment at DigiPen.

There are five tracks being offered: in game programming, game art, game design, music and sound design, and computer engineering. Students who successfully complete a DigiPen Pre-College Program will be eligible to receive non-matriculated college credit issued by DigiPen Institute of Technology. Students who matriculate into DigiPen Institute of Technology within three years will receive a tuition credit for the fees paid for the Pre-College Program. The program allows the student to develop an understanding of the game development process as it relates to the respective track chosen, gain knowledge as to the key types of academic subjects that a student must study to be successful, and get practical experience with the production process.

ProjectFUN Workshops

Now entering their 20th year, the ProjectFUN workshops engage elementary, middle and high school students in the arts and sciences by immersing them in the tools and techniques of today's high-tech careers. The workshops in animation, game design, video game programming, multimedia production, and robotics enhance students' critical thinking skills, improve their knowledge of core subjects like math and physics, and excite their interest in the academic concepts underlying modern technology.

These workshops are taught at DigiPen's Redmond, WA, campus, DigiPen's branch campuses in Singapore and Spain, and various locations across the U.S. and Canada. Some of these workshops are also offered in a synchronous online environment year-round.

High School Technology Academies

In 2000, DigiPen began teaching a computer science program for junior and senior high school students who are interested in taking a challenging computer science program. There are currently Technology Academy sites in Washington and various other locations in the U.S. and Canada which teach video game programming, 3D animation, robotics, and media communications. Since Fall 2007, DigiPen has been offering an online version of the Technology Academy to students in Washington state. This online program now includes students from across the nation. Depending on the school district, students participating in 90-540 hour classes are eligible to receive high school credit.

For more information about DigiPen's Youth Programs, visit projectfun.digipen.edu.

Institutional Mission

Our mission is to provide an exemplary education and to further research in digital media, simulation, and interactive computer technologies by teaching the academic fundamentals and applied theory necessary for our students to lead, innovate, and advance these industries. Through the work of our students, faculty and staff, we strive to empower and inspire these industries on a global level.

Building on a strong foundation rooted in academics and industry experience, we challenge our students to apply their knowledge towards the creation of real-world products for the ever-advancing demands of a technological society. Embracing teamwork and creative exploration, our mission is to produce highly qualified leaders and originators who will instigate growth, productivity, innovation, and success in their professions and industries.

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, sexual orientation, age, or with regard to the basis outlined in the Veterans' Readjustment Act and the Americans with Disabilities Act, as amended.

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@digipen.edu) to have copies of either report provided.

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
- Bachelor of Science in Computer Engineering
- Bachelor of Science in Engineering and Sound Design
- 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

About DigiPen's Facilities

DigiPen's campus (9931 Willows Road NE, Redmond, WA 98052) encompasses 105,000 square feet including a library, an academic support center, meeting rooms for student and faculty use, a professional kitchen and cafeteria, auditoriums, computer labs, art studios, and classrooms for lectures, instruction, and production work.

Weekly student access to the DigiPen campuses is from 8:00 a.m. to midnight, Monday through Friday, and from 12 p.m. to

8:00 p.m. on Saturday and Sunday with 12 p.m. to 8:00 p.m. lab access hours on certain holidays. Core office hours for the Administration staff run from 9:00 a.m. to 5:00 p.m., Monday through Friday.

Major equipment items include microphones and LCD high-definition projection systems in many of the classrooms. Various presentation formats are also available, including HD-DVD players, VCRs, document cameras, and CD players. The majority of the student computers currently range from Intel I7 quad-core, hyper-threaded systems with 8GB RAM to Intel I3 PCs with 4GB RAM to Core2 Duo-3GHz systems with 2GB RAM. All computers are on an internal network and have access to printers, servers, and archival media. DigiPen upgrades the computer equipment on a periodic basis.

DigiPen classrooms vary in size from lecture halls accommodating up to 198 students to small classrooms seating 16 students. DigiPen labs range in size from those accommodating 30 students to smaller labs seating 16 and 12. DigiPen also has two large, open production areas seating approximately 182 students and 131 students, respectively, facilitating the interdisciplinary work that goes into joint productions involving video game programmers and 3D artists.

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 1,100 square-foot library currently holds over 5,000 books, over 120,000 e-books, over 1,000 videos and video games, and subscriptions to 30 different magazines (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.

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 web site 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 Discipline Committee and be subject to disciplinary sanctions, up to and including suspension from the Institute, under the *Regulation of Conduct and Disciplinary Procedures*.

Voter Registration

For detailed information about voter registration in Washington state and to download a voter registration form, visit wei.secstate.wa.gov/osos/en/voterinformation/Pages/RegistertoVote.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.

Military Active Duty Policies for Students and Military Dependents

WITHDRAWAL AND READMISSION PROCEDURES FOR STUDENTS CALLED TO MILITARY ACTIVE DUTY

WITHDRAWAL

Students who are called to active duty should bring a copy of their activation orders to the Office of Student Affairs or the Office of the Registrar and complete an Institutional Withdrawal form.

- 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. Students who do not otherwise successfully complete their coursework in the agreed-upon time shall receive an “F” (or 0 quality points). Students who are assigned an “I” shall not receive a refund.

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 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 reapplication 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 to the Office of Student Affairs or the Office of the Registrar and complete an Institutional Withdrawal form.

- 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.

Important Dates

ACADEMIC CALENDAR

- **August 25-27, 2015**
Tuesday-Thursday
Orientation - First Year Students
- **August 31, 2015**
Monday
Classes Begin - Fall Semester
- **September 7, 2015**
Monday
Labor Day
No Classes - Labs Closed
- **November 11, 2015**
Wednesday
Veterans Day
No Classes – Labs Open
- **November 26-27, 2015**
Thursday-Friday
Thanksgiving
No Classes – Labs Closed
- **December 7-11, 2015**
Monday-Friday
Fall Semester Final Exams
- **December 11, 2015**
Friday
Fall Semester Ends
- **December 12, 2015-January 3, 2016**
Saturday-Sunday
Winter Break
No Classes – Labs Closed
- **January 4, 2016**
Monday
Classes Begin - Spring Semester
- **January 18, 2016**
Monday
M.L. King Jr. Day
No Classes – Labs Open
- **February 3, 2016**
Wednesday
Founder's Day
No Classes – Labs Open
- **February 15, 2016**
Monday
Presidents' Day
No Classes – Labs Open
- **T.B.A.**
Monday-Friday
Spring Break
No Classes – Labs Open
- **April 18-22, 2016**
Monday-Friday
Spring Semester Final Exams
- **April 22, 2016**
Friday
Spring Semester Ends
- **April 23-May 1, 2016**
Saturday-Sunday
Intersession
No Classes – Labs Closed
- **T.B.A.**
Commencement
- **May 2, 2016**
Monday
Classes Begin - Summer Session
- **May 30, 2016**
Monday
Memorial Day
No Classes – Labs Closed
- **July 4, 2016**
Monday
Independence Day
No Classes – Labs Closed
- **July 18-22, 2016**
Monday-Friday
Summer Session Final Exams
- **July 22, 2016**
Friday
Summer Session Ends
- **T.B.A.**
Orientation – Incoming Students
- **September 5, 2016**
Monday
Labor Day
No Classes – Labs Closed
- **September 6, 2016**
Tuesday
Classes Begin – Fall Semester
- **November 11, 2016**
Friday
Veterans Day
No Classes – Labs Open
- **November 24-25, 2016**
Thursday-Friday
Thanksgiving
No Classes – Labs Closed
- **December 12-16, 2016**
Monday-Friday
Fall Semester Final Exams
- **December 16, 2016**
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 7, 2015**
Tuesday
Last day to submit Request for Change of Major for Fall 2015 semester. Last day to submit Application for Readmission for Fall 2015 semester.
- **August 1, 2015**
Saturday
Tuition balance due for Fall 2015 semester.
- **September 6, 2015**
Sunday
Last day to drop Fall 2015 semester courses for 100% refund. Last day to add courses for Fall 2015 semester.
- **September 13, 2015**
Sunday
Final day to drop courses without academic penalty.
- **September 29, 2015**
Tuesday
Withdrawal deadline for 50% refund.
- **October 25, 2015**
Sunday
Final day to receive a “W” on transcript for Fall 2015 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) on transcript. Final day to drop a course.
- **November 25, 2015**
Wednesday
Last day to submit Request for Change of Major for Spring 2016 semester. Last day to submit Application for Readmission for Spring 2016 semester.
- **December 1, 2015**
Tuesday
Tuition balance due for Spring 2016.
- **January 10, 2016**
Sunday
Last day to drop Spring 2016 semester courses for 100% refund. Last day to add courses for Spring 2016 semester.
- **January 17, 2016**
Sunday
Final day to drop courses without academic penalty.
- **February 2, 2016**
Tuesday
Withdrawal deadline for 50% refund.
- **February 28, 2016**
Sunday
Final day to receive a “W” on transcript for Spring 2016 semester withdrawals. Withdrawals from the institute after this date will receive an “F”(or 0 quality points) on transcript. Final day to drop a course.
- **April 1, 2016**
Friday
Tuition balance due for Summer 2015 semester.
- **April 7, 2016**
Thursday
Last date to submit Request for Change of Major for Summer 2016 semester. Last day to submit Application for Readmission for Summer 2016 semester.
- **May 8, 2016**
Sunday
Last day to drop Summer 2016 semester courses for 100% refund. Last day to add courses for Summer 2016 semester. Automatic Withdrawal date from courses missing prerequisites.
- **May 15, 2016**
Sunday
Final day to drop courses without academic penalty.
- **May 31, 2016**
Tuesday
Last day to receive 50% Summer 2016 tuition refund.
- **June 26, 2016**
Sunday
Final day to receive a “W” on transcript for Summer 2016 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) on transcript. Final day to drop a course.
- **July 7, 2016**
Thursday
Last day to submit Request for Change of Major for Fall 2016 semester. Last day to submit Application for Readmission for Fall 2016 semester.
- **August 1, 2016**
Monday
Tuition balance due for Fall 2016 semester.
- **September 12, 2016**
Monday
Last day to drop Fall 2016 semester courses for 100% refund. Last day to add courses for Fall 2015 semester.
- **September 19, 2016**
Monday
Final day to drop courses without academic penalty.
- **October 5, 2016**
Wednesday
Withdrawal deadline for 50% refund.
- **October 31, 2016**
Monday
Final day to receive a “W” on transcript for Fall 2016 semester withdrawals. Withdrawals from the Institute after this date will receive an “F” (or 0 quality points) on transcript.
- **November 23, 2016**
Wednesday
Last day to submit Request for Change of Major for Spring 2017 semester. Last day to submit Application for Readmission for Spring 2017 semester.
- **December 1, 2016**
Thursday
Tuition balance due for Spring 2017.

Tuition and Fees

All tuition and fees are in U.S. dollars.

Application Fee

A \$35.00 application fee must accompany the application form. The application fee is refundable if the applicant is not accepted to the Institute or 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.

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), or cash. 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

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. To qualify for resident status, students must meet the following conditions and complete an affidavit/declaration/certification form found at: digipen.edu/fileadmin/website_data/admissions/2012/Tuition_Affidavit_Form.pdf

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 the state since earning the high school diploma or its equivalent.

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 \$1,026 per year. This cost is not included as a part of the cost of tuition.

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.

For the cohorts that began in 2011 or later, the current year's tuition rates are listed below.

UNDERGRADUATE DEGREE PROGRAMS

NO. OF CREDITS	U.S. CITIZENS AND RESIDENTS	NON-U.S. RESIDENTS
Fewer than 16 credits	\$890 per credit	\$980 per credit
16—22 Credits Flat Rate	\$13,800	\$15,100

GRADUATE DEGREE PROGRAMS

NO. OF CREDITS	U.S. CITIZENS AND RESIDENTS	NON-U.S. RESIDENTS
Fewer than 12 Credits	\$950 per credit	\$1,040 per credit
12—18 Credits Flat Rate	\$11,500	\$12,500

Intensive English Preparatory courses are \$980 per credit hour 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.

Parking

On-campus parking is available for \$240 per academic year. Please see the Office of Student Affairs for details regarding parking applications.

Administrative Fee

This fee covers a limited number of transcript requests, add/drop requests, and enrollment verifications. This fee is \$40.00 per semester for all students.

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 \$40.00 per semester for all students.

Graduation Fee

This \$100 fee covers the cost of processing the graduation application and degree audit. This fee must accompany the graduation application. This does not include the cost of regalia.

Transfer and Waiver Fees

Course transfers and waivers are processed at \$25.00 per credit.

Replacement Diploma Fee

Replacement diplomas requested are processed at \$20.00 per diploma.

Transcript Fee

Official transcripts are processed at \$5.00 per transcript. Unofficial transcripts are processed at \$3.00 per transcript.

Course Fees

Some courses may require lab or material fees. Please refer to course descriptions on course registration forms.

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 in 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 2015-2016

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 withdraws will 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, is entitled to a refund of all monies paid minus an enrollment fee of 15% of the contract price of the program. However, in no event will the school retain more than \$150.

Tuition Refund Schedule

A student who drops a course, who submits an official withdrawal in writing, or who is determined by the Administration to have withdrawn from the institute shall be refunded as follows:

- Before the close of the seventh calendar day from the beginning of the semester: Students receive a 100% tuition refund.
- Before the close of the eighth calendar day through the thirtieth calendar day from the beginning of the semester: Students receive a 50% tuition refund.
- After the thirtieth 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 last date of the student's attendance or within 60 days from the date of receipt of payment, in the event that the date of such receipt is after the student's last date of attendance.

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 with six or more credits per semester;
- 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 after January 2 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 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. For the current year's grant range, visit digipen.edu/financial-aid/loans-and-grants/undergraduate-grants/. 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 that they applied for in 7th and 8th grade at DigiPen. The scholarship amount can cover a percentage of tuition predetermined by the state. Please contact the Financial Aid Office 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 pays for up to 45 credits to be used within three years, and covers 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 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 students who demonstrate considerable financial need.

ART SCHOLARSHIP

For new undergraduate students who demonstrate considerable artistic talent.

FIRST SCHOLARSHIP

For new undergraduate students who participated in a "For Inspiration and Recognition of Science and Technology" (FIRST) team during their junior or senior year in high school.

CONTINUED STUDENT ACADEMIC SUCCESS SCHOLARSHIP

For continuing undergraduate students who demonstrate academic success during their time at DigiPen.

FINANCIAL STIMULUS SCHOLARSHIP

For continuing undergraduate students who demonstrate financial need.

CAMPUS LEADERSHIP SCHOLARSHIP

For continuing undergraduate students who have proven to be valued members of the DigiPen community by actively participating in campus organizations and activities.

PRESIDENT'S GRADUATE FELLOWSHIP

Each year, DigiPen's Graduate Selection Committee awards the President's Graduate Fellowship to one new incoming MS in Computer Science student and one new incoming MFA in Digital Arts student. All candidates who have applied for admission and have been accepted into one of these programs by July 1 are automatically considered for these fellowships; no additional application is required.

Both fellowships are awarded to students who demonstrate a history of high academic performance and/or professional success. The President's Graduate Fellowship for MFA students also takes into account candidates' artistic skill as demonstrated in their portfolio.

The fellowship for MS in Computer Science students covers nine credits of the first year of a student's program and six credits of the student's second year of the program.

The fellowship for MFA in Digital Arts students covers 15 credits of the first year and 10 credits of the second year.

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.

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 Stafford 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 STAFFORD LOANS

This is a low-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.

FEDERAL DIRECT UNSUBSIDIZED STAFFORD LOANS

This is a low-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 low-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 and have a fixed interest rate. The borrower must not have adverse credit history.

FEDERAL DIRECT GRADUATE PLUS LOANS

This is a low-interest loan awarded to graduate students. This loan can cover a large portion of educational costs and has a fixed interest rate. 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 that are less favorable than those of Direct Loans. Therefore, they should be used as a last resort

when seeking funding for your education. 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. An undergraduate student must be enrolled at least half-time in order to be eligible for federal financial aid. A graduate student must be enrolled at least half-time in order to be eligible for federal financial aid. 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.

Satisfactory Academic Progress for Financial Aid

In order for DigiPen undergraduate and graduate students to receive federal financial aid, they must be making satisfactory academic progress (SAP) in accordance with federal rules. Federal SAP rules are required to be the same, or stricter than, the institution's academic progress rules. Given the rigor of DigiPen's academic programs, the Institute uses its academic rules to measure federal SAP, taking into consideration federal requirements regarding GPA, pace of progression, and maximum time to completion of the degree. Please refer to the *Standards of Progress* section for specific requirements.

MONITORING AND APPEALS

At the end of each semester, the academic records of students eligible for federal funding are reviewed in order to determine whether or not the student is meeting all SAP requirements. This includes all courses attempted, whether financial aid was received or not. Should a student be deemed to not be meeting SAP, the student will be placed on Academic Warning, and they will have the opportunity to provide information to an appeals committee about mitigating circumstances, such as, but not limited to, death or major illness within the family, or personal illness or injury. If the student is placed on Academic Warning, the Office of Financial Aid will concurrently place the student on federal financial aid warning.

FEDERAL FINANCIAL AID WARNING

Students who fail to meet the SAP standards and who are placed on Academic Warning for the next semester will also be placed on federal financial aid warning. Students placed on

federal financial aid warning are eligible for financial aid during the warning term. A student on federal financial aid warning who fails to make satisfactory progress during the warning term may not be placed on federal financial aid warning for the consecutive term. Students may be placed on federal financial aid probation for the consecutive term after a successful appeal.

FEDERAL FINANCIAL AID PROBATION

Students who were on federal financial aid warning in the prior term and who are following an academic plan are given the status of federal financial aid probation for their next term of enrollment. (Federal rules mandate that students may not be placed on federal financial aid probation unless their college or university has a process for reviewing and granting appeals.) Students on federal financial aid probation may continue to receive federal financial aid for the federal financial aid probation term.

REESTABLISHING FINANCIAL AID ELIGIBILITY

A student who loses financial aid eligibility or whose appeal for continuation or reinstatement of financial aid has been denied can regain eligibility by complying with the SAP policy. If the student has resolved the SAP deficiencies that resulted in the termination of financial aid eligibility, the student should contact the Office of Financial Aid and request a SAP evaluation.

Washington State Need Grant Satisfactory Academic Progress Policy

The Washington State Need Grant Satisfactory Academic Progress Policy operates differently than the Financial Aid Satisfactory Academic Progress Policy. For detailed information, please contact the Office of Financial Aid or visit digipen.edu.

Withdrawal from the Institute

It is absolutely necessary for a student withdrawing from DigiPen to make an appointment with the Office of Financial Aid for an exit interview prior to leaving the Institute. This applies to students who are withdrawing and/or transferring to another institution. Failure to meet for an exit interview may increase the risk of defaulting on student loans. Students who withdraw may be subject to the return of Title IV Funds.

Return of Title IV Funds Policy

DigiPen's Institutional Refund Policy operates independently from the Return of Title IV Funds Policy requirements for all financial aid recipients.

I. TREATMENT OF TITLE IV FUNDS

When a recipient of a Title IV grant and/or loan withdraws from the Institute during any payment period in which the recipient began attendance, the Institute must determine the amount of Title IV grant and/or loan that the recipient earned as of the

student's withdrawal date. Unearned funds must be returned to the Title IV programs.

II. THE RETURN OF TITLE IV FUNDS

This policy applies to all financial aid recipients who withdraw, drop out, leave without notice, or otherwise fail to complete 60% of the payment period for which they received Title IV funds (grants and/or loans).

1. The term "Title IV Funds" refers to the Federal Financial Aid programs authorized under the Higher Education Act of 1965 (as amended) and includes the following programs administered by the Institute: Direct Subsidized and Unsubsidized Stafford Loans, Direct PLUS loans for Parents and Graduates, Pell Grants and Federal Supplementary Education Opportunity Grant (FSEOG), Federal Work Study, and the Iraq and Afghanistan Service Grant (IASG).
2. A student's withdrawal date is the last date of attendance as determined by the Institute's attendance records or the date of determination in accordance with the Institute's withdrawal policy.
3. The calculation required determines a student's earned and unearned Title IV aid based on the percentage of the payment period completed by the student. The Institute calculates the amount of Title IV assistance earned by the student by dividing the number of days the student attended in the payment period by the number of days in the payment period. Calendar days (including weekends) are used, but breaks of at least 5 days are excluded from both the numerator and denominator.
4. Until a student has passed the 60% point of a payment period, only a portion of the student's aid has been earned. A student who remains enrolled beyond the 60% point is considered to have earned all awarded aid for the payment period.
5. In accordance with Federal Regulations refunds are allocated in the following order:
 - » Federal Direct Unsubsidized Federal Stafford loans
 - » Federal Direct Subsidized Federal Stafford loans
 - » Federal Direct PLUS loans
 - » Federal Direct Grad PLUS loans
 - » Federal Work Study
 - » Federal Pell Grant
 - » Federal Supplemental Educational Opportunity Grant (FSEOG)
 - » Iraq and Afghanistan Service Grant (IASG)
6. Institutional and student responsibility in regard to the return of Title IV Funds:

The responsibility to repay unearned Title IV aid is shared by the Institute and the student. For example, the

calculation may require the Institute to return a portion of the federal funds to the Title IV programs.

Once the Institute has calculated the amount to return, the Institute will return the funds within 45 calendar days. The Institute will return the loan funds and make adjustments as required by Federal Regulations. The Bursar will refund the funds to the Direct Loan Program or a subsequent holder, if the loan has been transferred and the school knows the new holder's identity.

In addition, the student may also be obligated to return funds based on the calculation. A student returns funds to the Direct Stafford loan programs based on the terms and conditions of the promissory note of the loan. A student who receives a Federal Grant may be required to repay 50% of the funds received.

The Institute's Responsibility

The Institute's responsibilities in regard to the return of Title IV Funds include:

- » The Institute makes this policy readily available by request to any enrolled and/or prospective students through the Office of Financial Aid. In addition, the Office of Financial Aid makes readily available the written refund requirements.
- » Identifying students who are affected by this policy and completing the Return of Title IV funds calculation for those students.
- » Returning any Title IV funds that are due to the Title IV programs.

Student's Responsibility:

The student's responsibilities in regard to the return of Title IV Funds include:

- » Returning to the Title IV programs any funds that were disbursed directly to the student and which the student was determined to be ineligible for via the Return of Title IV Funds calculation.
 - » Students who owe funds to a grant program are required to make payment of those funds within 45 days of being notified that they owe this overpayment. During the 45-day period students will stay eligible for Title IV funds. If the student does not take any action within the 45 days of being notified, the Institute will notify the U.S. Department of Education of the student's overpayment situation. The student will no longer be eligible for Title IV funds until they enter into a satisfactory repayment agreement with the U.S. Department of Education.
7. Post-Withdrawal Disbursement: If a student receives less federal student aid than the amount earned, the Institute must offer a post-withdrawal disbursement. The Institute is required to make a post-withdrawal disbursement within 180 days of the date the Institute determines the student withdrew. Upon completion of the Return of Title IV Funds calculation, if it is determined a post withdrawal is due to

the student and/or parent the Institute will notify the student and/or parent in writing.

8. The Institute will make readily available a summary of the Return of Title IV Funds requirements to any enrolled and/or prospective student by request to the Office of Financial Aid.

III. TO OFFICIALLY WITHDRAW FROM DIGIPEN INSTITUTE OF TECHNOLOGY

Please refer to the *Withdrawing from the Institute* section regarding the withdrawal policy.

IV. CANCELLATION AND REFUND POLICIES

Please refer to the *Cancellation and Refund Policies* section.

If students have any questions or concerns regarding the Return of Title IV Funds Policy, Refund Policy, Overpayment, or would like examples of the Return of Title IV Funds calculations, please contact the Office of Financial Aid.

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 publically 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.

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.

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.

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 has been completed.

