



Course Catalog 2012-2013

NOTICES

Authorization

DigiPen Institute of Technology is authorized by the Washington Higher Education Coordinating Board (HECB) and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree-Granting Institutions Act. This authorization is subject to periodic review and authorizes DigiPen Institute of Technology to offer the following degree programs: Bachelor of Arts in Game Design; Bachelor of Arts in Music and Sound Design; Bachelor of Fine Arts in Digital Arts and Animation; Bachelor of Science in Computer Engineering; Bachelor of Science in Computer Science in Real-Time Interactive Simulation; Bachelor of Science in Engineering and Sound Design; Bachelor of Science in Game Design; Master of Fine Arts in Digital Arts; and Master of Science in Computer Science. Authorization by the HECB does not carry with it an endorsement by the board of the institution or its programs. Any person desiring information about the requirements of the act or the applicability of those requirements to the institution may contact the HECB at P.O. Box 43430, Olympia, WA 98504-3430.

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 national accrediting agency recognized 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 www.digipen.edu/academics/course-catalog.

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

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Rules and Policies for the Academic Year 2012-2013

GENERAL INFORMATION

Name of the School

DigiPen Institute of Technology

Contact Information

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Degree Authorization

DigiPen Institute of Technology is authorized by the Washington Higher Education Coordinating Board (HECB) and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree-Granting Institutions Act. This authorization is subject to periodic review and authorizes DigiPen Institute of Technology to offer the following degree programs: Bachelor of Arts in Game Design; Bachelor of Arts in Music and Sound Design; Bachelor of Fine Arts in Digital Arts and Animation; Bachelor of Science in Computer Engineering; Bachelor of Science in Computer Science in Real-Time Interactive Simulation; Bachelor of Science in Engineering and Sound Design; Bachelor of Science in Game Design; Master of Fine Arts in Digital Arts; and Master of Science in Computer Science. Authorization by the HECB does not carry with it an endorsement by the board of the institution or its programs. Any person desiring information about the requirements of the act or the applicability of those requirements to the institution may contact the HECB at P.O. Box 43430, Olympia, WA 98504-3430.

Accreditation

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

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

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

- 2006: DigiPen was granted approval for its Master of Science in Computer Science degree program by ACCSC.
- 2008: DigiPen was granted approval for its Game Design (BA) and Game Design (BS) degree programs by ACCSC.
- 2010: DigiPen was granted approval for its relocation to its current facility by ACCSC.
- 2010: DigiPen received ACCSC approval which allows DigiPen Institute of Technology Singapore to disclose in its advertising that it is a branch campus of DigiPen Institute of Technology.
- 2011: DigiPen Singapore received initial accreditation as a branch campus of the Redmond main school from ACCSC.
- 2011: DigiPen was granted approval for its Master of Fine Arts in Digital Arts degree program by ACCSC.
- 2012: DigiPen was granted approval for the Bachelor of Arts in Music and Sound Design program and the Bachelor of Science in Engineering and Sound Design program by ACCSC.

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 fully 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 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 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 US 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: Bachelor of Science in Computer Science in Real-Time Interactive Simulation and Bachelor of Fine Arts degree in Digital Art and Animation, to forty students.

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

*ACCSC granted approval for this degree in 2006.

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

Awards

DigiPen students have consistently excelled in both national and international game development competitions. At the annual Independent Games Festival (IGF) in San Francisco, California, DigiPen games have been nominated to the Student Showcase for the last 12 consecutive years. Out of 113 games recognized by the IGF as Student Showcase winners since 2001, 26 were created by DigiPen students – considerably more than that of any other school. 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 ten 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 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 www.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 either 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. 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 three tracks being offered in game programming, game art production, and game design. Students who successfully complete a DigiPen Pre-College Program will be eligible to receive non-matriculated college credit issued by DigiPen Institute of Technology and will have developed an understanding of the game development process as it relates to the respective tracks, knowledge as to the key types of

academic subjects that a student must study to be successful, and practical experience with the challenges of game production.

Youth Programs

In addition to its post-secondary degree programs, DigiPen offers opportunities for students entering grades 5 and higher to learn about video game development, 3D animation production, game design, music, visual effects, and robotics. DigiPen's ProjectFUN Youth Programs are committed to presenting a high quality education by engaging and challenging students through hands-on learning that support art, science, and math education workshops.

ProjectFUN Workshops

Now entering their 18th year, the ProjectFUN workshops engage 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 US and Canada. 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 US and Canada, which teach Video Game Programming, 3D Animation, Robotics, and Media Communications. Starting Fall 2007, DigiPen began offering an online version of the Technology Academy to students in Washington State. This online program now includes students from across the nation.

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

Mission of Institution

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 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 written request to the Admissions Office (admissions@digipen.edu) or Registrar's Office (registrar@digipen.edu) to have copies of either report sent to you.