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. \$35.00 application fee: If an applicant is denied admission to the program, DigiPen will refund the 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.
4. 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.
 - 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.
5. 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 Registrar, showing that they have not been opened.
6. 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.

7. Application essays. Please see the *Application Essays* section below for the requirements and recommendations about completing this important component of the application.
8. Letters of recommendation (optional). Two letters of recommendation 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 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.
9. 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.
10. Art portfolio. This is only required of applicants to the Bachelor of Fine Arts in Digital Art and Animation degree program. Please see the *Art Portfolio* section below for complete details about this important component of the application.
11. Performance Portfolio. This is only required of applicants to the Bachelor of Arts in Music and Sound Design degree program. Please see the *Performance Portfolio* section below for complete details about this important component of the application.
12. Optional application components for Game Design applicants: copies of drawings and paintings, photographs of landscapes or urban environments, printed versions of digital art, sketches of level designs, and copies of maps. These optional components must be original creations solely of the applicant.

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

HOME-SCHOOLED APPLICANT ADMISSION REQUIREMENTS

DigiPen welcomes applicants from all types of educational backgrounds and encourages home-schooled students to apply. The Office of Admissions 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.

APPLICATION ESSAYS

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

TOPICS

Please address the following:

1. **Reasons for Applying:** This section is required for ALL undergraduate applicants, regardless of the program to which they are applying.
 - » Write an essay that states the undergraduate program you want to enroll in, why you chose that program, and what being a professional in this field of study means to you. Explain what you hope to do in the future after graduation and why this is important to you. Also state why you think you are ready to enroll at such a challenging school, why you think DigiPen is a good fit for you, and what you have done (and what are you doing now) to prepare yourself to succeed at DigiPen. Spelling, grammar, and sentence structure, along with the correct use of punctuation, capitalization, quotation marks, etc. are all considered, so proofread your essay carefully.
2. **Optional Essay:** Applicants should use this optional essay to explain any unusual circumstances or situations that they think may have an impact on their application.

SUBMISSION

Applicants may choose to type the application essay(s) directly into the online application (in which case, there is an electronic signature and date stamp), to mail a hard copy to DigiPen's Office of Admissions, or email a copy to admissions@digipen.edu where it will be added to the applicant's file. Those who opt for online submission of the application essay(s) should be sure to have their answers drafted and prepared before beginning the online application.

FORMATTING FOR PAPER SUBMISSION

Please adhere to the following requirements if submitting the application essays in hardcopy format:

- Name and degree program should be printed at the top of each page.
- Each page should be typed and double-spaced.
- Essay(s) should be signed and dated on the last page.

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 3.0 quality points) 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 programs 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.**

DigiPen will try to evaluate an applicant's application based on the current grade in precalculus. 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.

ART PORTFOLIO

DigiPen reviews applicants' art portfolios to ensure that students have the appropriate foundational skills to succeed in the degree programs to which they are applying.

Applicants to the BFA in Digital Art and Animation degree are required to submit an art portfolio. This portfolio must contain between 15 and 20 samples of original artwork created by the applicant and must demonstrate that the applicant has sufficient

foundational drawing skills to meet the challenges of DigiPen's rigorous curriculum. Sustained drawings (i.e., those that took two to three hours to complete) are encouraged to demonstrate the applicant's skill and concentration. If necessary, DigiPen may request more samples for review.

THE PORTFOLIO SHOULD INCLUDE:

- 10 drawings from direct observations, preferably of still life (**not** from the applicant's imagination, memory, or from two-dimensional references such as a photograph or another artist's work). These drawings should clearly communicate the structure and three-dimensional form of the subject. **The applicant should focus on representational accuracy rather than on cartooning or heavy stylization.**
- The remaining five to 10 pieces should demonstrate the applicant's artistic range and skill. These works should be selected with an eye toward quality, design, composition, and a dedication to craft. Animations, figure/animal studies, character designs, architectural renderings, landscape studies, sculptures, and paintings are preferred for this part of the portfolio.
- The portfolio should **not** contain drawings that rely heavily on exaggerated physical features such as large eyes, big hair, and elongated limbs, or samples copied directly from manga, anime, Disney, and similar sources. Instead, the drawings should focus on work that demonstrates the applicant's ability to draw from observation and the applicant's own imagination.

GUIDELINES FOR ART PORTFOLIO SUBMISSIONS:

- Submit the portfolio via Slideroom (<https://digipen.slideroom.com>). Slideroom requires a \$10.00 fee to upload portfolios; however, this fee may be waived for students who demonstrate financial need through an SAT fee-waiver program or participation in a similar need-based program.
- All artwork should be submitted as .jpg, .jpeg, .png, .gif, .tif, .tiff, .tga, or .bmp files (each image must be under 5MB).
- Label all artwork with the date of completion, the medium used and whether or not it is observational or from imagination. Please note: DigiPen prefers that the artwork submitted be less than two years old.

PERFORMANCE PORTFOLIO

DigiPen's intent in reviewing applicants' performance portfolios is to ensure that applicants have appropriate foundational skills relative to the degree program to which they are applying. Applicants should have some background studies in music, some aptitude for music, and be capable of sight-reading music on their declared primary instrument.

PERFORMANCE PORTFOLIO REQUIREMENTS FOR BA IN MUSIC AND SOUND DESIGN APPLICANTS

Applicants to the BA in Music and Sound Design degree program must submit a performance portfolio. This portfolio should contain two **unedited videos** of live performances in contrasting styles on the applicant's instrument of choice, a representative music score indicating the applicant's sight-

reading ability; and a maximum of four examples of musical involvement (see below).

The performance portfolio must adhere to the following requirements:

- For the two unedited videos of live performance pieces in contrasting styles:
 - » Edited recordings will not be accepted.
 - » Audio quality must be clear and free of noise.
 - » For all instruments except voice, at least one of the performances must be unaccompanied.
 - » Both performances must be with the applicant's primary instrument with the applicant's face and body clearly visible.
 - » Each performance should be approximately two to five minutes in duration.
 - » The recorded performances should demonstrate the applicant's musicianship and performance ability, and should showcase the applicant's expertise on the instrument.
 - » All styles of music are welcome, as long as the two pieces are in sufficiently contrasting styles, such as Baroque and Romantic, or Classical and Jazz.
- For evidence of musical involvement, submit up to four examples of any of the following:
 - » Scores and/or recordings of compositions, arrangements and/or performances
 - » Concert programs
 - » Reviews
 - » Awards for musical competitions
 - » Video or audio recordings of musical performances
 - » Documentation of participation in performance ensembles, such as orchestras, bands, or other musical performance groups
 - » Video soundtracks (include video)

GUIDELINES FOR ALL PERFORMANCE PORTFOLIO SUBMISSIONS

- Submit the performance portfolio via Slideroom (*digipen.slideroom.com*). Slideroom requires a \$10.00 fee to upload portfolios; however, this fee may be waived for students who demonstrate financial need through an SAT fee-waiver program or participation in a similar need-based program. Slideroom accepts the following file types/sizes:
 - » **Images (5 MB)** .jpg, .jpeg, .png, .gif, .tif, .tiff, .bmp, .tga

- » **Videos (60 MB)** .m4v, .mov, .mp4, .wmv, .flv, .asf, .mpeg, .mpg, .mkv

- » **Audio (30 MB)** .mp3, .wma, .ogg, .flac

- » **Documents (10 MB)** .pdf

- Label items with the date, title and composer of a performance. Please note: DigiPen prefers that the performance submissions be less than three years old.

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. \$35.00 application fee. If an applicant is denied admission to the program, DigiPen will refund the 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. For applicants who have taken the Computer Science GRE subject test in the last five years, DigiPen will accept those official scores in lieu of the DigiPen Computer Science Exam. An acceptable score for the Computer Science GRE Subject Test is 700 or higher. Please note that achieving an acceptable score on the DigiPen Computer Science Exam or Computer Science GRE Subject Test 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 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 December 2010, graduates of DigiPen's Bachelor of Science in Computer Science in Real-Time Interactive Simulation degree program 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. \$35.00 application fee. If an applicant is denied admission to the program, DigiPen will refund the 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 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. 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. See the *MFA in Digital Arts Art Portfolio* section for more information.
 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.

MFA IN DIGITAL ARTS ART PORTFOLIO

Applicants to the MFA in Digital Arts degree program are required to submit an art portfolio. This portfolio must contain between 15-20 samples of original artwork by the applicant and demonstrate that the applicant has the strong foundational art and observational skills necessary to handle the rigors of the curriculum. The portfolio, as a whole, should demonstrate an applicant's artistic range and skill. Samples of painting, sculpture, animation, figure/animal studies, character designs, architectural renderings, and landscape studies are

encouraged. If necessary, DigiPen may request more samples for review.

Samples of digital art are strongly encouraged. Students accepted into the MFA in Digital Arts program without digital media samples may be required to take an articulation class before starting their first semester.

For candidates with bachelor's degrees but a lack of experience in computer graphics or technology, DigiPen may require students to take prerequisite courses.

The portfolio should include:

1. 10 drawings directly from live observation, preferably of people and animals (not from an applicant's imagination or from two-dimensional references such as a photograph). The drawings should clearly communicate the structure and three-dimensional form of the subject. The emphasis should be on representational accuracy rather than on cartooning or heavy stylization.
2. The remaining five to 10 samples should demonstrate the applicant's range and skill. Sustained works are highly encouraged. These pieces should be selected with an eye toward quality, design, composition, and a dedication to craft.

Guidelines for Art Portfolio Submissions: See *Art Portfolio* in the *Undergraduate Admissions* section for submission guidelines.

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 also 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 visas, please consult the U.S. Immigration and Customs Enforcement web page at ice.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 university 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 his/her 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.

Applicants who are not accepted to the Institute will receive a letter of denial by mail. If an applicant is denied admission to a degree program, the application fee will be refunded. 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 a new art portfolio, etc.) many of those 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 five years. Therefore, some items such as transcripts, letters of recommendations (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 \$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 his or her 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 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 Disciplinary Committee to review along with their application for readmission. Students previously withdrawn for disciplinary reasons must receive clearance from the Disciplinary Committee to return.

READMISSION FOR PERSONAL REASONS

There are usually no impediments to returning to the Institute if there is space available; however, an academic plan may need to be developed with the student's advisor upon re-enrollment, and students requesting readmission after an extended period of time must meet with an academic advisor to determine the viability of completing their degree program.

READMISSION AFTER NON-PAYMENT OF ACCOUNT

Outstanding accounts must first be settled before applying for readmission. Once settled, the policy for readmission follows the same guidelines listed under the *Readmission for Personal Reasons* section.

READMISSION AFTER 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 DigiPen Administration.

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.

Non-Matriculated Studies

Applicants who are interested in taking individual courses that are part of DigiPen's degree programs may register for them based on each semester's course offerings and availability. Applicants will be handled on a first-come, first-served basis.

1. Applicants to Non-Matriculated Studies must show proof of graduation from high school and a recommended minimum 2.5 GPA in their most recent studies for acceptance into Non-Matriculated Studies.
2. Upon application, a degree program track must be selected and additional corresponding materials may be required.
3. Students must pass or show proof of having passed prerequisite courses before they are able to register for more advanced courses. Waiver exams may be

administered if students feel they have achieved proficiency.

4. Students must receive a grade of “C-“ (or 1.7 quality points) or better to pass courses that are core to their chosen track.
5. Students must maintain a minimum 2.0 GPA in order to remain enrolled in Non-Matriculated Studies. Enrollment is on a continuous basis unless students do not register for classes for a given semester at which time they will be withdrawn.
6. Applicants who are not native English speakers must provide Proof of English Language proficiency. Please see the *Proof of English Language Proficiency* section in the *Undergraduate Admissions* section.

Please note that courses taken in Non-Matriculated Studies do not lead to a degree and are not applicable to earning a professional certificate from DigiPen.

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, International Baccalaureate (IB) courses, College-Level Examination Program (CLEP) subject exam scores, or transfer credits from other post-secondary institutions. Course transfers and waivers are processed at \$25.00 per credit.

Course Waiver Examinations

Students may meet an academic requirement, within specified limits, by passing a waiver examination at least equal in scope and difficulty to a final examination in a course. Successful completion of the examination waives the curricular requirement for a specific course but does not result in credit earned. Waiver credits will not reduce the total number of semester hours required for a degree; however, they will increase the available number of elective hours for a degree. Waiver examinations must be taken prior to the final semester at DigiPen, and they may not be repeated.

Students have the opportunity to waive designated core courses by demonstrating mastery of the material in two steps:

1. A waiver petition to the respective department, indicating prior academic coursework and relevant work experience in the subject area; and
2. Performance on a placement exam offered by the respective department at the beginning of each term.

To petition waiving a core course, the student must complete a waiver request for each course, submit a transcript or photocopy of transcript with relevant coursework highlighted, and submit the requests to the Office of the Registrar. Waiver requests may be completed online through SRS. Once submitted, waiver requests need to be approved by the department appropriate to the courses. For waiver requests received by July 1, students will receive notification by August 1. Waiver requests arriving in the Office of the Registrar after July 1 will be handled on a rolling basis, as faculty schedules allow. Results of waiver requests received after the deadline are not guaranteed to be available before the start of classes.

It is not possible to predict the results of faculty review of core course waiver requests. Core courses generally include intermediate-level material, so a student who has completed only introductory work in a subject is not likely to be granted a waiver. Faculty take many factors into consideration, including the academic caliber of the school where the course was taken, the difficulty of the text, the grade received, and the time elapsed since completion of the course.

The following restrictions apply to all waiver examinations.

1. A student must have an approved waiver request on file before credit by examination can be recorded on the permanent record.
2. A student must be currently enrolled before a waiver examination can be recorded on the permanent record.
3. A maximum of 15 semester hours may be waived toward a bachelor degree.
4. Examinations may not be repeated.
5. Repeat course work and “F” grades (or 0 quality points) are not open to waiver requests.
6. Students may not take waiver examinations on courses they have audited.

Advanced Placement Examinations

Course waivers or credit may be granted for satisfactory achievement on Advanced Placement (AP) Exams of the College Entrance Examination Board taken within the last 10 years. AP exams must have been taken prior to the applicant’s graduation from high school. No grades will be assigned to the courses, nor will they be figured into a student’s grade point average. Courses waived or transferred are entered on a student’s transcripts, but no grades or quality points are awarded. Official results must be sent to the Registrar before course waivers or transfers are granted.

DigiPen 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
Mathematics — Calculus AB	4	MAT 150
Mathematics — Calculus BC	4	MAT 200
Music Theory	4	MUS 120 & MUS 120L
Physics B — Physics (Introduction)	4	PHY 115
Physics C — Physics (Mechanical)	4	PHY 200
Psychology	4	PSY 101

International Baccalaureate (IB)

In general, three semester credit hours are waived for each Higher Level subject in which a score of five or greater was earned in the last 10 years.

The IB courses and scores listed below are eligible for waiver hours at DigiPen.

COURSE & LEVEL	SCORE
English (A1 & A2) - HL	5, 6, 7

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 in 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 no more than 25% of credits will transfer.

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, and these courses must appear on official transcripts from the institution.
2. The course(s) must be comparable in 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 their advisor and the Registrar using the form provided for this purpose prior to enrollment in any course for which transfer approval might be sought.
3. Transfer credit will be considered for courses in which the grade of "B-" (or 2.7 quality points) or better is recorded.
4. Courses transferred to a student's major may also require a validation examination in order to be accepted.
5. "Credit" or "Pass" grades will not be accepted for transfer.

If a course is accepted for credit, it will be counted as a transfer credit. No grade points from such transfer courses will be calculated in the 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, as well as 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

Applications submitted after the deadline will still be considered but it is not guaranteed that the approval will be completed in time. 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 the 75% of the entire programs 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 Forms

Application forms for challenge and waiver examinations may be obtained from the Office of the Registrar or online. A student must have approval for an exam prior to taking it.

Transferability of Credits to Other Institutions

A student wishing to transfer DigiPen 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.

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 or externship 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 or externship 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 the 11 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.

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	Poor	1.0	minimum grade required for undergraduate students to earn credit in non-core courses for their majors
F	Failure	0	

The following grades do not affect the GPA:

AU—AUDIT

Indicates that the student attended the course without expectation of receiving credit or a grade.

IP—IN PROGRESS

Indicates that the grade was not available from the instructor at the time the transcript was printed.

I—INCOMPLETE

This grade is used when circumstances beyond a student’s control prohibit the student from taking the final exam or completing course work. It is not a grade given to students who need to retake a course because the student has fallen substantially behind. Students will not be given an “I” grade for unacceptable reasons, including, but not limited to, the need to rewrite a paper, 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. Students who want to repeat a course can drop it prior to the end of the eighth week of classes, and they will receive a “W” (see *Withdrawal* below). Otherwise, the instructor will assign the appropriate final grade (“D” [or 1.0 quality points] or “F” [or 0 quality points], for example).

Arrangements for the “I” grade and its completion 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.

If make-up work requires classroom or laboratory attendance in a subsequent semester, the students should not register for the course again; instead, the student must audit the course and pay audit fees. If the make-up work does not require classroom or laboratory attendance, the instructor and student should decide on an appropriate plan and a deadline for completing the course. When the student completes the course, the instructor will submit a change of grade to the Office of the Registrar. Should the work not be completed within the agreed upon time frame, the Institute will assign a grade of “F.”

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

W—WITHDRAWAL

Indicates withdrawal from the course 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. An instructor may not withdraw a student from a course.

P—PASS

Given for internship, seminar, and thesis courses.

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, externships, 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 Administration, Security, or 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 grades earned in the two most recently completed attempts are calculated in the cumulative GPA. Course grades of “AU,” “I,” “W,” “S,” “U,” and “P” are non-punitive grades, so they are not calculated in the overall GPA since they carry no quality points.

The following example demonstrates how GPA is calculated:

Total grade points divided by total credits equals the cumulative grade point average. Therefore, the grade point average for the above example is 56.4 divided by 18 for a 3.13 GPA.

COURSE	CREDITS	GRADE	POINTS
CS 100	3	A	12.0 (3 x 4.0)
CS 100L	1	A	4.0 (1 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	3	B+	9.9 (3 x 3.3)
CS 120L	1	A-	3.7 (1 x 3.7)
Totals	18		56.4

Satisfactory Academic Progress

Federal Regulations mandate that Institutions of Higher Education create a Satisfactory Academic Progress (SAP) standard for students receiving financial assistance under the Title IV programs. SAP standards measure a student’s progress toward the completion of their education program. The Office of Financial Aid is responsible for ensuring that all students receiving federal financial aid are meeting these standards by conducting an evaluation at the end of each term.

The SAP standards established in this policy apply to all Title IV Financial Aid programs administered by the Institute. This includes Unsubsidized loans, Subsidized loans, PLUS loans, Grad PLUS loans, and Federal Pell Grant.

The Institute’s SAP policy is the same for all students, regardless of whether they are receiving federal financial aid or not. To

be eligible for any of the types of financial aid listed above, a student must be:

1. Matriculated
2. Meeting the terms of the SAP policy

The SAP policy is comprised of two standards: qualitative and quantitative. The qualitative standard measures academic performance by the cumulative grade point average. The quantitative standard measures the total number of academic credits earned within the specified time periods and satisfactory pace towards completion. Financial aid recipients must meet all of these standards to qualify for aid.

A program of study must be completed within a reasonable period of time for a student to be eligible for graduation; that is, the credit hours attempted cannot exceed 1.5 times the credit hours required to complete the program. For example, the BFA in Digital Art and Animation program normally takes 145 credits to complete. Students in this program have up to 217.5 credits to complete their program. The Registrar will withdraw students from the Institute who do not meet this requirement.

In addition, frequent withdrawals from courses or from the Institute, failed or repeated courses, changes of major, or taking courses that are not related to the student's degree program could put the student's financial aid eligibility at risk. All attempted hours at the Institute and accepted transfer credits will count toward the maximum time frame for SAP. Students who have completed sufficient hours to finish their degree program are no longer eligible for financial aid. For financial aid recipients, if it is determined that a student will not be able to complete their degree within the maximum allowable time frame, eligibility for student financial aid may be revoked.

CHANGING MAJORS AND SATISFACTORY ACADEMIC PROGRESS (SAP)

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

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

UNDERGRADUATE STUDENTS

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

GRADUATE STUDENTS

Graduate students who take the undergraduate-level classes to fulfill the contingency for acceptance into the graduate programs must earn a "B" (or 3.0 quality points) or better for

such a class to meet the minimum requirement. During the course of graduate study at DigiPen, students are required to maintain a cumulative GPA of 3.0 at the graduate level. If the cumulative GPA falls below the required standard, the student will be placed on Academic Warning. Students on warning must earn 3.0 GPA or better in their graduate-level classes in subsequent semesters until the cumulative GPA reaches 3.0 or above. Students who fail to attain a cumulative GPA of 3.0 in graduate-level classes during their Academic Warning will be academically terminated. Terminated students may apply for readmission after a 12-month period.

Graduate students who fail to complete their program within 1.5 times the attempted credits will be placed on Academic Warning. Students on Academic Warning shall work with their graduate advisors to develop a completion plan that outlines the quickest path to completion. Failure to meet the terms of this plan will result in academic termination.

STUDENTS WHO BEGAN IN THE 2015 COHORT OR LATER

MILESTONE – UNDERGRADUATE	MINIMUM GPA REQUIREMENT
<p>Up to 50% of program</p> <ul style="list-style-type: none"> • 77 attempted credits* for BS in Computer Science in Real-Time Interactive Simulation • 77 attempted credits for BS in Computer Science and Game Design • 75 attempted credits for BS in Computer Science • 77 attempted credits for BS in Computer Engineering • 71 attempted credits for BS in Engineering and Sound Design • 72 attempted credits for BFA in Digital Art and Animation • 76 attempted credits for BA in Game Design • 70 attempted credits for BA in Music and Sound Design 	<p>1.8 or better cumulative GPA</p>
<p>Over 50% of program</p> <ul style="list-style-type: none"> • 78-153 attempted credits for BS in Computer Science in Real-Time Interactive Simulation • 78-153 attempted credits for BS in Computer Science and Game Design • 76-149 attempted credits for BS in Computer Science • 78-153 attempted credits for BS in Computer Engineering • 72-142 attempted credits for BS in Engineering and Sound Design • 73-144 attempted credits for BFA in Digital Art and Animation • 77-152 attempted credits for BA in Game Design • 71-139 attempted credits for BA in Music and Sound Design 	<p>2.0 or better cumulative GPA</p>
<p>100% of program</p> <ul style="list-style-type: none"> • 154 earned credits or greater for BS in Computer Science in Real-Time Interactive Simulation • 154 earned credits or greater for BS in Computer Science and Game Design • 150 earned credits or greater for BS in Computer Science • 154 earned credits or greater for BS in Computer Engineering • 143 earned credits or greater for BS in Engineering and Sound Design • 145 earned credits or greater for BFA in Digital Art and Animation • 153 earned credits or greater for BA in Game Design • 140 earned credits or greater for BA in Music and Sound Design 	<p>2.0 or better cumulative GPA</p>

**An attempted credit is defined as any credit that is awarded a final letter grade (“A” to “F”). Credits earning a “W” or “I” are not considered attempted credits for the purpose of calculating GPA. Credits earning a “W” or “I” are considered attempted credits for the purpose of calculating pace.*

Appeals

Appeals involving extenuating circumstances may be addressed to the Chair of the Student Appeals and Discipline Committee for action and resolution.

Passing Classes and Graduation

UNDERGRADUATE STUDENTS

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

GRADUATE STUDENTS

All graduate students must have a cumulative GPA of 3.0 to graduate.

Academic Warning

See also: *Satisfactory Academic Progress for Financial Aid*.

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

FAILING TO MEET MINIMUM GPA REQUIREMENT

Any student who fails to maintain the required minimum cumulative Grade Point Average (GPA) will be placed on Academic Warning the semester following the one where their cumulative GPA falls below the minimum required GPA. Students are removed from Academic Warning as soon as their cumulative GPA is above the minimum required GPA. Students who earn a 2.0 during the semester while they are placed on Academic Warning but do not raise their cumulative GPA above the minimum requirement will continue on Academic Warning until their cumulative average meets the minimum requirement. While on Academic Warning, students may be restricted to a maximum course load of 15 credits of which 50% must be core courses as defined in the Course Catalog. These students must achieve a GPA of 2.0 or higher during the semester while on Academic Warning. Failure to satisfy these requirements will result in academic expulsion, and expelled students must wait 12 months before they can apply for readmission.

For financial aid recipients, please also refer to the *Financial Assistance* section for information regarding the SAP policy for financial aid.

FAILING TO COMPLETE PROGRAM WITHIN THE MAXIMUM TIME FRAME

Students who fail to complete their degree program within the maximum attempted credits allowed, as defined under the satisfactory progress policy, will be terminated by the Institute.

Terminated students may apply for readmission after a 12-month period.

FAILING TO MAINTAIN SATISFACTORY PACE TOWARDS COMPLETION OF THE PROGRAM

Students are required to complete their program within 150% of the published length of the educational program, as measured in semester credit hours. A detailed recommended sequence of courses is available for each program (see the *Degree Programs* section).

Satisfactory pace is measured when a student begins the program. Transfer credits, course withdrawals and course incompletes are included in the satisfactory pace calculation. The calculation resets if a student changes major with all transferred credits considered earned credits. In regard to course repetitions, only the grades earned in the two most recent attempts of a course are calculated in a student's pace. Please also refer to *Repeating Courses* in the *Standards of Progress* section. Remedial courses are not considered as part of the satisfactory pace calculation.

To ensure that students maintain satisfactory pace toward completing the program within the 1.5 timeframe, students must successfully complete (earn a passing grade) a minimum number of credits each semester that they are enrolled. Students are required to maintain a minimum pace requirement of 67%. Students opting to take classes during the summer semester will be required to meet the specific pace requirements for their major.

DigiPen calculates the pace at which the student is progressing by dividing the cumulative number of credits the student has successfully completed by the cumulative number of credits the student has attempted:

$$\left(\frac{\text{Cumulative credits earned}}{\text{Cumulative credits attempted}}\right) \times 100 = \text{Pace (\%)}$$

See the following chart for a sample pace calculation.

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	3
SOS 115	3	C+	6.90 (3x2.3)
	17		18.00
CUMULATIVE SEMESTER ATTEMPTED CREDITS (FOR GPA)			14.00
CUMULATIVE SEMESTER ATTEMPTED CREDITS (FOR PACE)			17.00
CUMULATIVE CREDITS EARNED			11.00
GRADE POINTS			18.00
GPA			1.63

Earned credits include: A-, C+ and P

Attempted Credits for Pace included: A-, F, W, P, and C+

$$(11.00 / 17.00) \times 100 = 64.7\%$$

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 academic advisors 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 academic suspension 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 if a satisfactory resolution is not achieved.

Repeating Courses

Students may repeat any course in which they did not receive a passing grade (below a “C-” [or 1.7 quality points] in a core course, below a “D” [or 1.0 quality points] in a non-core course), as long as they are in good standing with the Institute and eligible to continue their studies. All grades and attempted classes remain on a student’s transcript. However, only the grades earned in the two most recent attempts of a course are calculated in a student’s GPA. Courses in which a student has earned a passing grade may be repeated as audit courses only.

Course Overload

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

Attendance

Students more than 15 minutes late to class will be marked as absent for that entire class. Students may not leave class early

without instructor permission. Students absent from all classes without explanation for a period of two consecutive weeks or more are considered to have withdrawn from the Institute as of their last date of attendance.

Withdrawing from Individual Classes

To withdraw from individual classes, a student must complete the appropriate withdrawal form, either in person or online.

Withdrawing from the Institute

To formally withdraw from the Institute, a student must submit a completed Withdrawal Notice Form to the Office of the Registrar. Withdrawal Notice Forms may be obtained from the Office of Student Affairs or the Office of the Registrar.

Upon withdrawing from DigiPen, the student shall immediately return all materials in his or her possession relating to the program, whether created by the student or other students, or provided by the Institute.

Hardship Withdrawal

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

If the committee grants a hardship withdrawal, the student will receive “W” grades in all classes and is ineligible to receive a grade or an incomplete in any class in that semester. 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.

The “W” Grade

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

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

instruction, the Registrar will assign a final grade of “W” for each course in which the student was enrolled.

3. At the end of the eighth week of instruction of the semester, withdrawn students will receive final grades for each course in which they were enrolled.

Dean’s Honor List Requirements

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

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

1. Students must be matriculated.
2. Students must be registered full-time in credit-bearing courses during the fall or spring semester.
3. Full-time students must complete 12 or more credits in one semester.
4. Only passing grades (4.0 [or “A”], 3.0 [or “B”], 2.0 [or “C”], and 1.0 [or “D”]) in credit-bearing courses are counted for eligibility.
5. No failing grades: a grade of “F” (or 0 quality points) in any course makes the student ineligible, regardless of other grades.
6. Minimum GPA of 3.5 is required.
7. Any courses that do not count towards the degree are excluded.
8. AP, Internship, and Independent Study credits are excluded.
9. Pass/Fail credits are NOT to be counted when calculating qualifying credits.
10. Incomplete grades will be evaluated after they are made up. The student must have qualified for the Dean’s Honor List before and after the Incomplete grade was made up.

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

Process for Grievances and Appeals

CONCERNS OVER ACADEMIC STANDING

Students who would like to file an appeal against a decision regarding their academic standing in a particular course should discuss the matter with their instructor. If a satisfactory resolution is unattainable, students may file an appeal with the head of the department for that course. If the resultant solution is still unsatisfactory, then students may file an appeal with the Dean of Faculty. Students may appeal grades and review exams no later than two weeks after grade reports are issued. The Administration 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 Office of the Registrar. If dissatisfied with the decision of the Registrar, 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. If still unsatisfied with the decision, students may appeal to the Executive Director of the Washington Student Achievement Council at:

Washington Student Achievement Council
P.O. Box 43430
Olympia, WA 98504-3430

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. If the student remains unsatisfied with the decision, they may appeal to the Executive Director of the Washington State Achievement Council at:

Washington Student Achievement Council
P.O. Box 43430
Olympia, WA 98504-3430

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
accsc.org

A copy of the Commission’s Complaint Form is available at the Institute and may be obtained by contacting Meighan McKelvey, Sr. Vice President of Administration. If students are unsure of whom to speak to regarding a complaint, they may contact Meighan McKelvey at the following address:

Meighan McKelvey
Sr. VP, Administration
DigiPen Institute of Technology
9931 Willows Road NE
Redmond, WA 98052
Tel: (425) 558-0299

Transcripts

If a student's financial obligation is not fulfilled, the Institute is authorized to do the following until the owed monies are paid: withhold the routine release of the student's academic records or any information based upon the records, and withhold the issue of the student's transcripts. Students with any questions may contact the Office of Administration at (425) 558-0299.

To request an official transcript, students should complete a transcript request form (available online at digipen.edu, or from the Office of Administration) and either mail 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 within 24 hours of the missed exam. In the event that a student fails to provide such notification to an instructor, or if the Institute does not find the reasons for missing an exam justifiable, the student will be given a failing grade for the exam(s).

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

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

Student Internships

Overview of Internships

Student internships are monitored, on-site work or service experiences for which students earn credit. Juniors, seniors, and master's students who meet the prerequisites and are in good academic standing are eligible for internships.

Internships can be arranged for any setting related to a student's career goals. The internship usually takes place in a professional workplace under the supervision of an experienced professional, whereby a high degree of responsibility is placed on the student. Internships can be part-time or full-time, paid or unpaid. They can vary in duration and location. For example, our interns have worked at companies in Washington, California, Texas, and New York. Internships must be approved in advance by the Institute.

Objectives of Internship Programs

Through an internship program, students establish and meet intentional learning goals through actual product development experience, while actively reflecting on what they are learning throughout the experience. The goals for the internship may include:

- Academic learning—applying knowledge learned in the classroom to tasks in the workplace.
- Career development—gaining knowledge necessary to meet minimum qualifications for a position in the student's field of interest.
- Skill development—an understanding of the skills and knowledge required in a specific job category.
- Personal development—gaining decision-making skills, critical thinking skills, and increased confidence and self-esteem.

Since internships have a strong academic component, students are carefully monitored and evaluated for academic credit. As a rule, one semester credit hour of academic credit is awarded for 45 hours of internship/work experience. Typically, a five credit internship taken during the fall, spring, or summer semester means that the student will spend no less than 225 hours in the experience. Students may register for up to two semesters of internship credit (e.g., BS in Computer Science in Real-Time Interactive Simulation students may not register for more than 10 internship credits and MS in Computer Science students may not register for more than 6 internship credits).

The element that distinguishes an internship from a short-term job or community service is the intentional "learning agenda" that the intern brings to the experience. In support of a positive experience for the student and the employer, the Internship Coordinator assists in assuring that the work experience meets both student and organizational needs, with priority given to the student's interests and to the assurance that the experience will result in learning outcomes acceptable to the student's degree

program. More detailed information about student internships can be found in the Internship Guidelines available in the Office of Administration.

Change of Major and Graduation

Requesting a Change of Major

Students wishing to change their major are encouraged to speak with their academic advisor before submitting an application. To apply for a change of major, the following steps must be completed:

1. Submit a Request for Change of Major form to the Office of Admissions; forms are available online or through the Student Record System. The Office of Admissions will print an unofficial grade report to include with the Change of Major Application.
2. Submit a Change of Major Statement addressing the following topics:
 - » Discuss reasons for requesting a change of major, and explain how these reasons relate to your future goals (personal, educational, and professional).
 - » Describe how a change of major will affect your academic plan from this point forward, and include any steps you will take to ensure a smooth transition.
3. Submit any additional materials required for the degree program to which you would like to change. This information is available at digipen.edu/current-students/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/current-students/academics/change-of-major/.

Once all relevant materials have been received and the application has been evaluated, a decision regarding the change of major will be sent to the student via email. Students approved for a change of major will be emailed an Enrollment Agreement corresponding to the new program. The student must either sign this agreement electronically through DocuSign or print, sign, and return it to the 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 a new semester. To be considered, requests must be submitted at least 14 days before the end of the previous semester; otherwise, the request will be considered for the next available semester. 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 classes in any major prior to the deadline for adding a class, but it is recommended that they

speaking with their academic advisor if they have not yet had their request for change of major approved.

- Students who change their majors are encouraged to meet with their academic advisor or with the head of the program to which they are transferring to determine what changes need to be made to their schedules or recommended course sequences.
- 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 the Registrar.

IMPORTANT FINANCIAL AID INFORMATION

Applicants who are a recipient of federal financial aid could potentially lose some or all of their financial aid eligibility by changing majors. Accepted change of major applicants must notify the Office of Financial Aid in person, as the accepted applicant's financial aid will need to be revised.

Graduation Requirements

Degrees will be granted at the end of the semester in which students complete the final requirements. For example, if a student receives an "I" grade in a course required for graduation in their final semester, the student will not graduate until the semester in which the "I" is replaced by a letter grade. During that semester, the student must reapply for graduation.

A program of study must be completed within a reasonable period of time for a student to be eligible for graduation. The Institute defines "reasonable time" as: the credit hours attempted cannot exceed 1.5 times the credit hours required to complete the program. Students who do not complete their studies during this maximum time frame will be placed on Academic Warning and will have to complete their program requirements under the conditions of their Academic Warning. For more information, please see the *Academic Warning* section.

Applying for Graduation

The Institute sets minimum requirements for all students seeking undergraduate degrees. 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 academic 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/Discipline 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	April 1

1. The student completes the Graduation Application and submits the \$100 graduation fee by the deadlines stated in the table above.
2. The academic 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.

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 Center
- 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 has adopted a faculty-advisor model to provide academic and career-related advising for degree-seeking students. The student's advisor can be either a full-time faculty member from your major or a staff member who is familiar with the requirements of the student's program. It is recommended that students meet with their academic advisors at least once a year and when applying for graduation. This ensures that a student is enrolling in the correct classes and is doing well in them. Additionally, students are to meet with their advisor when preparing to apply to graduate from the Institute. Students should speak to their advisors about issues related to academic and school policies, scheduling and course selection, Request for Course Override forms and alternate schedules, degree audits and graduation, classroom success, career advising, mentoring, and referrals to other resources..

Academic Support Center

Peer tutoring is available for 100 and 200 level courses in the Academic Support Center. For further information please contact tutors@digipen.edu.

Career Services

DigiPen's Career Services staff provides a variety of resources for enrolled degree-seeking students to jumpstart their professional development before they graduate and transition into the industry. These resources include on-campus events for students to meet and interact with game industry professionals, online tools and on-campus facilities to connect students with prospective employers, communication workshops, and both group and one-on-one appointments to review application materials (e.g., resumes, cover letters, websites) and discuss interviewing and other job search skills.

The Career Services staff coordinates a variety of on-campus events for students; recruiters meet with juniors, seniors, and master's students to offer insight into their companies, review resumes and student work, and interview potential hires at weekly Company Day presentations. Career Services hosts an annual Career Fair every spring semester for all graduating students to showcase their projects and portfolios to employers and recruiters from across the country. 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 as well as online professional/social networking groups for alumni. The Career Services staff also maintains an on-campus bulletin board where employers can post open job and internship opportunities for students and visiting alumni. DigiPen attends industry events, such as the Game Developers Conference, to promote the Institute's programs and students.

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.

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 each year to provide opportunities for alumni to connect with one another. DigiPen also provides career resources post-graduation and encourages alumni to remain connected with the DigiPen community.

Housing

DigiPen offers services to assist students with relocation and housing.

DIGIPEN HOUSING LLC

DigiPen Housing LLC (“DHL”) offers apartment-style housing each year to a limited number of first-year DigiPen students. Assignments are based on application deadlines and availability. If DHL is unable to offer housing to an applicant, DHL will provide information about other housing options in the area. 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 existing students or those not seeking housing through DHL, DigiPen offers the following additional housing resources:

ROOMMATE LOCATOR DATABASE

DigiPen maintains a housing and roommate referral program for students. The Office of Student Affairs administers these programs with help from the Office of Admissions. The roommate referral program is an online program for students, giving them an opportunity to “meet” one another online and to find a compatible roommate before the beginning of the classes in the fall. Most students reside in apartment units located near the DigiPen campus. The Roommate Locator Database can be found at digipen.edu/rldb/.

RELOCATION GUIDE

The Relocation Guide is a handbook containing information regarding neighboring housing complexes and other valuable information regarding the Redmond area. You can access the Relocation Guide at digipen.edu/fileadmin/website_data/student-affairs/forms/Off_Campus_Living/RelocationGuide.pdf.

Family Educational Rights and Privacy Act (FERPA)

Students Rights to Their Academic Records

The Family Educational Rights and Privacy Act (FERPA) reserves for students certain rights with respect to their education records. These rights are:

1. The right to inspect and review their education records within 45 days of the day the Institute receives a request for access. Students should submit to the Registrar, Dean, or head of the academic department (or appropriate official) written requests that identify the record(s) they wish to inspect. The Institute official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the Institute official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.
2. The right to request the amendment of the student's education records that the student believes is inaccurate or misleading. Students may ask the Institute to amend a record that they believe is inaccurate. They should write to the Institute official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. If the Institute decides not to amend the record as requested by the student, the Institute will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.
3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. One exception, which permits disclosure without consent, is disclosure to Institute officials with legitimate educational interests. An "Institute official" is defined as a person employed by the Institute in an administrative supervisory, academic, or support staff position; law enforcement officials and health staff; a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a person assisting another Institute official in performing his or her tasks. An Institute official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibilities.
4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the Institute in compliance 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, S.W.
Washington, DC 20202-4605
Phone: 1-800-872-5327

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
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 the Office of Administration. 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 Administration and present photo identification and a completed Release/Restrict of Directory Authorization form.

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 workplace 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.

Rules and Regulations

1. It is strictly forbidden to bring in or out of the premises any digital storage and any form of memory sticks or optical media, diskettes, video recorders, etc. other than for academic and approved usages which directly apply to courses being taken by the student during his/her enrollment of this agreement, or for the required purpose of maintaining back-up copies of student-created projects and assignments. Any use of DigiPen's computer resources (including all video or audio recording) that violates the *Network and Internet Usage Agreement* is strictly forbidden and may be punished according to the fullest extent of the law. Students are responsible for guaranteeing that any files transferred to and from DigiPen's equipment are free of malicious viruses or Trojan horses. In respect to the above, students are only allowed to carry in and out of the DigiPen premises data files only and not executable files. This includes student-created executables. Following this policy will greatly reduce the risks of virus infections to the DigiPen network. In order for DigiPen faculty to review and grade projects and assignments, source code must be stored and executables must be generated at DigiPen from the corresponding source code.
2. Students are forbidden from downloading any files from the internet or installing any software, including but not limited to freeware and/or shareware, without the written approval from a DigiPen faculty member or from DigiPen's IT staff. Furthermore, illegal use of the internet may be prosecuted to the fullest extent of the law.
3. In order to prevent damage to equipment and facilities, food and/or drink are not permitted anywhere within the training areas of the premises.
4. Smoking is not permitted anywhere within the premises, including but not limited to, the washrooms, elevators, and stairwells.
5. Student ID tags must be worn visibly when on the premises. Lost or stolen ID tags must be reported to Security as soon as possible by contacting badge@digipen.edu.
6. All student projects must receive approval from DigiPen's instructors prior to commencement of any production.
7. Plagiarism will not be tolerated. Any student who submits the work of another person as the student's own is considered to have committed plagiarism. Types of work that can be plagiarized include, but are not limited to, source code, artwork, concepts, designs, or other material. Anyone submitting someone else's work without the explicit written permission from the legal owner may have violated the owner's intellectual property rights or copyrights, in addition to committing plagiarism. If any student is unsure as to what constitutes a case of plagiarism, the student should consult an instructor for clarification.
8. Students shall not submit any work to the Institute that infringes upon the intellectual property rights of a third party. If, during the program, a student submits such work to the Institute, the student shall indemnify or hold harmless the Institute from and against all loss, damage, cost (including legal fees), and other liability, which the Institute may suffer as a result of the same.
9. Cheating on an examination will not be tolerated. Using any materials other than those authorized by the examiners during an exam is an example of cheating.
10. Submitting false documents, transcripts, or any other academic credentials to gain admission to DigiPen or to obtain any academic benefit is grounds for expulsion without recourse.
11. Disrupting instructional activities, including making it difficult to proceed with scheduled lectures, seminars, examinations, tests, etc., shall be considered an offense.
12. In the interest of maintaining an environment that is safe and free of violence and/or threats of violence for its employees, students, and visitors, possession of a dangerous weapon is prohibited on property owned by or under the control of DigiPen. Weapons and ammunition are potential safety hazards. Possession, use, or display of weapons or ammunition is inappropriate in an academic community for any reason, except by law enforcement officials. No weapons or ammunition shall be worn, displayed, used, or possessed on campus. Any member of the DigiPen community who violates this policy shall

DigiPen reserves the right to reject ideas or to stop production of any student game, animation, or project for reasons deemed appropriate to DigiPen. The Institute will not allow the production of any student work that contains or makes a direct or indirect reference to any of the following material/subjects:

- » Religious content
- » Religious symbols
- » Pornographic material
- » Excessive violence
- » Sexual and nude content
- » Promotion of illegal substances
- » Promotion of racism or hate
- » Content demeaning to any group of society

be subject to appropriate disciplinary action up to and including dismissal from DigiPen and shall be subject to all appropriate procedures and penalties including, but not limited to, the application of the criminal trespass provisions of the law of the state of Washington. Any person who is not a member of the DigiPen community who violates this policy shall be subject to all appropriate procedures and penalties including, but not limited to, the application of the criminal trespass provisions of the law of the state of Washington. Members of the DigiPen community who are aware of any violations of this policy or who have other concerns about safety or weapons should report them to the Dean of Students, Dean of Faculty, Senior Vice President of Administration, Senior Vice President of Institutional Facilities, or the Chief Operating Officer – International.

13. Evidencing symptoms of alcohol or drug use while on Institute property, or the procurement or possession of alcohol or illegal substances on Institute property, is considered an offense.
14. It is forbidden to damage, remove, or make unauthorized use of the Institute's property or the personal property of faculty, staff, students, or others at the Institute. Without restricting the generality of "property," this includes information; however it may be recorded or stored.
15. It is strictly forbidden to use any equipment in the premises to produce any commercial work. The equipment is only to be used for homework and training purposes. Any attempt to produce commercial work will result in legal action against the offenders.
16. Public areas and equipment of the building must be kept clean. No tampering, moving, defacing, or otherwise altering the premises, equipment, or the building property is allowed.
17. Graffiti, other forms of mural art, or the posting of signs anywhere in the premises and the building without permission of the Administration is not permitted.
18. Office equipment (photocopier, fax, office phone, etc.) is not available for student use.
19. The assault of individuals, whether verbal, non-verbal, written, or physical, including conduct, or any other kind of assault which leads to the physical or emotional injury of faculty, staff, students, or others at the Institute, or which threatens the physical or emotional well-being of faculty, staff, students, or others at the Institute, is considered an offense.
20. In accordance with applicable law, DigiPen prohibits sexual harassment and harassment between employees, between students, and between employees and students. Harassment due to race, sex, color, national origin, ancestry, religion, physical or mental disability, veteran status, age, or any other basis protected by federal, state, or local law. Any such harassment may violate the law and will not be tolerated. DigiPen's policy prohibits inappropriate conduct even though it may not reach the legal standard for harassment.
21. It is forbidden to attempt to engage in, aid and abet others to engage in, or attempt to engage in conduct which would be considered an offense.

22. Failing to comply with any penalty imposed for misconduct is considered an offense.

Penalties

The penalties that may be imposed, singly or in combination, for any of the above offenses may include, but are not limited to, the following:

1. A failing grade or mark of zero for any course, examination, or assignment in which the academic misconduct occurred.
2. Suspension from the Institute for a specified period of time or indefinitely. Students will not receive credit for courses taken at another institution during a suspension.
3. Reprimand, with the letter placed in the student's file.
4. Restitution, in the case of damage to property or unauthorized removal of property.
5. A notation on the student's permanent record of the penalty imposed.
6. Expulsion from the Institute.
7. Legal action against the student committing the offense.

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.

Dismissal by the Institute

By written notice to a student, the Institute may, at its sole discretion, dismiss a student at any time if the student is in default of any of the terms, covenants, or conditions of the Institute. Furthermore, the Institute reserves the right to withdraw a student if the student is unable to maintain the minimum required GPA in the student's courses at the end of each semester. Upon dismissal, the student shall immediately return to the Institute all materials in the student's possession relating to the program, whether created by the student or other students, or provided by the Institute. 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.

Appeals Procedures

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 Disciplinary Committee. The student has two weeks from the official written charge to appeal the alleged violation.

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. Two notifications of academic dishonesty will result in a hearing with the Appeals and Discipline 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. Disciplinary Committee (if the alleged violation does have the possibility of resulting in suspension or expulsion).
 - c. The 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 Disciplinary Committee will determine the appropriate sanction, which can include, but is not limited to, community service, a failing grade, suspension, 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.

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.

APPEALS PROCESS

The student has the right to dispute the decision of the 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 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, he/she must notify the Chief Operating Officer – International in writing within one week of being notified of the

Degree Programs for the Academic Year 2015–2016

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

Program Overview

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

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

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

- are graphics-oriented simulations, including 2D and 3D simulations.
- can realistically reproduce or simulate natural phenomena and real-life events. Flight simulators are excellent examples of such simulations.
- are highly interactive, requiring an elaborate and efficient graphical user interface (GUI). The development of a GUI requires the management of windows, menus, dialog

boxes, and hardware resources including keyboards, mice, and display monitors.