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 Engineering
- Bachelor of Science in Game Design
- Bachelor of Arts in Game Design
- Bachelor of Science in Engineering and Sound Design
- Bachelor of Arts in Music and Sound Design
- Bachelor of Fine Arts in Digital Art and Animation
- 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, as well as additional 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 noon to 8 P.M. on Saturday and Sunday with noon to 8 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 172 students to small classrooms of 16 students. DigiPen labs range in size from those accommodating 30 students to smaller ones seating 16 and 12. DigiPen also has a large, open production area that seats approximately 200 students and facilitates the interdisciplinary work that goes into joint productions involving videogame 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, and faculty. Students have access to a variety of resources like 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 2,500 books, subscriptions to over 50 different magazines (print and electronic) and more than 120 console and computer games. In addition to these curriculum-related resources, the library has a collection of career-oriented materials, including books on resumes, cover letters, and interviews.

The library facilities provide a quiet place to study and areas for small groups to meet and work collaboratively. 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 which 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. If you have any questions or concerns about this policy, or you would like to report a problem with internet access, contact 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 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 www.copyright.gov, especially the FAQs at www.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

DigiPen maintains blank voter forms on campus in the main Administration office and near the Student Affairs office. For detailed information about voter registration in Washington State, visit <http://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) is available to download from the American College Health Association's website. This information is also available in the Student Affairs office.

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 Department of Student Affairs or the Registrar's Office 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". Students who are assigned an "I" shall not receive a refund.

Financial Aid

If students are receiving financial aid during the term 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 on these are not necessarily within the control of this institution. Students should consult with the Financial Aid Department 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 US Department of Veteran Affairs would be returned to the student, and it is the student's responsibility to return any funds to the US Department of Veteran 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 (see above). 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 re-application fee is waived for students returning to DigiPen from 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 Department of Student Affairs or the Registrar's Office 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 term 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 this institution. Students should consult with the Financial Aid Department concerning the impact of military redeployment/relocation on financial aid conditions and eligibility.

IMPORTANT DATES

Institutional Calendar

August 27-31, 2012	Orientation - First Year Students	
September 3, 2012	Labor Day	No Classes – Labs Closed
September 4, 2012	Classes Begin - Fall Semester	
November 12, 2012	Veterans' Day	No Classes – Labs Open
November 25-25, 2012	Thanksgiving	No Classes – Labs Open (11/25-11/27)
December 10-14, 2012	Fall Semester Final Exams	
December 14, 2012	Fall Semester Ends	
December 15, 2012-January 6, 2013	Winter Break	No Classes – Labs Closed
January 2-6, 2013	Intersession	No Classes – Labs Closed
January 7, 2013	Classes Begin - Spring Semester	
January 21, 2013	M.L. King Jr. Day	No Classes – Labs Closed
February 3, 2013	Founder's Day	No Classes – Labs Open
February 18, 2013	Presidents' Day	No Classes – Labs Open
March 25-29, 2013	Spring Break	No Classes – Labs Open
April 22-26, 2013	Spring Semester Final Exams	
April 26, 2013	Spring Semester Ends	
April 29-May 5, 2013	Intersession	No Classes – Labs Closed
T.B.A.	Commencement	
May 6, 2013	Classes Begin - Summer Session	
May 27, 2013	Memorial Day	No Classes – Labs Closed
July 4, 2013	Independence Day	No Classes – Labs Closed
July 22-26, 2013	Summer Session Final Exams	
July 26, 2013	Summer Session Ends	
August 27-30, 2013	Orientation – First year Students	
September 2, 2013	Labor Day	No Classes – Labs Closed
September 3, 2013	Classes Begin – Fall Semester	

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 1, 2012	Tuition deposit due for Fall 2012 semester
July 9, 2012	Last day to submit Request for Change of Major for Fall 2012 Semester Last day to submit Application for Readmission for Fall 2012 Semester
August 1, 2012	Tuition balance due for Fall 2012 Semester
September 10, 2012	Last day to drop Fall 2012 Semester courses for 100% refund Last day to add classes for Fall 2012 Semester
September 14, 2012	Final day to drop classes without academic penalty
October 3, 2012	Withdrawal deadline for 50% refund
October 25, 2012	Final day to receive a "W" on transcript for Fall 2012 Semester withdrawals. Withdrawals from the Institute after this date will receive "F" grades on transcript Final day to drop a class
November 1, 2012	Tuition deposit due for Spring 2013 Semester
November 26, 2012	Last day to submit Request for Change of Major for Spring 2013 Semester Last day to submit Application for Readmission for Spring 2013 Semester
December 1, 2012	Tuition balance due for Spring 2013
January 13, 2013	Last day to drop Spring 2013 Semester courses for 100% refund Last day to add classes for Spring 2013 Semester
January 18, 2013	Final day to drop classes without academic penalty
February 5, 2013	Withdrawal deadline for 50% refund
February 27, 2013	Final day to receive a "W" on transcript for Spring 2013 Semester withdrawals. Withdrawals from the institute after this date will receive "F" grades on transcript Final day to drop a class
April 1, 2013	Tuition Balance due for Summer 2013 session
April 8, 2013	Last date to submit Request for Change of Major for Summer 2013 session Last day to submit Application for Readmission for Summer 2013 session
May 12, 2013	Last day to drop Summer 2013 Session courses for 100% refund Last day to add classes for Summer 2013 Session Automatic Withdrawal date from classes missing pre-requisites
May 17, 2013	Final day to drop classes without academic penalty
June 4, 2013	Last day to receive 50% Summer 2013 tuition refund
June 26, 2013	Final day to receive a "W" on transcript for Summer 2013 Session withdrawals. Withdrawals from the Institute after this date will receive "F" grades on transcript Final day to drop a class
July 1, 2013	Tuition deposit due for Fall 2013 semester
July 8, 2013	Last day to submit Request for Change of Major for Fall 2013 Semester Last day to submit Application for Readmission for Fall 2013 Semester
August 1, 2013	Tuition balance due for Fall 2013 Semester
September 9, 2013	Last day to drop Fall 2013 Semester courses for 100% refund
July 1, 2013	Tuition deposit due for Fall 2013 Semester
July 8, 2013	Last day to submit Request for Change of Major for Fall 2013 Semester Last day to submit Application for Readmission for Fall 2013 Semester
August 1, 2013	Tuition balance due for Fall 2013 Semester
September 9, 2013	Last day to drop Fall 2013 Semester courses for 100% refund