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

Graduates of this degree program will be prepared to enter the video game industry as entry-level computer scientists and software engineers. Possible entry-level position titles include Computer Scientist, Software Engineer, Software Developer, Software Development Engineer, Software Development Engineer in Test, Software Analyst, Computer Programmer, Gameplay Programmer, Engine Programmer, Physics Programmer, Graphics Programmer, Networking Programmer, Artificial Intelligence Programmer, User Interface Programmer, Tools Programmer, Web Programmer, or Game Scripter. After several years in the industry, graduates may attain titles such as Lead Engineer, Lead Developer, Development Manager, Principal Engineer, Technical Director, and Chief Technology Officer. 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, Technical Writer, and Technical Designer.

Students in the BS in Computer Science in Real-Time Interactive Simulation program who are interested in pursuing a graduate degree at DigiPen or 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 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.

This degree program provides an intensive education in a specialized and highly complex scientific area, and it prepares students for a career in several rapidly expanding industries.

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/RTIS.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science and Real-Time Interactive Simulation requires completion of at least 154 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or a total of four academic years.

GRADE REQUIREMENTS AND CORE COURSES

Students must receive a grade of “C-” (or 1.7 quality points) or higher in all core courses for the BS in Computer Science and Real-Time Interactive Simulation major. (In a non-core course, a grade of “D” [or 1.0 quality points] or higher is considered passing.) The core courses are all those taken to fulfill the GAM, MAT, and CS requirements as described above. PHY 200 is also a core course.

ART AND MUSIC

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

COMPUTER SCIENCE

The following courses are required: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 200, CS 225, CS 230, CS 250, CS 260, CS 280, CS 300, CS 315, CS 330, CS 350, and CS 365. Students must select four more courses (12 credits) numbered higher than 200. (Total: 60 credits)

HUMANITIES AND SOCIAL SCIENCES

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

MATHEMATICS

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

PHYSICS

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

PROJECTS

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

OPEN ELECTIVES

At least eight credits from any courses in any department at DigiPen. (Total: 8 credits)

NOTE ON GENERAL EDUCATION COURSES

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

Recommended Course Sequence Chart for BS in Computer Science and Real-Time Interactive Simulation

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	X	4
	CS 100	Computer Environment	X	3
	CS 100L	Computer Environment Lab	X	1
	CS 120	High-level Programming I: The C Programming Language	X	3
	CS 120L	High-level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	ENG 110	Composition		3
	COL 101	College Life and Academic Skills		1
	Semester Total			
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	CS 170	High-level Programming II: The C++ Programming Language	X	3
	CS 170L	High-level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	COM 150	Interpersonal and Work Communication		3
	Semester Total			
Semester 3	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	CS 180	Operating System I: Man-Machine Interface	X	3
	CS 200	Computer Graphics I	X	3
	CS 225	Advanced C/C++	X	3
	GAM 200	Project II	X	4
	PHY 200	Motion Dynamics	X	3
	Semester Total			
Semester 4	PHY 250	Waves, Optics, and Aerodynamics		3
	CS 250	Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
	Semester Total			
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 260	Computer Networks I: Interprocess Communication	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 258	Discrete Mathematics	X	3
	CG 130	3D Computer Animation Production I		3
	GAM 300	Project III	X	5
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	MAT 300	Curves and Surfaces	X	3
	CS 350	Advanced Computer Graphics II	X	3
	CS 315	Low-level Programming	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required	X	3
	GAM 350	Project III	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 7	ART and MUS Elective	Select one: ANI 125, ART 400, ART 410, FLM 115, FLM 151, FLM 152, or MUS 115		2
	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required	X	3
	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	GAM 400	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	ART 210	Art Appreciation		2
Semester Total				20-23
Semester 8	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required	X	3
	GAM 450	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	HSS Elective	One humanities and social science elective from any three-credit HIS, PSY, or SOS courses		3
Semester Total				19-21
Degree Total				154 minimum

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

The BS/MS in Computer Science Accelerated Schedule

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 and allow students to finish both degree programs in five years sequentially (i.e., BS in Computer Science in Real-Time Interactive Simulation in four years, and then MS in Computer Science in one year).

MINIMUM REQUIREMENTS

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

- Major: Bachelor of Science in Computer Science in Real-Time Interactive Simulation at DigiPen Institute of Technology.
- Junior standing: students must have completed the fifth semester's study (the first semester of junior year) or earned 93 or more credits of course work.
- GPA in core courses: 3.0 or higher.
- Petition to take graduate level CS electives.
- Consent from the academic advisor in writing.

The MS in Computer Science Admissions Committee will review the student's request for 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 MS in Computer Science degree program. Students must still apply for the MS in Computer Science program following the standard admission procedures.

ACCELERATED SCHEDULE DEGREE REQUIREMENTS

The recommended course sequence for the BS in Computer Science and Real-Time Interactive Simulation degree program includes 6 elective courses (2 during each of the following semesters: 6, 7, 8). Students on the accelerated schedule may choose up to 5 graduate level CS courses for their CS electives. The following table contains the graduate level CS electives that are eligible for credit sharing (maximum 15 semester credits) between the BS in Computer Science and Real-Time Interactive Simulation and MS in Computer Science degree programs. Students may only share credits of courses for which they earn a B- or higher.

GRADUATE-LEVEL COMPUTER SCIENCE ELECTIVES

COURSE NUMBER	COURSE NAME	CREDITS
CS 500	Ray Tracing	3
CS 530	Advanced Game Engine Design	3
CS 550	Physics Simulation	3
CS 560	Advanced Animation and Modeling (I)	3
CS 561	Advanced Animation and Modeling (II)	3
CS 562	Advanced Real-Time Rendering Techniques	3
CS 570	Computer Imaging	3
CS 571	Advanced Computer Imaging	3
CS 580	Artificial Intelligence in Games	3
CS 581	Introduction to Artificial Intelligence	3
CS 582	Reasoning Under Uncertainty	3
CS 590	Introduction to Computation Theory	3
CS 599	Special Topics	3

RECOMMENDED COURSE SEQUENCE

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 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 2 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.

Displayed 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 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

Bachelor of Science in Computer Science and Game Design

Program Overview

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

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

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

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/BSGD.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

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

GRADE REQUIREMENTS AND CORE COURSES

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

ART

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

COMPUTER SCIENCE

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

DESIGN

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

HUMANITIES AND SOCIAL SCIENCE

The following courses are required: COL 101, COM 150, ENG 110, and PSY 101. Three additional credits must be selected from other courses with the designation COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS. (Total: 13 credits)

MATHEMATICS

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

PHYSICS

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

PROJECTS

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 302, and GAM 352. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490. (Total: 34 credits)

OPEN ELECTIVES

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

NOTE ON GENERAL EDUCATION COURSES

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

Recommended Course Sequence Chart for BS in Computer Science and Game Design

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	COL 101	College Life and Academic Skills	X	1
	CS 100	Computer Environment	X	3
	CS 100L	Computer Environment Lab	X	1
	CS 120	High-Level Programming I: The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	GAT 120	Game Analysis	X	2
	MAT 140	Linear Algebra and Geometry	X	4
	Semester Total			
Semester 2	CS 170	High-Level Programming II: The C ++ Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	ENG 110	Composition	X	3
	GAM 150	Project I	X	3
	GAT 210	Game Mechanics I	X	3
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	Semester Total			
Semester 3	CS 225	Advanced C/C++	X	3
	GAT 240	Technology for Designers	X	3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	PHY 200	Motion Dynamics	X	3
	GAT 211	Game Mechanics II	X	3
	GAM 200	Project II	X	4
	Semester Total			
Semester 4	ART 105	Art Processes	X	3
	COM 150	Interpersonal and Work Communication	X	3
	CS 180	Operating System I: Man-Machine Interface	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	GAT 250	2D Game Design I	X	3
	Semester Total			
Semester 5	ART 260	Graphic Design, User Experience, and Input	X	3
	CS 251	Introduction to Computer Graphics	X	3
	CS 380	Artificial Intelligence for Games	X	3
	GAM 302	Project III for Designers	X	5
	GAT 251	2D Game Design II	X	3
	PSY 101	Introduction to Psychology	X	3
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	CG 125	Introduction to 3D Production for Designers	X	3
	CG 102	2D Raster and Vector Graphics for Designers	X	3
	GAT 315	3D Game Design I	X	3
	GAM 352	Project III for Designers	X	5
	MAT 258	Discrete Mathematics	X	3
	Semester Total			
Semester 7	CS 311	Introduction to Databases	X	3
	CS 330	Algorithm Analysis	X	3
	GAM 400	Project IV	X	5
	Design Elective	Any three-credit course with the GAT designation	X	3
	GAT 316	3D Game Design II	X	3
	MAT 340 or MAT 364	Probability and Statistics or Combinatorial Game Theory	X	3
	Semester Total			
Semester 8	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
	HSS Elective	Any three-credit COM, ENG, ECN, HIS, LAW, PHL, PSY, or SOS course.	X	3
	GAM 450	Project IV	X	5
	Semester Total			
Degree Total				154 minimum

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

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.

The BS in Computer Science degree program will start in 2015; we will begin reporting certain disclosures, including graduation and placement rates, in accordance with ACCSC reporting requirements. For other important information, including occupational profiles and cost of attendance, visit digipen.edu/fileadmin/disclosures/BSCS.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The BS in Computer Science degree program requires completion of at least 150 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or a total of four academic years.

GRADE REQUIREMENTS AND CORE COURSES

Students must receive a grade of "C-" or higher in all core courses. (In a non-core course, a grade of "D" or higher is considered passing.) The core courses are all those taken to fulfill the projects, mathematics, and computer science requirements as described below. PHY 200 and PHY 200L are also core courses.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 211, CS 212, CS 225, CS 230, CS 251, CS 260, CS 261, CS 280, CS 315, CS 325, CS 330, CS 355, CS 365, CS 375 and CS 381. Students must select two additional CS or ECE courses (6 credits) numbered 200 or higher. (Total: 66 credits)

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COL 101, ENG 110 and COM 150. Six additional ENG credits are required from ENG 116 and above. Students must take an additional three credits in HIS, PSY, or SOS. (Total: 16 credits)

MATHEMATICS

The following courses are required: MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, MAT 258, MAT 340, and one MAT elective numbered 300 or higher, or MAT 256. (Total: 24 credits)

PHYSICS

The following courses are required: PHY 200, PHY 200L, PHY 250, and PHY 250L. (Total: 8 credits)

PROJECTS

The following courses are required: GAM 100, GAM 150, CSP 200, CSP 250, CSP 300, CSP 350, CSP 400, and CSP 450. (Total: 30 credits)

OPEN ELECTIVES

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

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), ENG electives numbered 116 or higher (6), a social science elective in HIS, PSY, or SOS (3), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 250 (3), PHY 200 (3), PHY 200L (1), PHY 250 (3), and PHY 250L (1), for a total of 34 credits.

Recommended Course Sequence Chart for BS in Computer Science

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	X	4
	CS 100	Computer Environment	X	3
	CS 100L	Computer Environment Lab	X	1
	CS 120	High-level Programming I: The C Programming Language	X	3
	CS 120L	High-level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	ENG 110	Composition		3
	COL 101	College Life and Academic Skills		1
	Semester Total			
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	CS 170	High-level Programming II: The C++ Programming Language	X	3
	CS 170L	High-level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	COM 150	Interpersonal and Work Communication		3
	Semester Total			
Semester 3	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	CS 180	Operating System I: Man-Machine Interface	X	3
	CS 211	Introduction to Databases	X	3
	CS 225	Advanced C/C++	X	3
	CSP 200	Computer Science Project II	X	4
	PHY 200	Motion Dynamics	X	3
	PHY 200L	Motion Dynamics Lab	X	1
	Semester Total			
Semester 4	PHY 250	Waves, Optics, and Aerodynamics		3
	PHY 250L	Waves, Optics, and Aerodynamics Lab		1
	CS 212	Advanced Databases	X	3
	CS 365	Software Engineering	X	3
	CS 280	Data Structures	X	3
	CSP 250	Computer Science Project II	X	4
	MAT 258	Discrete Mathematics	X	3
	Semester Total			
Semester 5	CS 260	Computer Networks I, Interprocess Communication	X	3
	CS 315	Low-Level Programming	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 250	Linear Algebra	X	3
	CS 251	Computer Graphics	X	3
	CSP 300	Computer Science Project III	X	4
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	MAT 340	Probability and Statistics	X	3
	CS 355	Parallel Programming	X	3
	CS 261	Computer Networks II	X	3
	CS 375	Compilers and Interpreters	X	3
	CSP 350	Computer Science Project III	X	4
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 7	CS 381	Introduction to Artificial Intelligence	X	3
	English Elective	Any ENG course numbered 116 or higher		3
	CS 325	User Interface and User Experience Design	X	3
	Math Elective	MAT 256 or any MAT course numbered 300 or higher	X	3
	CSP 400	Computer Science Project IV	X	4
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 8	English Elective	Any ENG course numbered 116 or higher		3
	Computer Science Elective	Any CS or ECE course numbered 200 or higher	X	3
	Computer Science Elective	Any CS or ECE course numbered 200 or higher	X	3
	CSP 450	Computer Science Project IV	X	4
	HSS Elective	Any HIS, PSY, or SOS course		3
	Semester Total			
Degree Total				150 minimum

Bachelor of Science in Computer Engineering

Program Overview

The BS in Computer Engineering degree program at DigiPen prepares students to become engineers who understand both sides of the hardware-software interface, from designing circuits to developing operating systems. Multidisciplinary in scope, the BS in Computer Engineering degree program integrates the fields of electrical engineering and computer science. 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 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 for Alumni 3-5 Years After Graduation

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

- who are exceptionally competent computer engineers whose work is notable for its technical excellence and innovation;
- with a broad spectrum of professional skills, including expertise in software, hardware, operating systems, circuit design, and embedded systems;
- with an in-depth understanding of computer engineering practice and judgment via team projects that include design, implementation, and testing;
- who are prepared and motivated for a lifetime of independent, reflective learning and critical thinking;
- who are fully aware of the societal impacts of their work, both nationally and globally.

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.

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/CE.html.

Degree Requirements

NUMBER OF CREDITS & GPA

The Bachelor of Science in Computer Engineering degree program requires completion of at least 154 semester credits with a cumulative GPA of 2.0 or better. The program typically spans eight semesters of 15 weeks each, or four academic years.

GRADE REQUIREMENTS AND CORE COURSES

Students must receive a grade of “C-” (or 1.7 quality points) or higher in all core courses (or “Pass” for ECE 101L). All required CS, ECE, MAT, and PHY courses are considered core courses. (In a non-core course, a grade of “D” [or 1.0 quality points] or higher is considered passing.)

ART AND MUSIC

The following course is required: ART 210. Students must also take an additional three semester credits of any ANI, ART, FLM, or MUS course. (Total: 5 credits)

COMPUTER SCIENCE

The following courses are required: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 225, CS 280, CS 315, and CS 330. In addition, students must take twelve semester credits of CS courses chosen from CS 245, CS 246, CS 260, CS 261, or any CS course numbered 300 or higher. (Total: 36 credits)

ELECTRICAL AND COMPUTER ENGINEERING

The following courses are required: ECE 110 or GAM 150, ECE 200, ECE 210, ECE 220L, ECE 260, ECE 270, ECE 300, ECE 310L, ECE 350, ECE 360L, ECE 400 or ECE 420, ECE 410L, and ECE 460L. (Total: 49 credits)

HUMANITIES AND SOCIAL SCIENCE

The following courses are required: COL 101, COM 150, ENG 110, and ECN 350. Students must also take an additional three semester credits of ENG classes numbered 116 or higher. Additionally, students must take three semester credits of social science in HIS, SOS, PSY, PHL, or LAW. (Total: 16 credits)

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. (Total: 24 credits)

PHYSICS

The following courses are required: PHY 200, PHY 200L, PHY 250, PHY 250L, PHY 270 and PHY 270L are required. (Total: 12 credits)

ELECTIVES

Nine semester credits of electives of any of the courses offered at DigiPen and an advanced elective consisting of three semester credits from any CS, MAT, or PHY course numbered 200 or above. (Total: 12 credits)

A NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the BS in Computer Engineering: ENG 110 (3), COM 150 (3), social science elective (3), ART 210 (2), MAT 140 (4), MAT 150 or MAT 180 (4), MAT 200 or MAT 230 (4), PHY 200 (3), PHY 250 (3), and ECN 350 (3), for a total of 32 credits.

Recommended Course Sequence Chart for BS in Computer Engineering

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	CS 120	High-level Programming I: The C Programming Language	X	3
	CS 120L	High-level Programming I Lab	X	1
	CS 100	Computer Environment I	X	3
	CS 100L	Computer Environment I Lab	X	1
	MAT 140	Linear Algebra and Geometry	X	4
	MAT 150 or MAT 180	Calculus and Analytics Geometry I or Vector Calculus I	X	4
	COL 101	College Life and Academic Skills		1
	ENG 110	Composition		3
	Semester Total			
Semester 2	CS 170	High-level Programming II: The C++ Programming Language	X	3
	CS 170L	High-level Programming II Lab	X	1
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	ECE 210	Digital Electronics I	X	4
	PHY 200	Motion Dynamics	X	3
	PHY 200L	Motion Dynamics Lab	X	1
	ECE 110	CE 1 st Year Project	X	3
	Semester Total			
Semester 3	CS 225	Advanced C/C++	X	3
	MAT 225	Calculus and Analytic Geometry III	X	3
	MAT 256	Introduction to Differential Equations	X	3
	ECE 220L	CE 2 nd Year Project	X	3
	PHY 250	Waves, Optics, and Thermodynamics	X	3
	PHY 250L	Waves, Optics, and Thermodynamics Lab	X	1
	COM 150	Interpersonal and Work Communication		3
	Semester Total			
Semester 4	CS 280	Data Structures	X	3
	ECE 200	Electric Circuits	X	3
	ECE 260	Digital Electronics II	X	4
	ECE 300	Embedded Microcontroller Systems	X	3
	PHY 270	Electricity and Magnetism	X	3
	PHY 270L	Electricity and Magnetism Lab	X	1
	MAT 258	Discrete Mathematics	X	3
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 5	CS 315	Low-level Programming	X	3
	CS 330	Design and Analysis of Algorithms	X	3
	ECE 310L	CE 3 rd Year Project I	X	5
	ART 210	Art Appreciation		2
	ECE 270	Real-Time Operating Systems	X	3
	CS Elective	Any of CS 245, CS 246, CS 260, CS 261, or any CS course numbered 300 or higher		3
	Semester Total			
Semester 6	ECE 420	Digital Signal Processing	X	3
	ECE 360L	CE 3 rd Year Project I	X	5
	CS/MAT/PHY Elective	An elective in CS, MAT, or PHY numbered 200 or above	X	3
	MAT 340	Probability and Statistics	X	3
	ECN 350	Engineering Economics		3
	Semester Total			
Semester 7	ECE 410L	CE 4 th Year Project I	X	5
	ECE 350	Control Systems	X	3
	ART and MUS Elective	Any ANI, ART, FLM, or MUS course		3
	ENG Elective	One ENG elective chosen from ENG 116 or higher		3
	Elective	An elective of the student's choice from any department at DigiPen (excluding ECE and CS courses)		3
	CS Elective	Any of CS 245, CS 246, CS 260, CS 261, or any CS course numbered 300 or higher	X	3
	Semester Total			
Semester 8	ECE 460L	CE 4 th Year Project II	X	5
	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
	Social Science Elective	Any HIS, SOS, PSY, PHL, or LAW course		3
	CS Elective	Any of CS 245, CS 246, CS 260, CS 261, or any CS course numbered 300 or higher	X	3
	CS Elective	Any of CS 245, CS 246, CS 260, CS 261, or any CS course numbered 300 or higher	X	3
	Semester Total			
Degree Program Total				154 Minimum

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

Bachelor of Science in Engineering and Sound Design

Program Overview

The BS in Engineering and Sound Design degree program offers extensive training in basic science and software engineering fundamentals as well as solid training and project work in game development, music technology, and sound design. Students have the opportunity to work on both individual and team-based projects to produce software technology and sound effects for video games, simulations, and other interactive media. Through lab courses in four of the eight semesters, these students gain expertise in working with computer software and hardware that is essential to the sound design and synthesis process. In three of the four years, students work on game development team projects, solidifying their skills as software developers. The balance between foundational science such as calculus, acoustics, and data structures, and applied laboratory project work in game development and sound design, gives the student the technical and creative experience to be a software engineer with special emphasis on the art and science of sound.

The Bachelor of Science in Engineering and Sound Design degree program is a four-year undergraduate computer science degree program designed to prepare software engineers for careers in software development with an emphasis on music- and audio-related applications. The program includes training in computer audio, graphics, and real-time simulation programming. Graduates of this program are prepared for the following entry and intermediate level positions: 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.

The first BS in Engineering and Sound Design cohort matriculated in 2012; we will begin reporting certain disclosures, including graduation and placement rates, in accordance with ACCSC reporting requirements. For other important information, including occupational profiles and cost of attendance, visit digipen.edu/fileadmin/disclosures/BSESD.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Science in Engineering and Sound Design 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 REQUIREMENTS AND CORE COURSES

Students must receive a grade of "C-" (or 1.7 quality points) or better in all core courses for the Bachelor of Science in Engineering and Sound Design. (In a non-core course a grade of "D" [or 1.0 quality points] is considered passing.) The core courses are: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS 230, CS 245, CS 246, CS 251, CS 280, ECE 101L, ECE 200, GAM 100, GAM 150, GAM 200, GAM 250, GAM 300, GAM 350, MAT 140, MAT 150, MAT 200, MAT 220, MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 150, MUS 150L, MUS 151, MUS 151L, MUS 250, MUS 250L, MUS 251, MUS 251L, PHY 200, PHY 250, PHY 320, PHY 321, and three MUS elective credits.

COMPUTER SCIENCE

The following courses are required: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS 230, CS 245, CS 246, CS 251, CS 280. (Total: 33 credits.)

ELECTRICAL AND COMPUTER ENGINEERING

The following courses are required: ECE 101L, ECE 200. (Total: 4 credits.)

FILM

The following course is required: FLM 115. (Total: 3 credits.)

PROJECTS

The following courses are required: GAM 100, GAM 150, GAM 200, GAM 250, GAM 300, and GAM 350. (Total: 24 credits.)

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COL 101, COL 499, COM 150, ENG 110, LAW 115, and three HSS elective credits. (Total: 14 credits) Humanities and Social Sciences Electives HSS Electives include courses with the following prefixes: COM (Communications), ECN (Economics), ENG (English), HIS (History), LAW (Law), MGT (Management), PHL (Philosophy), PSY (Psychology), and SOS (Social Sciences).

MATHEMATICS

The following courses are required: MAT 140, MAT 150, MAT 200, and MAT 220 (Total: 15 credits.)

MUSIC

The following courses are required: MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 150, MUS 150L, MUS 151, MUS 151L, MUS 250, MUS 250L, MUS 251, MUS 251L, and three MUS elective credits. (Total: 23 credits.)

PHYSICS

The following courses are required: PHY 200, PHY 250, PHY 320, and PHY 321. (Total: 12 credits.)

STEM (SCIENCE, TECHNOLOGY, ENGINEERING, MATH) ELECTIVE

The following courses are required: Nine credits taken from courses numbered 200 or higher from CS, ECE, MAT, or PHY. (Total: 9 credits.)

OPEN ELECTIVES

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

INTERNSHIP OPTION

Students have the option to replace the course GAM 350 with the internship course GAM 390. All internships must be approved in writing by the program director and internship coordinator, and comply with the DigiPen internship guidelines.

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the Bachelor of Science in Engineering and Sound Design: COM 150, ENG 110, FLM 115, LAW 115, MAT 140, MAT 150, MAT 200, PHY 200, PHY 250, and three HSS elective credits, for a total of 33 credits.

Recommended Course Sequence Chart for BS in Engineering and Sound Design

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	COL 101	College Life and Academic Skills		1
	CS 100	Computer Environment I	X	3
	CS 100L	Computer Environment I Lab	X	1
	CS 120	High-Level Programming I: The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	MAT 140	Linear Algebra and Geometry	X	4
	MUS 120	Music Theory and Musicianship I	X	2
	MUS 120L	Music Theory and Musicianship I Lab	X	1
	Semester Total			
Semester 2	CS 170	High-Level Programming II: The C++ Programming Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques		3
	GAM 150	Project I	X	3
	ECE 101L	Introduction to Engineering Projects	X	1
	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	MUS 121	Music Theory and Musicianship II	X	2
	MUS 121L	Music Theory and Musicianship II Lab	X	1
	Semester Total			
Semester 3	CS 180	Operating System I: Man-Machine Interface	X	3
	CS 225	Advanced C/C++	X	3
	ENG 110	Composition		3
	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	MUS 150	Sound Design Project I	X	2
	MUS 150L	Sound Design Project I Lab	X	2
	PHY 200	Motion Dynamics	X	3
	Semester Total			
Semester 4	ECE 200	Electric Circuits	X	3
	CS 245	Introduction to Interactive Sound Synthesis	X	3
	FLM 115	History of Film and Animation		3
	MAT 220	Mathematics of Digital Sound Processing	X	3
	MUS 151	Sound Design Project II	X	2
	MUS 151L	Sound Design Project II Lab	X	2
	PHY 250	Waves, Optics, and Aerodynamics	X	3
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 5	CS 246	Advanced Sound Synthesis	X	3
	CS 251	Introduction to Computer Graphics	X	3
	GAM 200	Project II	X	4
	MUS 250	Sound Design Project III	X	1
	MUS 250L	Sound Design Project III Lab	X	2
	PHY 320	Acoustics I	X	3
	COL 499	Career Search Preparation: Materials, Logistics and Communication		1
	Semester Total			
Semester 6	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MUS 251	Sound Design Project IV	X	1
	MUS 251L	Sound Design Project IV Lab	X	2
	PHY 321	Acoustics II	X	3
	STEM Elective	Science, Technology, Engineering, or Math Elective: CS, ECE, MAT, or PHY, over level 200	X	3
	Semester Total			
Semester 7	COM 150	Interpersonal and Work Communication		3
	GAM 300	Project III	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen	X	3
	STEM Elective	Science, Technology, Engineering, or Math Elective: CS, ECE, MAT, or PHY, over level 200	X	3
	STEM Elective	Science, Technology, Engineering, or Math Elective: CS, ECE, MAT, or PHY, over level 200		3
	Semester Total			
Semester 8	GAM 350	Project III	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	HSS Elective	Humanities and Social Sciences Elective		3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	MUS Elective	Music Elective	X	3
	Semester Total			
Degree Program Total				143 minimum

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

Bachelor of Fine Arts in Digital Art and Animation

Program Overview

As the digital entertainment and animation industries mature, there is a noticeable shift by companies to hire employees who demonstrate more than a working knowledge of a specific commercial software package or traditional artistic skills. Industry-quality standards continue to rise and competition for entry-level positions demands that artists possess sophisticated skill sets before they can even begin their careers. Studios seek artists with a broad and integrated foundation of theoretical, practical, and technical skills in production animation, traditional art, modern computer software, and media story flow. Insight and long-term potential have become increasingly important. The studios also demand professional accountability and consistency.

A degree in digital art and animation opens the door to viable career opportunities for graduates who possess the knowledge, abilities, and talent. Animation is capable of solving informational, educational, and entertainment problems no other discipline can resolve. It provides a cornerstone for many industries including cinema, broadcast entertainment, cable television, software development, the internet, education, simulation, product design, research, forensic science, architecture, telecommunications, advertising, travel and tourism, and video games. The fact that these industries depend upon qualified candidates accentuates the need for quality digital art and animation education.

The broad scope of these demands presents a series of significant academic challenges. Most art students enter collegiate training with little or no substantial background knowledge relative to this field. Many secondary schools have been forced to cut back on the level of arts training that they are able to provide. Consequently aspiring artists must acquire this foundation while they are also trying to establish their professional focus. The complexity of the individual components of this field demands a structured curriculum and programmed sequencing to enable students to be successful. Students benefit from the deep and sequential approach to the material that the program provides.

Students who successfully complete this curriculum will possess appropriate samples of professional work and the following:

- A broad foundation of traditional and digital art techniques and production experiences using different media in both 2D and 3D art and animation. This base allows students to gain an overview of the profession and provides long-term adaptability.
- An area of production emphasis and focus. This enables students to target a specific sector of the industry upon graduation. Each student will produce a portfolio to support this focus.
- Strong foundational skills in storytelling. This includes visual storytelling, literary traditions, story through dialog, story through acting, and cinematic conventions.

- Strong foundational skills in applied technology using industry-standard hardware and software. Students will be thoroughly familiar with modern interface and workflow conventions. They will also understand how to learn new software while maintaining a production schedule.
- A solid foundation in professional work habits and attitude. Students will understand how to utilize and integrate professional criticism into their work. Additionally, they will be able to identify and create work that meets professional quality standards. They will also understand production flow and be able to generate and maintain appropriate schedules and production goals for their work.
- Social perspective and civic accountability relative to the roles that animation plays in society. Students will explore the long-term ramifications of this industry and be able to intelligently discuss their responsibilities to the betterment of the animation industry and society as a whole.

Examples of student artwork and projects can be found in the Digital Gallery on DigiPen's website.

The BFA in Digital Art and Animation prepares students for careers in digital art and digital 3D animation, digital 2D animation, and video game or animation pre-production. Possible job titles include Props and Environment Modeler, Texture Artist, Character Modeler, Character Rigger, Character Animator, 3D Lighting and Camera Designer, Effects Animator, Level Designer, UI Designer, Technical Artist, Producer, Project Manager, Composer, Simulation and Effects Animator, Storyboard Artist, Maquette Sculptor, Web Designer, Art Instructor, Illustrator, Concept Artist, and Character Designer.

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/BFA.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Fine Arts in Digital Art and Animation requires completion of at least 145 credits with a cumulative GPA of 2.0 or better. Courses are either mandatory or elective and must in either case be passed with a final grade of "C-" (or 1.7 quality points) or higher. The program usually spans eight semesters of 15 weeks each, or four academic years.

GRADE REQUIREMENT AND CORE COURSES

Certain non-elective courses that are part of the DigiPen BFA in Digital Art and Animation course sequence are survey or introductory courses intended to widen the student's understanding and educational experience but are additional to, not central to, the degree. These courses (SOS 115, PHY 115, CS 115, and LAW 115) are all 100 level courses, which are not taught during the first year of the degree program. As such, they are considered to be non-core classes and the grading protocols for non-core courses apply (i.e., credit is given if the class is passed with a grade of "D" [or 1.0 quality points] or higher). All other courses, required or elective, are core courses and students must receive a grade of "C-" (or 1.0 quality points) or higher to pass.

ANIMATION

The following courses are required: ANI 101, ANI 125, and ANI 151. (Total: 9 credits)

ART

The following courses are required: ART 101, ART 110, ART 115, ART 125, ART 151, ART 201, ART 251, ART 300, ART 350, ART 401, and ART 450. (Total: 34 credits)

COMPUTER GRAPHICS

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

ELECTIVES

Students must take a minimum of 24 credits from any DigiPen courses excluding the following: ART 102, ART 126, ART 210, ART 400, CG 102, CG 125, CG 130, CG 135. (Total: 24 credits)

FILM

The following courses are required: FLM 115, FLM 151, and either FLM 201 or FLM 210. (Total: 9 credits)

HUMANITIES AND SOCIAL SCIENCE

The following courses are required: COL 101, LAW 115, SOS 115, ENG 116, and ENG 315. (Total: 15 credits)

PROJECTS

The following courses are required: PRJ 201, PRJ 251, PRJ 300, PRJ 350, PRJ 400, and PRJ 450. Please note that INT 390 and INT 450, internship courses, may be taken in place of PRJ 400 and PRJ 450. (Total: 30 credits)

SCIENCE

The following courses are required: CS 115, PHY 115, BIO 150, and BIO 200. (Total: 12 credits)

NOTE ON GENERAL EDUCATION COURSES

The following courses satisfy the general education requirement for the BFA in Digital Art and Animation: ART 110 (3), ART 115 (4), (3), ENG 116 (4), ENG 315 (4), FLM 115 (3), LAW 115 (3), SOS 115 (3), CS 115 (3), and PHY 115 (3), for a total of 30 credits.

Recommended Course Sequence Chart for BFA in Digital Art and Animation

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	ANI 101	Introduction to Animation: Theories and Techniques I	X	3
	ART 101	The Language of Drawing	X	3
	ART 110	Fundamentals of Visual Communication and Design Process	X	3
	ART 115	Art and Technology	X	4
	ENG 116	Storytelling	X	4
	FLM 115	History of Film and Animation	X	3
	COL 101	College Life and Academic Skills	X	1
	Semester Total			
Semester 2	ANI 125	Acting for Animation	X	3
	ANI 151	Advanced Animation: Theories and Techniques II	X	3
	ART 125	Tone, Color, and Composition	X	3
	ART 151	Basic Life Drawing	X	3
	BIO 150	Human Muscular, Skeletal, and Kinetic Anatomy	X	3
	FLM 151	Visual Language and Film Analysis	X	3
	Semester Total			
Semester 3	ART 201	Advanced Life Drawing	X	3
	BIO 200	Animal Muscular, Skeletal, and Kinetic Anatomy	X	3
	CG 201	2D Raster Graphics and Animation	X	3
	CG 225	Introduction to 3D Animation	X	3
	PRJ 201	2D Animation Production	X	5
	Semester Total			
Semester 4	FLM 201 or FLM 210	Cinematography or Cinematography for Visual Effects	X	3
	ART 251	Character Design	X	3
	ART 300	Perspectives, Backgrounds, and Layouts	X	3
	ART 350	Storyboards	X	3
	CG 275	3D Character Animation	X	3
	PRJ 251	2D Vector Animation	X	5
	Semester Total			
Semester 5	ANI 300 or Elective	Acting through an Interface or **any course from the Elective Requirements list	X	3
	CG 251 or Elective	2D Vector Animation Production or **any course from the Elective Requirements list	X	3
	CG 300	3D Environment and Level Design	X	3
	ENG 315	Story Through Dialogue	X	4
	PRJ 300	Limited-Scope 3D Production	X	5
	Semester Total			

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	ANI 350 or Elective	Voice Acting for Animation or **any course from the Elective Requirements list	X	3
	ART 225 or Elective	3D Design and Sculpture or **any course from the Elective Requirements list	X	3
	PHY 115	Introduction to Applied Math and Physics		3
	CG 350 or Elective	Graphics for Gaming or **any course from the Elective Requirements list	X	3
	PRJ 350	3D Animation Production	X	5
	Semester Total			
Semester 7	ART 401	Conceptual Illustration and Visual Development	X	3
	FLM 250 or Elective	Digital Post-Production or **any course from the Elective Requirements list	X	3
	MUS 115 or Elective	Fundamentals of Music and Sound Design or **any course from the Elective Requirements list	X	3
	ART 450	Portfolio	X	3
	PRJ 400	Capstone Project I	X	5
	Semester Total			
Semester 8	ANI 400 or Elective	Cinematic Animation or **any course from the Elective Requirements list	X	3
	SOS 115	Media and Ethics: A Social Science Perspective		3
	CS 115	Introduction to Scripting and Programming		3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	PRJ 450	Capstone Project II	X	5
	Semester Total			
Degree Total				145 minimum

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

**Note: Please refer to the Elective requirements on the previous page.

Bachelor of Arts in Game Design

Program Overview

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

Graduates will be extremely well-versed in game design theory for digital and non-digital games, level design, system design, and behavior design. Graduates will have extensive experience testing, iterating, and polishing both digital and non-digital designs, through the completion of many individual projects and multiple team game projects. However, modern game designers must have a much greater breadth of knowledge than just design. Graduates will also learn the basics of programming, art, psychology, and writing, along with an introduction to sound design, economics, statistics, and probability. Students can bolster any one of these areas by taking additional courses to emphasize skills in narrative design, world design, character design, visual design, sound design, or psychology.

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

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/BAGD.html.

Degree Requirements

NUMBER OF CREDITS & GPA

The Bachelor of Arts in Game Design requires completion of at least 153 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of 15 weeks each, or four academic years.

GRADE REQUIREMENTS AND CORE COURSES

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

ART

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

COMPUTER SCIENCE

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

DESIGN

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

HUMANITIES AND SOCIAL SCIENCE

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

MATHEMATICS

The following courses are required: MAT 100 or MAT 140, and MAT 105. (Total: 7 credits)

MUSIC

The following course is required: MUS 115. (Total: 3 credits)

PROJECTS

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

SCIENCE

The following courses are required: PHY 115 or PHY 200. (Total: 3 credits)

ADVANCED ELECTIVES

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

OPEN ELECTIVES

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

NOTE ON GENERAL EDUCATION COURSES

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

Recommended Course Sequence Chart for BA in Game Design

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

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	GAT 212	Advanced Game Mechanics	X	3
	GAT 315	3D Game Design I	X	3
	ECN 100	Introduction to Economics	X	3
	Advanced Elective	A 200 level or higher elective of the student's choice from any department at DigiPen	X	3
	GAM 352	Project III for Designers	X	5
	Semester Total			
Semester 7	GAT 316	3D Game Design II	X	3
	GAT 330	Interactive Narrative and Character Creation for Games	X	3
	Advanced Elective	A 200 level or higher elective of the student's choice from any department at DigiPen	X	3
	GAM 400	Project IV	X	5
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 8	Design Elective	Any three-credit course with the GAT designation	X	3
	Open Elective	An elective of the student's choice from any department at DigiPen		3
	HSS Elective	Any three-credit course from the Department of Humanities and Social Sciences offered at DigiPen	X	3
	MGT 451	Project Management	X	3
	GAM 450	Project IV	X	5
	Semester Total			
Degree Program Total				153 minimum

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

Bachelor of Arts in Music and Sound Design

Program Overview

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

The BA in Music and Sound Design degree program prepares students to become 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 and production 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.

The first BA in Music and Sound Design cohort matriculated in 2012; we will begin reporting certain disclosures, including graduation and placement rates, in accordance with ACCSC reporting requirements. For other important information, including occupational profiles and cost of attendance, visit digiopen.edu/fileadmin/disclosures/BAMSD.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The Bachelor of Arts in Music and Sound Design requires completion of 140 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 REQUIREMENTS AND CORE COURSES

Students must receive a grade of "C-" (or 1.7 quality points) or better in all core courses for the Bachelor of Arts in Music and Sound Design. (In a non-core course a grade of "D" [or 1.0 quality points] is considered passing.) The core courses are:

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 250, MUS 250L, MUS 251, MUS 251L, MUS 260, MUS 261, MUS 310, MUS 311, MUS 316, MUS 320, MUS 321, MUS 322, MUS 330, MUS 331, MUS 350, MUS 350L, MUS 351, MUS 351L, MUS 410, MUS 411, MUS 415, MUS 416, MUS 450, MUS 450L, MUS 451, MUS 451L, and 9 MUS elective credits.

COMPUTER SCIENCE

The following courses are required: CS 116 and CS 175. (Total: 7 credits.)

FILM

The following courses are required: FLM 115 and FLM 151. (Total: 6 credits.)

GAME DESIGN AND DEVELOPMENT

The following course is required: GAT 110. (Total: 3 credits.)

HUMANITIES AND SOCIAL SCIENCES

The following courses are required: COL 101, COL 499, COM 150, ENG 110, ENG ELEC, LAW 115, and 9 HSS elective credits. (Total: 23 credits.)

HUMANITIES AND SOCIAL SCIENCES ELECTIVES

HSS Electives include courses with the following prefixes: COM (Communications), ECN (Economics), ENG (English), HIS (History), LAW (Law), MGT (Management), PHL (Philosophy), PSY (Psychology), and SOS (Social Sciences).

MATHEMATICS

The following course is required: MAT 120. (Total: 3 credits.)

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 250, MUS 250L, MUS 251, MUS 251L, MUS 260, MUS 261, MUS 310, MUS 311 or MUS 316, MUS 320, MUS 321, MUS 322, MUS 330, MUS 331, MUS 350, MUS 350L, MUS 351, MUS 351L, MUS 410 or MUS 415, MUS 411 or MUS 416, MUS 450, MUS 450L, MUS 451, MUS 451L, and 9 MUS elective credits. (Total: 83 credits.)

PHYSICS

The following courses are required: PHY 115 and PHY 116. (Total: 6 credits.)

OPEN ELECTIVES

At least nine credits from any courses in any department at DigiPen. (Total: 9 credits)

INTERNSHIP OPTION

Students have the option to replace one of the pairs of courses: MUS 450 and MUS 450L, or MUS 451 and MUS 451L, with the internship course MUS 390. All internships must be approved in

writing by the program director and internship coordinator, and comply with the DigiPen internship guidelines.

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, ENG 110, FLM 115, LAW 115, PHY 115, PHY 116, and nine HSS elective credits, and three ENG elective credits, for a total of 30 credits.

Recommended Course Sequence for BA in Music and Sound Design

SEMESTER	COURSE	COURSE TITLE	CORE*	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	X	1
	MUS 112	Vocal Ensemble I	X	1
	MUS 120	Music Theory and Musicianship I	X	2
	MUS 120L	Music Theory and Musicianship I Lab	X	1
	MUS 150	Sound Design Project I	X	2
	MUS 150L	Sound Design Project I Lab	X	2
	Semester Total			
Semester 2	COM 150	Interpersonal and Work Communication		3
	FLM 151	Visual Language and Film Analysis		3
	MUS 111	Private Lessons II: Instrumental or Vocal	X	1
	MUS 113	Vocal Ensemble II	X	1
	MUS 121	Music Theory and Musicianship II	X	2
	MUS 121L	Music Theory and Musicianship II Lab	X	1
	MUS 151	Sound Design Project II	X	2
	MUS 151L	Sound Design Project Lab	X	2
	PHY 115	Introduction to Applied Math and Physics		3
	Semester Total			
Semester 3	CS 116	Introduction to Computer Technology and Programming		4
	MUS 210	Private Lessons III: Instrumental or Vocal	X	1
	MUS 212	Vocal Ensemble III	X	1
	MUS 220	Music Theory and Musicianship III	X	2
	MUS 220L	Music Theory and Musicianship III Lab	X	1
	MUS 230	Composition I	X	2
	MUS 250	Sound Design Project III	X	1
	MUS 250L	Sound Design Project III Lab	X	2
	MUS 260	Music History and Literature I	X	3
	Semester Total			
Semester 4	CS 175	Scripting Languages		3
	HSS Elective	Humanities and Social Sciences at Elective		3
	MUS 211	Private Lessons IV: Instrumental or Vocal	X	1
	MUS 213	Vocal Ensemble IV	X	1
	MUS 221	Music Theory and Musicianship IV	X	2
	MUS 221L	Music Theory and Musicianship IV Lab	X	1
	MUS 231	Composition II	X	2
	MUS 251	Sound Design Project IV	X	1
	MUS 251L	Sound Design Project IV Lab	X	2
	MUS 261	Music History and Literature II	X	3
Semester Total				19

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 5	COL 499	Career Search Preparation: Materials, Logistics, and Communication		1
	ENG Elective	English Elective		3
	HSS Elective	Humanities and Social Sciences Elective		3
	MUS 310	Private Lessons V: Instrumental or Vocal	X	1
	MUS 320	Conducting and Instrumentation	X	2
	MUS 330	Advanced Composition I	X	3
	MUS 350	Sound Design Project V	X	1
	MUS 350L	Sound Design Project V Lab	X	2
	PHY 116	Physics of Music and Sound		3
	Semester Total			
Semester 6	GAT 110	Game History		3
	MUS 311	Private Lessons VI: Instrumental or Vocal	X	1
	MUS 321	Introduction to Orchestration	X	3
	MUS 322	Adaptive Music for Video Games	X	3
	MUS 331	Advanced Composition II	X	3
	MUS 351	Sound Design Project VI	X	1
	MUS 351L	Sound Design Project VI Lab	X	2
	Semester Total			
Semester 7	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
	HSS Elective	Humanities and Social Sciences Elective		3
	MUS 410	Private Lessons VII: Instrumental or Vocal	X	1
	MUS 450	Sound Design Project VII	X	1
	MUS 450L	Sound Design Project VII Lab	X	2
	MUS Elective	Any MUS Course	X	3
	Semester Total			
Semester 8	Open 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 Lessons VIII: Instrumental or Vocal	X	1
	MUS 451	Sound Design Project VIII	X	1
	MUS 451L	Sound Design Project VIII Lab	X	2
	MUS Elective	Music Elective	X	3
	MUS Elective	Music Elective	X	3
	Semester Total			
Degree Program Total				140 minimum

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

Minors

To obtain a minor at DigiPen, undergraduates must satisfy criteria set out by the department awarding the minor. The following minors are available:

- Minor in Art
- Minor in Electrical and Computer Engineering
- Minor in English
- Minor in Game Design
- Minor in Mathematics
- Minor in Physics

Art Minor

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

- ART 101 and ART 125.
- Choice of two of the following courses: ART 151, ART 201, CG 201, or ART 225.
- Choice of ART 300 or ART 310.
- ART 401 or other 400-level ART course (except ART 400).

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

Electrical and Computer Engineering Minor

Digital games are limited by the hardware that contains them. Understanding and creating hardware and software at the base infrastructure level enables game designers and programmers to interact with the player in a fundamentally different manner. Students who complete a minor in computer engineering have a working knowledge of systems and circuits and have worked on both hardware and software projects.

Students must pass all of the following courses with a “C-” (or 1.7 quality points) or better to earn a minor in computer engineering: CS 100, CS 100L, CS 120, CS 120L, CS 180, CS 280, CS 315, CS 365, ECE 210, MAT 150 or MAT 180, MAT 200 or MAT 230, PHY 200, and 9 credits of CE electives. CE electives must be selected from the following list: ECE 200, ECE 220L, ECE 260, ECE 270, ECE 300, ECE 310L, and PHY 270.

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 upper-division ENG course numbered 300 or above.

Game Design Minor

To earn a game design minor at DigiPen, students must complete a block of 15 credits satisfying the following:

- Five of the following courses: GAT 110, GAT 210, GAT 211, GAT 212, GAT 250, GAT 251, GAT 305, GAT 310, GAT 315, GAT 316, GAT 330, GAT 335, GAT 405.
- All credits must be earned with a grade of “C-” (or 1.7 quality points) or better.

Mathematics 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 (any MAT course excluding MAT 103).
- PHY 300 may substitute for one of the MAT courses.
- Six credits must be numbered 300 or higher.
- At least nine credits in this subject area must be taken at DigiPen.
- All credits must be earned with a grade of “C-” (or 1.7 quality points) or better.

Physics Minor

Creating realistic simulations requires knowledge of the underlying physical laws of the universe. In modern simulations, for example, physics is the cornerstone around which the engine is built. Translating a set of natural laws into rules for the computer requires not only the ability to understand these laws, but also the ability to synthesize these laws given the restrictions of modern computing. All students with a BS in Computer Science and Real-Time Interactive Simulation or BS in Computer Engineering degree will understand the basic physical rules of simulations, but the students with a minor in physics will have a proven ability to recreate those rules.

Students who minor in physics will also have a wider exposure to the place of physics in the modern world, from electromagnetism to quantum mechanics. They will be introduced to many of the quandaries facing the modern physical sciences.

Students must complete 18 credits in PHY courses numbered 200 and above with a "C-" (or 1.7 quality points) or better to earn a physics minor. Additionally, students must achieve a grade "C-" (or 1.7 quality points) or better in MAT 100 or MAT 140, MAT 150 or MAT 180, MAT 200 or MAT 230, and MAT 225 or MAT 250.

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 degree program 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.

For details about graduation rates, median debt for students who complete this program, and other important information visit digipen.edu/fileadmin/disclosures/MSCS.html.

Degree Requirements

NUMBER OF CREDITS AND GPA

The MS in Computer Science degree program requires completion of at least 37 semester credits with a grade of “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 12 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

The following courses are required: 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 561, CS 562, CS 500
- Physically-based Simulation
 - » PHY 500
 - » CS 550
- Image Processing
 - » CS 570
 - » one of the following courses: CS 571, CS 572

ELECTIVES

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

The following courses are required: GAM 541 and two courses from the following: GAM 550, GAM 551, GAM 590, and GAM 591. (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 601 or 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 the 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 PT 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.

Program Transfer

When a matriculated full-time MS in Computer Science 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 MS in Computer Science program can be transferred to the part-time program. The student must fill out a Program Transfer Request form, obtain approval from his or her academic 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 automatically withdrawn from the full-time 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 MS 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 two additional electives offered at the graduate level to replace 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 the student's 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 the *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.

Graduate Grading System

The following system applies to graduate students. Undergraduate students refer to *Standards of Progress—Grading System*.

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 Poor = 1.0 quality points

F Failure = 0 quality points

AU Audit

M Missing grade

I Incomplete

W Withdrawal

S Satisfactory

U Unsatisfactory

P Pass

* A grade of 2.0 or better is required to earn credit for graduate-level classes.

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.

S—SATISFACTORY

The “S” grade is given only in non-credit courses.

U—UNSATISFACTORY

The “U” grade is given only in non-credit courses.

For complete descriptions of the other special grades, please refer to the *Standards of Progress—Grading System* section.

GRADE REPORTS

Reports of the final grade in each subject will be made available to the student soon after the close of each semester. However, grade reports are withheld from students who have delinquent accounts with the Office of Administration, Office of Accounting, Security, or Library.

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 on 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 terminated. Terminated 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 will be placed on Academic Warning. These students will work with their graduate 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 academic termination.

FAILING TO MAINTAIN SATISFACTORY PACE TOWARDS COMPLETION OF THE PROGRAM

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 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.

See *Satisfactory Academic Progress* under *Standards of Progress*.

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 semesters’ credits, 9 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.

Recommended Course Sequences

RECOMMENDED COURSE SEQUENCE CHART FOR FULL-TIME MS IN CS (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 Design	R	3
	Elective	CS, MAT* or PHY elective	E	3
	Semester Total			
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			
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			
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			
Semester 5	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 CS (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 Design	R	3
Semester 5	GAM 541	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.

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 and Real-Time Interactive Simulation degree and Master of Science in Computer Science in five years sequentially. Please refer to the *Accelerated Schedule* section (after the *BS in Computer Science and Real-Time Interactive Simulation Course Sequence*) for more details.

Master of Fine Arts in Digital Arts

Program Overview

As the animation and game industries grow, so does the demand for highly skilled and creative digital artists. The rapid advances in technology allow for a broader range of styles and greater flexibility in visual expression, particularly in real-time interactive entertainment. As the industries continue to evolve, they demand creative vision and original art beyond the production of assets.

To meet this demand, DigiPen's Master of Fine Arts in Digital Arts degree program offers a graduate level education with an emphasis on traditional art techniques, creativity and personal voice. The DigiPen faculty has crafted curriculum that focuses on the art first while also serving the needs of industry. DigiPen's unique curriculum requires the application of these skills in a digital context. Not only will alumni be prepared for the 3D graphics industry, they will have the tools and vision to become leaders who can advance the arts in video games and animated films.

The MFA in Digital Arts degree program emphasizes foundational studies such as anatomy, figure drawing, sculpture, art history, design, and color theory. Students will also become proficient in character design, traditional sculpting, digital sculpting, hard surface modeling, lighting, texturing, rendering, and rigging. Students combine these studies with original research to create innovative digital work for a thesis project.

MFA in Digital Arts candidates will be required to focus on areas of specialization and demonstrate mastery of their chosen fields. MFA in Digital Arts graduates' portfolios will exhibit a level of proficiency commensurate with specialists in the industry and will be qualified for jobs such as 3D Artist, 3D Modeler, Animator, Character Artist, Technical Artist, Texture Artist, Environment Artist or Art Instructor. In addition, some of the most successful MFA in Digital Arts graduates may attain jobs such as: Art Lead, Art Director, Senior Artist, and Senior Character Artist.

The first MFA in Digital Arts cohort matriculated in 2012; we will begin reporting certain disclosures, including graduation and placement rates, in accordance with ACCSC reporting requirements. Other important information, including occupational profiles and cost of attendance, can be found at digipen.edu/fileadmin/disclosures/MFA.html.

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 4 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 521, CG 525, CG 620, CG 501, and CG 605. (Total: 15 credits)

ELECTIVE

Students must take five electives for a total of 15 credits. The electives are as follows:

- ART or CG ELECTIVE: Students must select one course from any ART or CG course numbered 500 or higher.
- CSX, MGT or GAMX ELECTIVE. Students must select one course from CS, CSX, MGT, GAM, or GAMX numbered 500 or higher.
- ANY ELECTIVE. Students must select one course from any graduate level offering (500 or higher) at DigiPen.

(Total: 15 credits)

FINE ARTS

The following courses are required: ART 501, ART 515, ART 516, ART 517, ART 522, ART 528, ART 555. (Total: 21 credits)

PROJECTS AND THESIS

The following courses are required: PRJ 690, PRJ 701, and PRJ 702. (Total: 9 credits)

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.

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.

Program Transfer

When a matriculated full-time MFA in Digital Arts 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 MFA in Digital Arts program can be transferred to the part-time program. The student must fill out a Program Transfer Request form and submit the completed form to the Office of Administration in order to transfer from the full-time to the part-time program. Once granted, the student will automatically be withdrawn from the full-time 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 PRJ 702 (or 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 PRJ 690 must schedule and present their thesis proposal to a select thesis committee of faculty and senior industry professionals. No student may register for PRJ 701 without approval of the thesis committee.

There are three standard outcomes from the thesis proposal review:

- Approved: The thesis is approved for production. The student is promoted to Graduate Candidate and registration is opened for this student for thesis specific classes.
- Conditional: The thesis as proposed does not meet the quality and/or technical standards but will be allowed to proceed based on conditions determined by the thesis committee. The student will be required to schedule a follow up thesis review during the next academic semester before being allowed to register for PRJ 701.
- Rejection: The thesis proposal is not acceptable. The student is required to meet with the thesis advisor to create a new proposal and develop a new schedule for the proposed work. The student, at the discretion of the thesis committee, must repeat PRJ 690 to develop and refine the thesis proposal.

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, yet 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 in PRJ 690.

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 written component of the thesis will be a process paper, a research paper, or other written creative endeavor or documentation, such as schedules, marketing materials, an artist book or other design documents.

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).

Specifics for the defense will be provided during PRJ 702, but 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 expected, 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.

There are two possible outcomes of the thesis defense:

- **Approved:** Upon final approval of the thesis defense, the student must submit an archive copy of their work. The Graduate Candidate who has successfully completed all 60 required credits, archived the thesis and has received approval of the thesis defense is recognized as having completed requirements of DigiPen MFA in Digital Arts and will receive the degree.
- **Rejected:** The presentation, thesis or work does not meet technical and/or quality requirements of DigiPen. The thesis committee will provide instructions on aspects to be addressed. The candidate will reschedule a thesis defense for the following semester.

Graduate Grading System

The following system applies to graduate students. Undergraduate students, please refer to *Standards of Progress—Grading System*.

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 Poor = 1.0 quality points

F Failure = 0 quality points

AU Audit

M Missing grade

I Incomplete

W Withdrawal

S Satisfactory

U Unsatisfactory

P Pass

* A grade of 2.0 or better is required to earn credit for graduate-level classes.

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.

S—SATISFACTORY

The “S” grade is given only in non-credit courses.

U—UNSATISFACTORY

The “U” grade is given only in non-credit courses.

For complete descriptions of the other special grades, please refer to the *Standards of Progress—Grading System*.

GRADE REPORTS

Reports of the final grade in each subject will be made available to the student soon after the close of each semester. However, grade reports are withheld from students who have delinquent accounts with the Office of Administration, Office of Accounting, Security, or Library.

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 during the warning period will be academically terminated. Terminated 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 90 attempted credits will be placed on Academic Warning. Probationary students will work with their graduate advisor to develop a completion plan that outlines the quickest path to completion. Failure to meet the terms of this plan will result in academic termination.

FAILING TO MAINTAIN SATISFACTORY PACE TOWARDS COMPLETION OF THE PROGRAM

Students are required to complete their program within 150% of the normal time frame of their program. The normal time frame for full-time graduate program is two years and for part-time graduate program is four years in the MFA in Digital Arts program. See Recommended Sequence of Classes at the end of the *Masters of Fine Arts in Digital Arts* section.

See *Satisfactory Academic Progress* under *Standards of Progress*.

Transfer Credits

Graduate students are eligible to transfer up to 15 credits 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 below 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, 45 of which are specifically required and 15 of which are elective.

COURSE	COURSE TITLE	CREDITS	R/E
ART 501	Advanced Figure Drawing	3	R
ART 515	Art History: Classical to Renaissance	3	R
ART 516	Art History: 19th-21st Century	3	R
ART 517	Art History: Research Seminar	3	R
ART 522	Character Design	3	R
ART 528	Advanced Figure Sculpting	3	R
ART 555	Anatomy: Ecorché	3	R
CG 501	3D Concepts and Production	3	R
CG 521	Organic and Hard Surface Modeling	3	R
CG 525	Digital Painting: Composition and Color	3	R
CG 605	Digital Sculpting	3	R
CG 620	Lighting and Rendering	3	R
PRJ 690	Thesis I: Proposal Pre-Production	3	R
PRJ 701	Thesis II	3	R
PRJ 702	Thesis III	3	R
ART 503	Gesture Drawing	3	E
ART 504	Storyboarding	3	E
ART 511	Oil Painting: The Figure	3	E
ART 512	Plein Aire Painting	3	E
BIOX 500	Human Anatomy	3	E
BIOX 550	Animal Anatomy and Locomotion	3	E
CG 570	Digital Painting: Matte and Background	3	E
CG 577	Facial Rigging and Animation	3	E
CG 599	Special Topics	3	E
CG 661	Advanced Character Creation	3	E
CG 675	Character Rigging	3	E
CSX 510	Scripting for Games	3	E
FLM 508	Cinematography and The Art of The Story	3	E
GAMX 500	Game Design, Development and Production	3	E
MCM 600	Master's Continuous Matriculation	1	E
MGT 500	Management for Art Directors	3	E
PHYX 510	Physics for Animation and Modeling	3	E

Recommended Course Sequence

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

SEMESTER	COURSE	COURSE TITLE	R/E	CREDITS
Semester 1	ART 501	Advanced Figure Drawing	R	3
	ART 555	Anatomy: Ecorché	R	3
	CG 501	3D Concepts and Production	R	3
	CG 525	Digital Painting: Composition and Color	R	3
	ART 515	Art History: Classical to Renaissance	R	3
	Semester Total			
Semester 2	ART 522	Character Design	R	3
	ART 528	Advanced Figure Sculpting	R	3
	CG 521	Organic and Hard Surface Modeling	R	3
	ART 516	Art History: 19th to 21st Century	R	3
	PRJ 690	Thesis I: Proposal Pre-Production	R	3
	Semester Total			
Semester 3	CG 605	Digital Sculpting	R	3
	Elective	Any ART, ANI, or CG Elective*	E	3
	Elective	Any ART, ANI, or CG Elective*	E	3
	PRJ 701	Thesis II	R	3
	Open Elective	Any course from any department at DigiPen	E	3
	Semester Total			
Semester 4	ART 517	Art History: Research Seminar	R	3
	Elective	ART or CG Elective*	E	3
	CG 620	Lighting and Rendering	R	3
	Elective	Cross-Disciplinary Elective*	E	3
	PRJ 702	Thesis III	R	3
	Semester Total			
Degree Total				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	ART 501	Advanced Figure Drawing	R	3
	ART 555	Anatomy: Ecorché	R	3
	CG 501	3D Concepts and Production	R	3
	Semester Total			
Semester 2	ART 522	Character Design	R	3
	ART 528	Advanced Figure Sculpting	R	3
	CG 521	Organic and Hard Surface Modeling	R	3
	Semester Total			
Semester 3	CG 525	Digital Painting Color and Composition	R	3
	ART 515	Art History: Classical to Renaissance	R	3
	CG 605	Digital Sculpting	R	3
	Semester Total			
Semester 4	ART 516	Art History: 19th to 21st Century	R	3
	Elective	Any ART, ANI, or CG Elective*	E	3
	Semester Total			
Semester 5	CG 620	Lighting and Rendering	R	3
	Elective	Any ART, ANI, or CG Elective*	E	3
	Semester Total			
Semester 6	Art 517	Art History: Research Seminar	R	3
	Elective	Any ART, ANI, or CG Elective*	E	3
	PRJ 690	Thesis I: Proposal Pre-Production	R	3
	Semester Total			
Semester 7	PRJ 701	Thesis II	R	3
	Elective	Any course offered at DigiPen	E	3
	Semester Total			
Semester 8	Elective	Cross-Disciplinary Elective*	E	3
	PRJ 702	Thesis III	R	3
	Semester Total			
Degree Total				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 advisor.

Course Descriptions for the Academic Year 2015–2016

Please note that 500-level and higher courses are designated for DigiPen's graduate programs. Undergraduate students will not be admitted, unless by override or through approved matriculation in an accelerated program.

Department of Animation and Production

Animation Courses

ANI 101 **Introduction to Animation: Theories and Techniques I** (3 cr.)

Prerequisite(s): None

This course introduces students to the principles of animation through classical animation techniques. Students explore the art of creating convincing movement through effective timing, spacing, and drawing. Works of master animators are screened and analyzed frame-by-frame to illustrate the principles covered in class, and students will put their knowledge to work through a series of exercises. The ultimate goal of both this course and its sequel is to introduce methods by which animators act and bring characters to life through sequential images.

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 **Advanced Animation: Theories and Techniques II** (3 cr.)

Prerequisite(s): ANI 101

In this course students continue to explore and exercise the concepts and techniques of classical animation through a series of assignments. The exercises in this course are considerably more demanding than those completed in ANI 101 as they are longer and will require more refinement, subtlety, and creativity. There is also a greater emphasis on character development - the expression of personality, mood, thought, and attitude through motion and posing.

ANI 300 **Acting Through an Interface** (3 cr.)

Prerequisite(s): ANI 125, ANI 151, CG 275

An animator's ability to express attitude, thought, and emotion through a surrogate is a fundamental skill of 3D character animation. This course builds upon the earlier acting and 2D animation curriculum. It explores 3D character animation techniques of performance, physicality, and weight. Students complete a number of animation assignments during the semester.

ANI 301 **Physicality and Pantomime in CG Animation** (3 cr.)

Prerequisite(s): ANI 125, ANI 151, ART 201, ART 226, CG 275

Students in this course will be expected to take the information and experience they have learned in ANI 101 and ANI 151 and develop those principles further. Here students will create a catalog of movement and dynamic expression. They will explore a full range of action in depth and dimension, paying special attention to gestured movement and timed performance. They will learn that the pose is everything and that the movement from pose to pose in three-dimensional space can help heighten and dramatize performance. In this course students will not only deepen their understanding of performance animation but also a mastery of performance in time and space.

ANI 350 **Voice Acting for Animation** (3 cr.)

Prerequisite(s): ANI 300

This course explores the nature of acting through the medium of the human voice. The curriculum explores narration, expressive reading, diction, and vocal refinement. It introduces students to basic audio technology and recording equipment. The course also covers lip-synchronization techniques in animation and culminates in a series of practical exercises in both 2D and 3D animation.

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 151

Credit may be received for either FLM 201 or FLM 210, but not for both.

Like a filmmaker, computer animators must have a good understanding of appropriate camera composition, lighting, and editing techniques to enhance the visual impact of the story being told. Appropriate composition and camera movement help to reveal action, and lighting establishes focus, place, and mood. Assignments in camera composition, movement, lighting, and editing help students solidify their understanding of the concepts presented.

FLM 210 **Cinematography for Visual Effects** (3 cr.)

Prerequisite(s): FLM 151

Credit may be received for either FLM 201 or FLM 210, but not for both.

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. Emphasis is on digital imagery.

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., rotoscoping, blue/green screen, masks, wire removal) and compositing software (layer-based, node-based). Students apply this knowledge to basic 2D compositing, as well as motion tracking and color correction.

FLM 360 **Compositing II** (3 cr.)

Prerequisite(s): 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.

Projects 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. Internships are structured along the Internship Guidelines available in the Administration Office.

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. Internships are structured along the Internship Guidelines available in the Administration Office.

PRJ 201 **2D Animation Production** (5 cr.)

Prerequisite(s): ANI 151, ART 125

This is a traditional animation course within the context of a two-semester project. This project builds on the cumulative skill sets acquired in ANI 101 and ANI 151, but with a focus on team dynamics, acting, visual storytelling, and the goal of completing a short animated film rather than a series of learning exercises. This course concentrates on pre-production for the project.

PRJ 251 **2D Animation Production** (5 cr.)

Prerequisite(s): PRJ 201

This is a traditional animation course within the context of a two-semester project. This project builds on the cumulative skill sets acquired in ANI 101 and ANI 151, but with a focus on team dynamics, acting, visual storytelling, and the goal of completing a short animated film rather than a series of learning exercises. Building on the work completed in PRJ 201, PRJ 251 concentrates on the production and animation for the project.

PRJ 300 **Limited-Scope 3D Production** (5 cr.)

Prerequisite(s): ART 251, ART 300, ART 350, CG 275, PRJ 251

In PRJ 300 students will be guided through the elements of creating a short animated piece from design through pre-production including designing and building a character as well as an environment, then planning the animation. The remainder of the production continues in PRJ350.

PRJ 350 **3D Animation Production** (5 cr.)

Prerequisite(s): ART 300, CG 300, PRJ 300

PRJ 350 picks up where PRJ 300 left off in further developing design and production skills. The course is a full-semester project where students will produce a short animated production that demonstrates their skills in design, modeling, animation, lighting and rendering.

PRJ 400 **Senior Cinematic Project I** (5 cr.)

Prerequisite(s): ART 350, ENG 116, PRJ 350

This course is the first half of a two semester sequence on the production of an innovative short film. It focuses on concept, pre-production and asset creation in a team environment. Teams include other BFA students registered in PRJ 400. Projects can be produced in 2D or 3D. Additional topics may include effective presentations, managing scope, and team dynamics.

PRJ 402 **Senior Game Art Project I** (5 cr.)

Prerequisite(s): CG 310 or CG 350, ART 350, ENG 116, PRJ 350

This course is the first half of a two semester sequence on the production of an innovative interactive experience. It focuses on concept, pre-production and asset creation in a team environment. Students may use current software and hardware technologies such as web technologies, consoles, mobile devices. Teams include other BFA students registered in PRJ 402 and will collaborate with students registered for GAM classes. Projects can be produced in 2D or 3D. Additional topics may include effective presentations, managing scope and team dynamics.

PRJ 450 **Senior Cinematic Project II** (5 cr.)

Prerequisite(s): PRJ 400

With the completed pre-production work for a cinematic project done, students are then guided through final rendering and post-production. Students are assisted through the challenges of commercial art direction, quality control, production deadlines, and team dynamics, as well as many technical challenges.

PRJ 452 **Senior Game Art Project II** (5 cr.)

Prerequisite(s): PRJ 402

Having completed the pre-production work for a team-based interactive experience production in PRJ 402, students are guided through final implementation, debugging and polish of their projects. Students face the challenges of commercial art direction, quality control, production deadlines, and team dynamics, as well as the many technical challenges. Teams include other BFA students registered in PRJ 452 and will collaborate with students registered for GAM classes.

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** (3 cr.)

Prerequisite(s): None

Concurrent Course(s): CS 100L

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

CS 100L **Computer Environment Lab** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): CS 100

CS 100L is the lab component of the introductory computer environment course. Students meet weekly to explore the topics presented in CS 100, from building basic analog and digital circuits to programming a microcontroller to manage autonomous robot navigation.

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** (3 cr.)

Prerequisite(s): None

Concurrent Course(s): CS 120L

In presenting the C programming language, this course serves as a foundation for all high level programming courses and projects. It provides the fundamentals of programming, including control flows, such as statement grouping, decision-making, case selection, procedure iteration, and termination test and basic data types, such as arrays, structures, and pointers. Additionally, it intensively discusses the lexical convention, syntax notation, and semantics.

CS 120L **High-Level Programming I Lab** (1 cr.)

Prerequisite(s): None

Concurrent Course(s): CS 120

This is the lab component of the introductory High-Level Programming I course. Students meet for two hours weekly to apply the concepts presented in CS 120 in a controlled environment.

CS 170 **High-Level Programming II: The C++ Programming Language** (3 cr.)

Prerequisite(s): CS 120, CS 120L

Concurrent Course(s): CS 170L

This course is a continuation of High-Level Programming I (CS 120). It introduces the C++ language with particular emphasis on its object-oriented features. Topics covered include stylistic and usage differences between C and C++, namespaces, function and operator overloading, classes, inheritance, class and function templates, STL lists, and vectors.

CS 170L **High-Level Programming II Lab** (1 cr.)

Prerequisite(s): CS 120, CS 120L

Concurrent Course(s): CS 170

This is the lab component of the High-Level Programming II course. Students meet weekly to work on topics presented in the CS 170 lectures in a lab environment.

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 100L or CS 101, CS 170, CS 170L

This course presents an overview of modern operating systems, in particular Windows and Linux/Unix as implemented on modern PCs. After an overview of what an operating system is and does, the following is also covered: organization and design (the kernel and various subsystems), process management (creation and management of processes and threads, including an introduction to multi-threaded programming), networks (the TCP/IP stack and the organization of the Internet), interprocess communication, process synchronization (locks, semaphores, and methods to avoid deadlocks), memory management (hardware and process views of memory layout and demand-paged virtual memory), file systems, and security and protection (viruses, worms, and Trojan horses).

CS 200 **Computer Graphics I** (3 cr.)

Prerequisite(s): CS 170, CS 170L, 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, CS 170L

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, CS 170L

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, CS 120L

Concurrent Course(s): CS 170, CS 170L

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 241 **Fundamental Computer Graphics** (3 cr.)

Prerequisite(s): None

Entrance into the Master of Science in Computer Science program.

This course covers the contents of CS 200 and CS 250 in a single semester. It examines the algorithms and mathematical elements needed to generate and render 2D and 3D scenes. Topics include the graphics pipeline, 2D and 3D coordinate

systems and their transformations, homogeneous coordinates and perspective calculations, scan-conversion algorithms, color models, collision detection techniques, and basic culling, clipping, and intersection.

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 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 311 **Introduction to Databases** (3 cr.)

Prerequisite(s): CS 170, CS 170L

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

CS 315 **Low-Level Programming** (3 cr.)

Prerequisite(s): CS 100, CS 100L, CS 120, CS 120L, CS 180

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

CS 325 **User Interface and User Experience Design** (3 cr.)

Prerequisite(s): None

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

CS 375 **Compilers and Interpreters** (3 cr.)

Prerequisite(s): CS 330, MAT 258

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

CS 380 **Artificial Intelligence for Games** (3 cr.)

Prerequisite(s): CS 280

This course introduces students to a wide range of concepts and practical algorithms that are commonly used to solve game AI problems. Case studies from real games are used to

illustrate the concepts. Students have a chance to work with and implement core game AI algorithms. Topics covered 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 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 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 350

Entrance into the Master of Science in Computer Science program is an alternative prerequisite for this course.

In this course, students are introduced to the basic techniques used in ray tracing, including intersection calculations, illumination models, and anti-aliasing. The underlying physical and mathematical underpinnings are also discussed, as well as the practical aspects of how to implement a ray tracer.

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

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

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

Prerequisite(s): None

This course is the first part of the master's program thesis. The student works with the thesis advisory committee to select a research topic, to conduct a complete survey of existing techniques and algorithms in the related field, to identify fundamental knowledge, and to collect materials and tools that are essential to his or her research work. Upon completion of the course, the student produces a written document to summarize the above steps. In this document, the student is also encouraged to include an original idea of proposed approaches to the problem.

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

Prerequisite(s): CS 601

This course is the second part of the master's program thesis. Students continue to work under the supervision of the thesis advisory committee to create the theory of the proposed research topic, to develop algorithms, and to possibly create a

prototype to verify the theory and methods. Upon completion of the course, the student must submit his or her formal written thesis to the advisory committee to summarize the research and pass the oral exam to defend 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 registration 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 and Animation for Designers** (3 cr.)

Prerequisite(s): ART 125 or ART 126
Concurrent Course(s): CG 125

This course introduces students to industry-standard software and practices of raster graphics and animation. The course begins with basic information, such as interface organization strategies, system components, bit depth, resolution, memory management, and output strategies. Then it explores techniques and critical thinking skills for digital painting, scanning, character development and animation for 2D games. Additionally, it looks at basic interface customization options and strategies in 2D raster graphics.

CG 125 **Introduction to 3D Production for Designers** (3 cr.)

Prerequisite(s): ART 125 or ART 126
Concurrent Course(s): CG 102

This course introduces game design students to current software and production process of 3D animation, with a focus on implementing the art assets into a game engine. The course begins with basic information, such as interface organization strategies, equipment options, and production elements. The class also introduces techniques for texture mapping, modeling, rigging, lighting, cameras, and animation. Additionally, it looks at basic interface customization options and strategies in 3D graphics, culminating in a series of applied problems in 3D production techniques.

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 **2D Raster Graphics and Animation** (3 cr.)

Prerequisite(s): ANI 151, ART 101, ART 125

This course introduces students to the industry-standard software and practices of raster graphics and animation. The course begins with basic information, such as interface organization strategies, system components, bit depth, resolution, memory management, and output strategies. It also explores techniques and critical thinking skills for digital painting, scanning, still compositing, and texture creation. Additionally, it looks at basic interface customization options and strategies in 2D raster graphics.

CG 225 **Introduction to 3D Animation** (3 cr.)

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

This course introduces students to industry-standard software and practices of 3D animation. The course begins with basic information such as interface organization strategies, equipment options, and production elements. It also introduces techniques and critical thinking skills for texture mapping, modeling, rigging, lighting, cameras, and animation. Additionally, it looks at basic interface customization options and strategies in 3D graphics, culminating in a series of applied problems in 3D production techniques.

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 **3D Character Animation** (3 cr.)

Prerequisite(s): CG 225

Students continue to explore and exercise the concepts and techniques of 3D animation through a series of assignments applied to characters. Exercises in this course are considerably more demanding than those completed in CG 225 as they are longer and require more refinement, subtlety, and creativity. The course emphasizes character development - the expression of personality, mood, thought, and attitude through motion and posing. It also gives special consideration to proper model rigging.

CG 300 **3D Environment and Level Design** (3 cr.)

Prerequisite(s): CG 275

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

CG 301 **3D Environment Design for Games** (3 cr.)

Prerequisite(s): ART 310, CG 102, CG 125

This course provides game design students with an understanding of the design and production process of environments for 3D games. It introduces the principles of 3D environment creation and provides a functional working

knowledge of modeling, texturing and lighting skills within the framework of a 3D modeling package to create believable and well-designed environments. Student work is implemented into a game engine.

CG 303 Hard Surface Modeling and Texturing (3 cr.)

Prerequisite(s): CG 275

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

CG 305 Digital Sculpture (3 cr.)

Prerequisite(s): CG 275

This course introduces an array of digital modeling, sculpting, and painting techniques with a set of industry-standard 3D and 2D tools. After a series of exercises, students learn the tools and work flow of digital sculpting and enhance their knowledge of anatomy. As part of this class, students create a highly finished 3D character that is fully designed, modeled, 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 399 Special Topics in Computer Graphics (3 cr.)

Prerequisite(s): None

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

CG 400 Advanced 3D Modeling Techniques (3 cr.)

Prerequisite(s): CG 275

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

CG 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 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 Sculpting** (3 cr.)

Prerequisite(s): CG 501

This course introduces an array of digital modeling, sculpting, and painting techniques with a set of industry-standard 3D and 2D tools. Students practice sculpting, modeling, posing, anatomy, texturing, and workflow.

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

Prerequisite(s): CG 501

This course introduces advanced lighting techniques in a 3D scene. A variety of output formats are presented and students are exposed to solutions for various media projects.

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

Prerequisite(s): ART 522

This course exercises advanced character creation theory and techniques. Students should bring evolved ideas and concepts to design and create a comprehensive character. Other than the techniques of digital painting, sculpting, organic and hard surface modeling, texturing, advanced shading, lighting and rendering, some additional challenges such as cloth, hair, and fur simulation may be introduced as well.

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

Prerequisite(s): CG 501

This course is designed to teach students how to effectively rig biped and quadruped characters for games or films. This class explores multiple methods for providing industry-standard solutions in a timely and efficient manner. Topics may include: building a hierarchy of joints, creating flexible controls for characters, dynamic simulation, and scripting for rigging.

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, CS 100L

This course introduces students to the basics of the Computer Engineering field. This is done by presenting overviews of diverse subjects such as, but not limited to: the history of computer engineering, the electronics development cycle, professional ethics, multidisciplinary team environments, and common development tools used in industry. Students are expected to apply this and previous knowledge to completing a project involving an embedded microprocessor.

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

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

This course covers analog circuits. Topics in the course usually include the following: 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. Additionally, students are expected to learn how their analog and digital circuit designs are affected by capacitive and inductive effects.

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

Prerequisite(s): CS 100, CS 100L

This course focuses on digital circuit design. Topics include combinational and sequential logic, logic families, state machines, timers, digital/analog conversion, memory devices, and microprocessor architecture. Integral to this course are hands-on laboratories where students design, build, and test many of the circuits presented in lecture.

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

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

In this course, students are expected to design and build a device using components such as integrated circuits and embedded microprocessors, usually taking the form of a

robot or electronic toy. The device interacts with people or the environment, and it demonstrates digital communication. This course introduces concepts of software engineering and process documentation, and emphasizes system-level design. Students are expected to learn the process of creating a device from documenting their concept to building an initial prototype.

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 260 or ECE 220L, CS 170, CS 170L

This course covers topics needed to build the hardware and software for embedded devices. 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 310L **CE 3rd Year Project I** (5 cr.)

Prerequisite(s): CS 225, ECE 200, ECE 210, ECE 220L, ECE 300, PHY 200

In this course, students work in small teams to design, build, program, document, and test an interactive embedded device. Students are expected to integrate a microprocessor with various peripheral devices such as storage, input, sensors, and display devices, into a portable embedded platform. Moreover, they are expected to develop team management skills, presentation skills, and critical design processes, as well as study and implement the theory behind human-machine interaction and interface devices.

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 360L **CE 3rd Year Project II** (5 cr.)

Prerequisite(s): CS 280, ECE 310L

In this course, students work in small teams to complete a portable interactive embedded device that was started in ECE 310L. Teams are expected to develop a system that integrates software and hardware in a real-time environment. Development includes component selection, design, testing, implementation, and demonstration. Students are expected to provide a framework for applications on the device and to showcase their final project with a simple application.

ECE 390 **CE Internship I** (5 cr.)

Prerequisite(s): ECE 270, ECE 310L

The ECE internship is a monitored work or service experience in an ECE-related professional environment. The student intern, faculty advisor, and internship provider will agree on intentional learning goals and a method of evaluation. Due to the professional nature of the work, there is a high degree of responsibility associated with this course. Internships are structured along the Internship Guidelines available from the Administration Office.

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 410L **CE 4th Year Project I** (5 cr.)

Prerequisite(s): CS 330, ECE 360L, MAT 225, MAT 256, MAT 258, PHY 270

ECE 410L is the first semester of the CE program capstone project. Students working in teams are expected to develop

a system that integrates software and hardware in a real-time environment. Students are responsible for all aspects of the project, including component selection, design, testing, and implementation. In addition to the project work, there will be weekly lectures covering communication and professional skills (e.g., interview preparation, resume/CV writing, presentations) and engineering skills (e.g., engineering management, testing and quality control, statistical methods).

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** (5 cr.)

Prerequisite(s): ECE 410L

ECE 460L is the second semester of the CE program capstone project. Students working in teams are expected to develop a system that integrates software and hardware in a real-time environment. Students are responsible for the project description, component selection, design, testing, implementation, and demonstration. In addition to the project work, there will be weekly lectures covering communication and professional skills (e.g., interview preparation, resume/CV writing, presentations) and engineering skills (e.g., engineering management, testing and quality control, statistical methods).

ECE 490 **CE Internship II** (5 cr.)

Prerequisite(s): ECE 270, ECE 310L

The ECE internship is a monitored work or service experience in an ECE-related professional environment. The student intern, faculty advisor, and internship provider agree on intentional learning goals and a method of evaluation. Due to the professional nature of the work, there is a high degree of responsibility associated with this course. Internships are structured along the Internship Guidelines available from the Administrative Office.

Department of Fine Arts

Art Courses

ART 101 **The Language of Drawing** (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. Applied drawing goals and critical thinking skills are given special consideration. Students are introduced to basic professional habits in drawing practice, drill, and play. Design principles, basic research, and the design process are introduced and applied to a series of practical problems. This course also explores basic drawing materials, drawing strategy, drawing sequence, 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 115 **Art and Technology** (4 cr.)

Prerequisite(s): None

This course provides an overview of art history from Paleolithic times until the modern day. It traces the technological advances of society and art and considers the interplay between art and technology. Classical art materials and methods are examined, and students explore how art has historically impacted society. This course has a worldwide scope and is not limited to just European and Western traditions.

ART 125 **Tone, Color and Composition** (3 cr.)

Prerequisite(s): ART 101

Credit maybe received for either ART 125 or ART 126, not both.

This course continues to build upon students' abilities to draw by exploring the nature and use of tone, color, and composition in drawing. It emphasizes methods of creating tone, ways to use luminance as an organizational element, and the importance of thinking critically. Additionally, the course introduces students to a variety of classical tonal systems and tonal illusions, including atmospheric perspective, sculptural modeling, basic direct lighting, lighting position relative to viewpoint, light intensity, local value, and reflectivity. Students then explore the artistic use of color. The course covers systems and traditions of organizing hue and saturation, and it examines methods of building from tonal preliminary studies. Students also explore classical forms of compositional organization, such as symmetry, asymmetry, golden mean, and figure-ground relationships.

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 151 **Basic Life Drawing** (3 cr.)

Prerequisite(s): ART 101

This course introduces students to the challenges of drawing the human form for animation. Students examine life drawing for animation in addition to methods for attaining these goals. The course emphasizes capturing skeletal structure, muscle form, emotion, and gesture. By drawing clothed and nude models of both genders, students learn to apply lessons in anatomy to the figure, significantly expanding their understanding of human kinetics and structure. Additionally, students practice extrapolating basic human life drawing strategies to other animals.

ART 201 **Advanced Life Drawing** (3 cr.)

Prerequisite(s): ART 125, ART 151

This course builds upon the anatomy and drawing courses students have already taken. Students continue to improve their ability to capture kinetics in humans and animals. By engaging in a series of exercises designed to enhance their visual memory, students build the foundation for drawing accurate figures from their imagination. They also explore putting the figure into an environment, figurative composition, and introductory sequential figurative composition.

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, 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 101, BIO 150

This course introduces students to the challenges of sculpting the human figure from life. Using traditional techniques to build an armature and complete a sculpture in clay, students enhance their understanding of the human form in 3D space. Emphasis is placed on gesture, proportion, and anatomy, as well as 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 aire. Technical and social problems related to painting are explored using portraiture, still life, and environment/landscape. A portable field easel and appropriate painting supplies will be required. The course will culminate in a group show of student projects.

ART 234 **Survey of Sequential Art** (3 cr.)

Prerequisite(s): ART 125, ART 151

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

ART 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

Students leverage their drawing and anatomy knowledge to the creation of animation characters. This course introduces students to 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, and story interaction. 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 260 Graphic Design, User Experience, and Input (3 cr.)
Prerequisite(s): None

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

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

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

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

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

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

This course introduces students to the aesthetics and principles of 2D (floor plans and elevations) and 3D environment design. A survey of architectural styles from throughout the world is blended with concepts, such as emotion, mood, lighting, shadows, aesthetics, and more. The course emphasizes learning the architectural vocabulary as well as the aesthetics of environmental and game-level design. Texturing, spatial design, negative space, dramatic lighting, and other concepts that affect

not only the psychology of level design but also gameplay principles are covered. Students participate in numerous field trips to local examples of architecture in order to gain an understanding of architectural spaces and the field's vocabulary.

ART 350 Storyboards (3 cr.)
Prerequisite(s): ART 201, ENG 116, FLM 151

This course explores the animation pre-production skills of storyboard art. Students leverage their knowledge of drawing, storytelling, and cinematography to create both 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. The work completed in this course serves as pre-production design for PRJ 300, PRJ 350, or ANI 300.

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

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

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

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

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

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

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

This course explores the animation pre-production skills of conceptual illustration and visual development. Students apply their knowledge of drawing, storytelling, and composition to create speculative drawings for animation. They review compositional systems, design process, and illustration techniques. Additionally, students explore means of using drawing to visually explore story and character ideas from

both existing and original story materials. They also consider adaptation, stylization, and visual variety. The course emphasizes professional applications, techniques, and standards of quality. The work completed in this course serves as pre-production design for PRJ 300, PRJ 350, or ANI 300.

ART 405 **Matte Painting** (3 cr.)

Prerequisite(s): ART 401

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

ART 410 **Mechanical Drawing** (3 cr.)

Prerequisite(s): None

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

ART 450 **Portfolio** (3 cr.)

Prerequisite(s): PRJ 350 or INT 390

Students use this course to compile the elements of their professional portfolio, which will serve as their BFA thesis. Additionally, this course introduces students to the marketing campaign needs of modern animation portfolios, including visual continuity, business documents, traditional still art portfolios, process and practice samples, digital portfolios, web sites, demo reels, and promotional items. They use this knowledge to assemble their own portfolios. The course also covers related information regarding job interviews, trade shows, professional standards, and contract negotiation.

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 Aire 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 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 555 Anatomy: Ecorché (3 cr.)

Prerequisite(s): None

Students create a scale model of the flayed human form starting with the skeletal system. Attention is focused on identifying the anatomical structures, proportion, the complex curves created by each bone or muscle, and the spatial relationships between the individual forms.

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.

Department of Game Software Design and Production

Computer Science Projects Courses

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

Prerequisite(s): CS 170, CS 170L, CS 230, GAM 150, MAT 140

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): CS 225, CSP 200

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 260 or CS 365, CS 211, CS 280, CSP 250, PHY 200

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

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

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

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

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

Prerequisite(s): CS 120, CS 120L, GAM 100

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

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

GAM 152 **Project I for Designers** (3 cr.)

Prerequisite(s): CS 120 or CS 116, GAM 100

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

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

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

Prerequisite(s): CS 170, CS 170L, CS 230, GAM 150, MAT 140

Credit may be received for either GAM 200 or GAM 205, not both.

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

GAM 202 Game Usability and Analysis (1 cr.)

Prerequisite(s): GAM 150 or GAM 152

This course focuses on assessing and analyzing the usability of games in development. Topics covered may include usability, testing roles, bug reports and regression, player psychology and observation, and measuring subjective experiences. Students run usability sessions as the basis to report on and analyze games from other project classes.

GAM 205 Project II for Designers (4 cr.)

Prerequisite(s): CS 175, GAM 152, MAT 100

Credit may be received for either GAM 200 or GAM 205, not both.

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

GAM 250 Project II (4 cr.)

Prerequisite(s): CS 170 or CS 175, GAT 210

Credit may be received for either GAM 250 or for GAM 255, but not for both.

In this class, students work to complete and polish the projects they began in GAM 200. Additional topics may include intermediate software architecture, advanced debugging techniques, bug tracking, formal playtesting, game pacing, and game balance.

GAM 252 Advanced Usability and Analysis (1 cr.)

Prerequisite(s): GAM 202

This course expands on the fundamentals of usability from GAM 202 and covers the full usability and testing process. Topics covered may include functional specifications, test cases, test coverage, build processes, prioritization methods, testing tools, automation, beta tests, internal vs. external testing, localization issues, and certification requirements. Students continue to run usability sessions and write reports on games from other project classes.

GAM 255 Project II for Designers (4 cr.)

Prerequisite(s): CS 176, GAM 205

Credit may be received for either GAM 250 or GAM 255, not both.

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

GAM 300 Project III (5 cr.)

Prerequisite(s): CS 200 or CS 251, CS 260 or CS 245 or CS 365, CS 280, GAM 250, PHY 200

Credit may be received for either GAM 300 or GAM 302, not both.

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

GAM 302 Project III for Designers (5 cr.)

Prerequisite(s): GAM 250 or GAM 252, GAT 251 or CS 280, PHY 115 or PHY 200, GAT 211

Credit may be received for either GAM 300 or GAM 302, not both.

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

GAM 350 Project III (5 cr.)

Prerequisite(s): GAM 300

Credit may be received for either GAM 350 or GAM 352, not both.

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

GAM 352 Project III for Designers (5 cr.)

Prerequisite(s): GAM 302

Credit may be received for either GAM 350 or GAM 352, not both.

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

GAM 375 Advanced Project (5 cr.)

Prerequisite(s): GAM 350 or GAM 352

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

GAM 390 Internship I (5 cr.)

Prerequisite(s): GAM 250 or GAT 251

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

GAM 400 Project IV (5 cr.)

Prerequisite(s): CS 250 or GAT 251, GAM 350 or GAM 352 or GAM 390 or GAM 490

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

GAM 450 Project IV (5 cr.)

Prerequisite(s): GAM 400 or GAM 390 or GAM 490

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

GAM 490 Internship II (5 cr.)

Prerequisite(s): GAM 250 or GAT 251

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

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. Internships are structured along the Internship Guidelines available in the Administration Office.

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. Internships are structured along the Internship Guidelines available in the Administration Office.

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.

Game Design and Development Courses

GAT 110 **Game History** (3 cr.)

Prerequisite(s): None

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

GAT 120 **Game Analysis** (2 cr.)

Prerequisite(s): None

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

GAT 210 **Game Mechanics I** (3 cr.)

Prerequisite(s): GAT 110, GAT 120

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

GAT 211 **Game Mechanics II** (3 cr.)

Prerequisite(s): GAT 210

This course focuses on how to create the maps, characters, and combat systems needed for combat-oriented games. Students work to create a large variety of maps, create new character types for existing games, convert specific video games into tabletop games, and build a tabletop combat-oriented game of their own design. Topics may include map types and layouts, movement, visibility, force composition, character statistics and roles, melee combat, ranged combat, damage, armor, and health.

GAT 212 **Advanced Game Mechanics** (3 cr.)

Prerequisite(s): GAT 211

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

GAT 240 **Technology for Designers** (3 cr.)

Prerequisite(s): CS 170 or CS 175, MAT 100 or MAT 140 or MAT 103

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

GAT 250 **2D Game Design I** (3 cr.)

Prerequisite(s): CS 170 or CS 175, GAT 210

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

GAT 251 **2D Game Design II** (3 cr.)

Prerequisite(s): GAT 211, GAT 250

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

GAT 315 **3D Game Design I** (3 cr.)

Prerequisite(s): GAT 251

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

GAT 316 **3D Game Design II** (3 cr.)

Prerequisite(s): ART 310, GAT 315

This course focuses on designing and implementing 3D games in specific genres, such as first-person shooters, adventure

games, role-playing games, platformers, or real-time strategy games. Students work to create an original prototype for each genre covered using a 3D engine of the appropriate type. Topics may include puzzle design, platforming design, boss fight design, cover mechanics, and terrain modification for a 3D game.

GAT 330 Interactive Narrative and Character Creation for Games (3 cr.)

Prerequisite(s): ENG 110, GAT 251

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

GAT 335 Serious Games (3 cr.)

Prerequisite(s): GAM 250 or GAT 250

This course focuses on games and simulations that do not have entertainment as their primary purpose. Topics may include military training, medical training, employee training, skill training, safety training, emergency response training, educational games, advocacy games, therapeutic games, exercise games, scientific simulations, optimization simulations, and planning simulations.

GAT 399 Special Topics in Game Design and Development (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.

GAT 401 Rapid Prototyping (3 cr.)

Prerequisite(s): CS 225 or CS 176

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

GAT 405 Advanced Game Design (3 cr.)

Prerequisite(s): GAT 251

This course focuses on one or more advanced game design topics based on the expertise of the instructor. Topics may include art games, music games, social games, educational games, serious games, handheld games, alternative input

games, radically innovative games, and more. Students work to create one or more prototypes of a game in the areas being covered, either individually or in teams, as appropriate. Emphasis is heavily placed on innovation and students are encouraged to challenge their assumptions about what games are and what games can be.

GAT 480 Senior Portfolio (1 cr.)

Prerequisite(s): GAM 350 or GAM 352

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

GAT 501 Rapid Prototyping (3 cr.)

Prerequisite(s): GAM 541

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

GAT 599 Special Topics in Game Design and Development (3 cr.)

Prerequisite(s): None

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

Management Courses

MGT 451 Project Management (3 cr.)

Prerequisite(s): None

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

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 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

Students explore how their culture, gender, economic status, age, and other personal characteristics influence their work communications. The course explores verbal and non-verbal communication skills in a global work environment. Students learn written communication techniques most effective for use in the technology workplace. Additionally, students explore and practice negotiation skills, both internally and externally at their workplace.

COM 250 **Professional Communication** (3 cr.)

Prerequisite(s): COM 150

This course is designed to prepare 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 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** (4 cr.)

Prerequisite(s): None

This course covers the principal elements of storytelling including theme, character, perspective, setting, plot, and dialogue. It encompasses both visual and non-visual media, such as short stories, novels, drama, and film. Through a series of creative writing exercises, students practice developing stories with both words and images.

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 Poetry (3 cr.)

Prerequisite(s): ENG 110 or ENG 116, ENG 150

This course provides an introduction to the literary form of the epic poem. Students gain in-depth knowledge of the form and apply this experience by adapting the epic's themes and structures into their own creative endeavors, including video games. Students also produce an epic-based creative work as a final project in the course.

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 Story Through Dialogue (4 cr.)

Prerequisite(s): ENG 116 or ENG 245

This course introduces students to the basics of screenplay writing for film beginning with the fundamentals of dramatic structure, story arcs, character arcs, and dialogue. Through a series of related assignments, students experience the process of developing a script of their own and practice their hand at writing dialogue for film. Students will write at least one original pre-production script in screenplay format.

ENG 340 Creative Writing Across the Arts (3 cr.)

Prerequisite(s): ENG 110 or ENG 116

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

ENG 360 Gender Identity in Literature (3 cr.)

Prerequisite(s): ENG 116 or ENG 150 or ENG 230 or ENG 242 or ENG 243 or ENG 245 or ENG 246 or ENG 250

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

ENG 399 **Special Topics in English** (3 cr.)

Prerequisite(s): None

Permission of instructor required

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

ENG 400 **Creative Writing for Game Design** (3 cr.)

Prerequisite(s): ENG 150 or ENG 110

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

ENG 410 **Interactive Storytelling** (3 cr.)

Prerequisite(s): ENG 110

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

ENG 420 **Cybertexts: Interactive Media and the Future of Narrative** (3 cr.)

Prerequisite(s): ENG 110 or ENG 150

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

the class, students reach a conclusion, based on their reading and course work, as to whether cybertexts can effectively encompass traditional narrative genres, and if not, whether this is due to limitations of the form, or the limitations of technology.

ENG 440 **Advanced Fiction Writing** (3 cr.)

Prerequisite(s): ENG 245 or ENG 315 or ENG 340

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

ENG 450 **Elements of Media and Game Development** (2 cr.)

Prerequisite(s): None

Relative to modern technological media, the most important issue to consider is the nature of the interactive loop of influence between media and culture. Interactivity is one of the most powerful and important potentials of the game medium, but the term is often used with superficial understanding of its implications. This course emphasizes the nature of interactivity primarily from psychological and sociological perspectives. Students review and define interactive media using examples drawn from academic research, film, television, and games. Students have ample opportunity to contemplate and discuss how they can apply a more comprehensive understanding of interactivity in order to surpass the current limits of interactive media products.

History Courses

HIS 100 **Introduction to World History I** (3 cr.)

Prerequisite(s): None

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

HIS 150 **Introduction to World History II** (3 cr.)

Prerequisite(s): HIS 100

This course continues the topics covered in HIS 100, covering from approximately 1650 A.D. until present day (Renaissance to present day, Western and Asian Civilizations). Students analyze a series of case studies with particular focus on governments, technology, religion, and culture, and how clashes between these (and other) themes created changes in culture, power,

and civilizations. Three major themes connect several topics discussed in this course with those explored in HIS 100: issues of authority and inequality within civilizations; encounters and conflicts between civilizations; and cultural and technological exchanges within and between civilizations.

Japanese Courses

JPN 101 **Introduction to Japanese I** (3 cr.)

Prerequisite(s): None

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

JPN 102 **Japanese II** (3 cr.)

Prerequisite(s): JPN 101

This course is designed for students who have taken JPN 101. The pace of JPN 102 is slightly faster than JPN 101. JPN 102 emphasizes acquiring the ability to communicate and function in Japanese accurately and appropriately, both in speech and in writing. By the end of the course, students are able to speak, understand, read, and write Japanese on a limited variety of topics.

Law Courses

LAW 115 **Introduction to Intellectual Property and Contracts** (3 cr.)

Prerequisite(s): None

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

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 on the theory and dynamics of consciousness and the cognitive unconscious. Students are exposed to recent research that has led to an unprecedented understanding of higher human cognitive processes such as creativity, learning, perception, information processing, and memory.

PSY 250 **Psychology of Myth** (3 cr.)

Prerequisite(s): PSY 101

This course addresses the meaning of myth from the perspective of Jungian archetypes, archetypal projections as image, the Amplification Method of dream analysis, and Campbell's mythic parallels. Carl Jung and Joseph Campbell had a radical influence of the study of myth, and their influence generated a new understanding of human psychology.

PSY 320 **Psychology of Interactive Drama** (3 cr.)

Prerequisite(s): ENG 110 or ENG 116 or PSY 201

The course explores the rhetorical patterns and psychological characteristics of dramatic architecture. The course illustrates how neural processes structure the cognitive unconscious, how this structure is related to image projection and perception, and how it contributes to the interactive learning process. Exercises are designed to help students understand the psychology

related to character design and personality development, archetypes, conflict, plot patterns, back-story, dialogue, exposition, lysis, premise, and the psychological dynamics of human choice.

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 Life Sciences

Biology Courses

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

Prerequisite(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.

BIO 200 **Animal Muscular, Skeletal, and Kinetic Anatomy** (3 cr.)

Prerequisite(s): BIO 150 or ART 110

This course introduces the major skeletal and muscular structures of animals. Students extrapolate their knowledge of the human form to the structure and form of a variety of animal types, specifically focusing on the impact of locomotion and feeding strategies on form. Additionally, students consider terminology, structural arrangement, and kinetic function. The course also considers standard locomotion cycles and the relationship between humans and various animals. It gives special emphasis to adapting this knowledge to the needs of artists and animators.

BIO 225 **Animal Motion: Sequential Limb Movement** (3 cr.)

Prerequisite(s): None

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

BIO 399 **Special Topics in Biology** (3 cr.)

Prerequisite(s): None

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

BIOX 500 **Human Anatomy** (3 cr.)

Prerequisite(s): None

This course explores the skeletal and muscular structures of the human body. Topics may include: identification of bones and

muscles, anatomical terminology, concepts of body mechanics, kinetic function and facial expressions. Special emphasis is placed on adapting this knowledge to the needs of artists and animators.

BIOX 550 **Animal Anatomy and Locomotion** (3 cr.)

Prerequisite(s): None

This course introduces different types of locomotion and the major skeletal and muscular structures of animals. Special emphasis is placed upon the impact of locomotion and feeding strategies upon form. Vocabulary, structural arrangement, and kinetic function are all considered. The course also considers standard locomotion cycles and the relationship between humans and various animals. Special emphasis is given to adapting this knowledge to the needs of artists and animators.

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 I (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, combinatorics and probability.

MAT 140 Linear Algebra and Geometry (4 cr.)

Prerequisite(s): None

Credit may be received for either MAT 100 or MAT 140, but not for both.

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

MAT 150 Calculus and Analytic Geometry I (4 cr.)

Prerequisite(s): None

Credit may be received for MAT 150 or MAT 180, but not for both.

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

MAT 180 Vector Calculus I (4 cr.)

Prerequisite(s): MAT 140

Credit may be received for either MAT 150 or MAT 180, but not for both.

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

MAT 200 Calculus and Analytic Geometry II (4 cr.)

Prerequisite(s): MAT 150 or MAT 180

Credit may be received for MAT 200 or MAT 230, but not for both.

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

MAT 220 Mathematics of Digital Sound Processing (3 cr.)

Prerequisite(s): MAT 200

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

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

MAT 225 Calculus and Analytic Geometry III (3 cr.)

Prerequisite(s): MAT 200 or MAT 230

This course extends the basic ideas of calculus to the context of functions of several variables and vector-valued functions. Topics include partial derivatives, tangent planes, and Lagrange multipliers. The study of curves in two- and three space focuses on curvature, torsion, and the TNB-frame. Topics in

vector analysis include multiple integrals, vector fields, Green's Theorem, the Divergence Theorem and Stokes' Theorem. Additionally, the course may cover the basics of differential equations.

MAT 230 Vector Calculus II (4 cr.)

Prerequisite(s): MAT 180

Credit may be received for MAT 200 or MAT 230, but not for both.

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

MAT 250 Linear Algebra (3 cr.)

Prerequisite(s): MAT 200 or MAT 230

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

MAT 256 Introduction to Differential Equations (3 cr.)

Prerequisite(s): MAT 200 or MAT 230

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

MAT 258 Discrete Mathematics (3 cr.)

Prerequisite(s): MAT 200 or MAT 230

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

MAT 300 Curves and Surfaces (3 cr.)

Prerequisite(s): MAT 250, MAT 258

This course is an introduction to parameterized polynomial curves and surfaces with a view toward applications in computer

graphics. It discusses both the algebraic and constructive aspects of these topics. Algebraic aspects include vector spaces of functions, special polynomial and piecewise polynomial bases, polynomial interpolation, and polar forms. Constructive aspects include the de Casteljau algorithm and the de Boor algorithm. Other topics may include an introduction to parametric surfaces and multivariate splines.

MAT 340 Probability and Statistics (3 cr.)

Prerequisite(s): MAT 200 or MAT 230, MAT 258

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

MAT 350 Advanced Curves and Surfaces (3 cr.)

Prerequisite(s): MAT 300

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

MAT 351 Quaternions, Interpolation and Animation (3 cr.)

Prerequisite(s): MAT 300

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

MAT 352 Wavelets (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 353 Differential Geometry (3 cr.)

Prerequisite(s): MAT 300

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

MAT 354 Discrete and Computational Geometry (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 355 Graph Theory (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 356 Advanced Differential Equations (3 cr.)

Prerequisite(s): MAT 250, MAT 256

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

MAT 357 Numerical Analysis (3 cr.)

Prerequisite(s): MAT 250, MAT 258

This course covers the numerical techniques arising in many areas of computer science and applied mathematics. Such techniques provide essential tools for obtaining approximate solutions to non-linear equations arising from the construction of mathematical models of real-world phenomena. Topics of study include root finding, interpolation, approximation of

functions, cubic splines, integration, and differential equations. Further topics may include stability, iterative methods for solving systems of equations, eigenvalue approximation, and the fast Fourier transform.

MAT 359 Computational Algebraic Geometry (3 cr.)

Prerequisite(s): MAT 300

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

MAT 361 Introduction to Number Theory and Cryptography (3 cr.)

Prerequisite(s): MAT 250, MAT 258

This course is an introduction to elementary number theory and cryptography. Among the essential tools of number theory that are covered, are divisibility and congruence, Euler's function, Fermat's little theorem, Euler's formula, the Chinese remainder theorem, powers modulo m , 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 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 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 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 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 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 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 **Performance Ensemble** (1 cr.)

Prerequisite(s): None

Permission of the instructor; audition required

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

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

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

Prerequisite(s): MUS 221

Entrance to the BA in Music and Sound Design degree program 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

Entrance to the BA in Music and Sound Design degree program 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 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. Internships are structured along the Internship Guidelines available in the Administration Office.

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 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 415 Private Lessons - Music Composition III (1 cr.)

Prerequisite(s): MUS 316

Entrance to the BA in Music and Sound Design degree program 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

Entrance to the BA in Music and Sound Design degree program 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 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. Internships are structured along the Internship Guidelines available in the Administration Office.

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** (3 cr.)

Prerequisite(s): MAT 150

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

PHY 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** (3 cr.)

Prerequisite(s): MAT 200, 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 (IEP) 2015–2016

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 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, anime, and ping pong.

Students who successfully complete the Intensive English Preparation courses will continue to take the degree program in which they enrolled, 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 twelve 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	Poor = 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 termination 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 academic expulsion, and expelled 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:

Electives	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.

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.

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.

Faculty Roster for
the Academic Year
2015–2016

Academic Leadership

Xin Li	Dean of Faculty & Senior Vice President of Academic Affairs
Charles Duba	Associate Dean
Jen Sward	Associate Dean
Meighan McKelvey	Registrar
Samir Abou Samra	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
Samir Abou Samra	Program Director - Bachelor of Science in Computer Science
Charles Duba	Program Director - Bachelor of Science in Computer Engineering
Lawrence Schwedler	Program Director - Bachelor of Science in Engineering and Sound Design
Jazno Francoeur	Program Director - Bachelor of Fine Arts in Digital Art and Animation
Benjamin Ellinger	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
Alecia Rossano	Program Director - Master of Fine Arts in Digital Art
Jen Sward	Internship Coordinator - Bachelor and Master of Science Programs
Jim Johnson	Internship Coordinator – Bachelor and Master of Art Programs

Department of Computer Science

Dmitri Volper*	BS Mathematical and Computer Science MS Mathematics MS Computer and Information Science PhD Mathematical Sciences	Omsk State University (Russia) Syracuse University Syracuse University Russian Academy of Sciences, Novosibirsk (Russia)
Stephen Beeman		
Elie Abi Chahine	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Antoine Abi Chakra	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Christopher Comair	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Charles Duba	BS Physics MS Physics PhD Physics	University of California, San Diego University of Washington University of Washington
Jason Hanson	BS Mathematics BS Physics MS Physics MA Mathematics PhD Mathematics	University of Massachusetts University of Massachusetts University of Virginia Columbia University University of Hawaii
Gary Herron	BA Mathematics PhD Mathematics	Northern Michigan University University of Utah
Pushpak Karnick	Bachelor of Engineering in Computer Engineering Doctor of Philosophy in Computer Science and Engineering	University of Pune, Pune (India) Arizona State University
Xin Li	BS Computer Science MS Computer Science PhD Computer Science	Northwest University (P.R. of China) Academic Sinica (P.R. of China) University of Central Florida
Matthew Mead	BS Computer Science MS Computer Science	Portland State University Portland State University
Tom Portegys	PhD Computer Science MS Computer Science BA Psychology	Ringling College of Art and Design Northern Illinois University Northern Illinois University
Cody Pritchard	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Steve Rabin	BS Computer Engineering MS Computer Science	University of Washington University of Washington
Samir Abou Samra	BS Computer Science MS Computer Science	Lebanese American University Lebanese American University

Department of Electrical and Computer Engineering

Jeremy Thomas*	PhD Geophysics	University of Washington
Charles Duba	BS Physics MS Physics PhD Physics	University of California, San Diego University of Washington University of Washington
Lukas van Ginneken	MS Electrical Engineering	Eindhoven University of Technology (Netherlands)
Christopher Theriault	BS Computer Engineering	DigiPen Institute of Technology
Hao Wu	BS Electrical Engineering MS Electrical Engineering	Tsinghua University (China) University of Washington

Department of Animation and Production

Jim Johnson*	BA Theater Arts MA Cinematography	Humboldt State University Humboldt State University
Dan Daly	BA English Walt Disney Feature Animations	Whitman College
Antony de Fato	BFA Drawing BSHE Housing Design Walt Disney Feature Animations	University of Missouri University of Missouri Walt Disney Animation Studios
Jazno Francoeur	Bachelor of Fine Art	Kansas City Art Institute
Marc Freeman	Bachelor of Arts	Pomona College
David Helsby	BA Certificate Traditional Animation & Maya Animation	Central Washington University Vancouver Film School
Carol Hendricks	MA in Art History	Temple University
John Hermanowski	Bachelor of Fine Art	School of Visual Arts
Keith Huggins	Bachelor of Science	Purdue University
Hummel, Claire	BA Illustration	Rhode Island School of Design
Bill Jarcho	BFA Visual Design in Media Arts	Emerson College
Suzanne Kaufman	BA Computer Animation and Photography	University of Wisconsin, Madison
Nick Kondo	Associates of Applied Arts	DigiPen Institute of Technology
Pamela Mathues	BFA Illustration and Fine Art Walt Disney Feature Animations	Columbus College of Art and Design Walt Disney Animation Studios
Chris Mosio		
William O'Brien	Diploma	The Joe Kubert School of Cartoon and Graphic Art
Price, Thomas	AA	Art Institute of Seattle
Smith, Eddie	BA Fine Arts	California State University
Rick Sullivan	BA Journalism	University of Washington

Department of Fine Arts

Jim Johnson*	BA Theater Arts MA Cinematography	Humboldt State University Humboldt State University
Antoine Abi Chakra	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Matthew Buckner	MFA Sculpture BA Art History	Boston University Hunter College, NY
Ryan Finnerty	Bachelor of Fine Art Master of Fine Art	Savannah College of Art and Design University of Washington
Jazno Francoeur	Bachelor of Fine Art	Kansas City Art Institute
Ganulin, Randi	BA Communication Design MA Photography	Otis College of Art and Design Otis College of Art and Design
Claire Hummel	Bachelor of Fine Art	Rhode Island School of Design
Robert Kmiec	BFA Illustration MFA Illustration	Massachusetts College of Art Syracuse University
Morgan, Richard	BFA	Ringling College of Art and Design
Longo, David	BFA Illustration	Pratt Institute, NYC
Michael Lorefice	BA MFA Studio Arts	Colgate University Memphis College of Art
Monte Michaelis	AAA Computer Animation BS Graphic Design	Art Institute of Seattle Art Institute of Pittsburgh
Peter Moehrle	Associate of the Ontario College of Art	Ontario College of Art (Canada)
Steffon Moody	BFA Painting	Washington University
Mark Kang-O'Higgins	MFA Painting and Sculpture BA Sociology and Political Science MA Sociology and Political Science Fine Art Certificate, BFA Program Fine Art Certificate, Fine Art	New York Academy of Art University College Galway (Ireland) University College Galway (Ireland) Edinburgh College of Art (Scotland) Leith School of Art (Scotland)
Michal Ozeri	BA Arts and Literature/Psychology	Antioch University
Douglas Parry	MFA Painting BFA Printmaking	Pratt Institute University of Washington
Thomas Price	AAA	Art Institute of Seattle
Alecia Rossano	BA Studio Art MFA Sculpture	Scripps College New York Academy of Art
Richard Rowan	BA Gaming Systems & Applications	Western Washington University
Eddie Smith	BA Fine Art & Studio Painting	California State University, San Bernardino
Eric Swangstu	M.P.S. Arts and Cultural Management BFA Painting/Printmaking	Pratt Institute (NYC) Kansas City Art Institute (KC)
Thacker, John	BA Production Animation	DigiPen Institute of Technology
Ken Turner	AA	Peninsula Community College

Department of Digital Arts

Alain Schneuwley*	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 Illustration	Cornish College of the Arts
Jeff Dulong	Computer Animation/Graphic Artist Degree	Art Institute of Seattle
Elijah Evenson	Associates of Applied Arts	Art Institute of Seattle
Jay Gale	BA Broadcast Communication	University of Colorado
Harrison, Ben		Art Institute of Chicago
Mark Henne		
Nick Kondo	Associates of Applied Arts	DigiPen Institute of Technology
Chun Lu	BS – Interior Design MA – Environmental Design	University of Missouri – Columbia University of Missouri – Columbia
Magruder, Doug	Associates Degree in Animation Arts	Art Institute of Seattle
Michelle Lu	BS – Horticulture Certificate – 3D Animation and Modeling	National Chung-Hsing University Vancouver Film School
Nelson, Mark	BA in Painting and Drawing MA in Art	Art Institute of Chicago University of Washington
Brigitte Samson	BA (Hon) Visual Arts	University of Quebec, Montreal
Kamal Siegel	AAA Computer Animation	The Art Institute of Seattle

Department of Game Software Design and Production

Douglas Schilling*	BS Computer Science	Pacific Lutheran University
Ellen Beeman	BA Political Science	Univeristy of California at Santa Cruz
Christiaan Champagne	MA Instructional Technologies MFA Film Production BA General Studies	San Francisco State University Academy of Art College, San Francisco University of Nevada, Reno
Comair, Christopher	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Benjamin Ellinger	BS Kinesiology	University of Texas
Feil, John	Bachelor of Arts	University of Nevada, Reno
Eric Fleegal	MS Computer Science & Engineering	University of Washington
Jeremy Holcomb	BA Communications	University of Washington
Bill Morrison	AA Commercial Art	Somerset County Technical Institute
Chris Peters	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Richard Rowan	BA Gaming Systems & Applications	Western Washington University
Rachel Rutherford	BA Rhetoric	University of California, Berkeley
Jen Sward	BS Electrical & Computer Engineering	University of California, Davis
John Williamson	BS in Experimental Psychology MS in Experimental Psychology	Texas A&M University

Department of Humanities and Social Sciences

Claire Joly*	BA English Language & Literature MA American Studies MA Theatre & African American Studies PhD Comparative Cultures	Sorbonne (France) Sorbonne (France) Smith College University of California, Irvine
Connolly, Mark	BA in Interdisciplinary Studies Journalism and Creative Writing MA in Political Science and Environmental Studies	Fairhaven College Western Washington University
Vanessa Hemovich	PhD Social Psychology MA Psychology BA	Claremont Graduate University Claremont Graduate University University of Washington
Lenneman, Elisa	BA in Interdisciplinary Humanities (Anthropology, Spanish, Linguistics) MA in Sociolinguistics	Michigan State University University of Essex
Sonia Michaels	BA English MA English	University of Washington University of Washington
Matthew Muth	MFA Creative Writing BA Language, Literature, Writing	University of Washington Eastern Michigan University
Fara Nizamani	BS Ed. Secondary English Education MA English Literature PhD English Literature	University of Miami Barry University City University of Los Angeles
Ruscha, Yuka	BA International Languages MA Education, Curriculum, Instruction	Setsunan University, Osaka Seattle University
Stephen Schafer	BA Psychology MA English	University of Denver University of Denver
Tayebi, Cheeva	BA Psychology Juris Doctor	University of Washington Seattle University School of Law
Wetzel, Ariel	BA in Interdisciplinary Studies MA in English Studies Ph.D. in English Literature and Language	Western Washington University Western Washington University University of Washington

Department of Mathematics

Matthew Klassen*	BS Mathematics PhD Mathematics	University of Arizona University of Arizona
Barnabás Bede	BS Mathematics and Physics MSc Mathematics PhD Mathematics	University of Oradea, Romania University of Oradea, Romania Babes-Bolyai University, Cluj-Napoca, Romania
Antonie Boerkoel	BS Mathematics MS Mathematics PhD Mathematics	University of Leiden (Netherlands) University of Leiden (Netherlands) University of Texas
Andy Demetre	BS Mathematics MS Mathematics	Reed College University of Washington
Thayer, Peter	BA of Science MA of Science	University of Louisiana University of Louisiana
Brigitta Vermesi	PhD Mathematics MS Mathematics BS Mathematics	Cornell University Cornell University Rutgers University

Department of Music

Lawrence Schwedler*	BA in Music MFA in Music	University of California Los Angeles University of California Los Angeles
Tacket Brown	Bachelor of Music	University of Michigan
Alex Chadsey	BFA in Jazz Studies	University of Michigan
Dixon, Greg	PHD Masters of Music Bach of Music	U of North Texas Ball State U Ball State U
Eric Likkel	Bachelor of Music Master of Music	University of Cincinnati University of Cincinnati
Michael Lim	Bachelor of Music Master of Music	Indiana University Indiana University
Teresa Lin	Bachelor of Music BA in German Master of Music MA in Music History	University of Washington University of Washington Washington State University Washington State University
Rachel Rutherford	BA Rhetoric	University of California, Berkeley
Steven Saulls	BA in Guitar Performance MFA in Guitar Performance	Western Washington University Western Washington University
Brian Schmidt	Bachelor of Music BS in Computer Science MS in Computer Applications in Music	Northwestern University Northwestern University Northwestern University
Bruce Stark	BM in Composition MM in Composition	California State University The Julliard School of Music
Matthew Wexler	BA in Music Education BA in Communication	University of Massachusetts University of Massachusetts

Department of Physics

Erik Mohrmann*	BS Physics MS Physics PhD Physics	Rensselaer Polytechnic Institute University of Washington University of Washington
Charles Duba	BS Physics MS Physics PhD Physics	University of California, San Diego University of Washington University of Washington
Roberson, Race	BA in Science(Physics) Ph.D. in Earth and Space Sciences	University of Washington University of Washington
Natalia Solorzano	PhD Space Geophysics MS Meteorology BS Physics	National Institute for Space Research, Brazil National Institute for Space Research, Brazil Federal University of the State of Minas Gerais, Brazil

Learning Resource Center

Judi Windleharth**	Master of Library and Information Science	San Jose State University
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* Department Chair

** Director of Learning Resource Center

Research and Development Division

Chief Technology Officer	Samir Abou Samra
Principal Artist	Alain Schneuwly
Senior Artist	Michelle Lu
Assistant Artist	Zahra Haghiri
Assistant Artist	Shilo Mulkin
Lead Designer	Christopher Comair
Designer	Victor Cecci
Senior Engineer	Andre Eid
Senior Engineer	Charles Yaacoubian
Lead Engineer	Antoine Abi Chacra
Lead Engineer	Elie Abi Chahine
Associate Engineer	Ryan Edgemond
Assistant Engineer	Cassandra Sundberg
Assistant Engineer	Trevor Sundberg
Assistant Engineer	Joshua Claeys
Assistant Engineer	Joshua Davis
Assistant Engineer	Nicholas Rivera
Assistant Engineer	Nathan Carlson
Assistant Engineer	Kenneth Lombardi
Assistant Engineer	Ryan Davison

Management

President and Chief Executive Officer	Claude Comair
Chief Operating Officer, International	Jason Chu
Chief Financial Officer	John Bauer
Senior Vice President	Raymond Yan
Chief Technical Officer	Samir Abou Samra
Executive Vice President of Asia-Pacific	Prasanna Ghali
Dean of Faculty & Senior Vice President of Academic Affairs	Xin Li
Senior Vice President of Administration	Meighan McKelvey
Senior Vice President of Facilities Management	Melvin Gonsalvez
Vice President of External Affairs	Angela Kugler
Vice President of Software Production	Ben Ellinger
Director	Michele Comair