TUITION AND FEES

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

Enrollment 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 his or her 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.

Registration Fee

Upon acceptance into a degree program, a \$150.00 registration fee must be paid to confirm enrollment. If a student cancels his or her enrollment, he or she may request a refund of the registration 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.

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: https://www.digipen.edu/fileadmin/website_data/admissions/2011/AffidavittoQualifyforUSTuitionRates2011.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 Admissions Office. Faxed or emailed forms, or forms without an original signature, are not acceptable.

On April 1, 2009, DigiPen began accepting the affidavit form, and the effect of the affidavit will begin September 1, 2009. This means that the affidavit will affect all tuition payable beginning September 1, 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 \$100.00 to cover administrative fees.

Books & Supplies

Estimated cost for textbooks and supplies is \$972.00 per year. This cost is not included as a part of the 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, he or she must take an average of 16-20 credits per semester.

For the 2011 and 2012 Cohorts

Undergraduate Students

No. of Credits	U.S. Citizens and Residents	Non-U.S. Residents
Fewer than 16 credits	\$825.00 per credit	\$908.00 per credit
16 - 22	\$12,800.00	\$14,080.00
23 & above	\$12,800.00 plus \$600.00 per additional credit	\$14,080.00 plus \$660.00 per additional credit

Graduate Students

No. of Credits	U.S. Citizens and Residents	Non-U.S. Residents
Fewer than 9 credits	\$875.00 per credit	\$962.00 per credit
9 - 12	\$8,750.00	\$9,625.00
12 & above	\$8,750.00 plus \$875 per additional credit	\$9,625.00 plus \$962 per additional credit

*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 \$240.00 per academic year. Please see the Administration Office 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 \$100.00 fee covers the cost of processing of the graduation application and degree audit. This fee must accompany the graduation application. This does not include the cost of graduation regalia for students who choose to participate in the graduation ceremony.

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 per transcript. Unofficial transcripts are processed at \$3 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 MFA program section for more information about transfer credits at the graduate level.

CANCELLATION AND REFUND POLICIES 2012-2013

Cancellation Policies

- 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 a registration fee of 15% of the contract price of the program. However, in no event will the school retain more than \$150.00.

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 registration 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 Accounting Office 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 Financial Aid Office 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 the Title IV federal student aid recipients.

FINANCIAL ASSISTANCE

The Role of the Financial Aid Office

The Financial Aid Office assists students and their parents in meeting basic educational costs. Its goal is to deliver student assistance in a timely manner and to seek financial aid availability for those who qualify.

The primary objective of the Financial Aid Office is to provide adequate financial assistance to the maximum number of eligible students through coordination with and full utilization of all governmental, community, and on-campus resources. DigiPen administers all financial aid programs in accordance with established state, federal, and institutional regulations and policies. Please contact the Financial Aid Office or visit www.digipen.edu for the most up-to-date eligibility criteria and award amounts for the aid programs outlined in this catalog.

The Financial Aid Office endeavors to fully fund students to the maximums provided under the law and strives to eliminate unnecessary steps by simplifying the aid process. The Financial Aid Office attempts to provide individualized services to students. It also provides intervention and liaison support when necessary to resolve problems related to an individual student's award. Additionally, DigiPen takes a proactive approach to default management and prevention by performing an active role in student loan counseling and delinquency notification procedures.

The U.S. Department of Education has designated DigiPen Institute of Technology as an eligible institution for participation in the following programs:

Federal Pell Grant Program

Federal Pell Grants are the largest source of free government money for college students. These need-based grants are awarded to every undergraduate student who qualifies and has not already earned a bachelor's degree, master's degree, or other professional degree. Grants can be used for tuition, fees, and living expenses. The amount a student may receive depends on the financial situation of the student's family and the student's enrollment status.

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 him or her to receive an amount equal to the maximum Pell grant; if the student is eligible for a partial Pell grant, the IASG may qualify him or her for an increase in funds up to the maximum Pell grant.

Annual Award Amounts

Applicants with an Estimated Family Contribution (EFC) that is not Pell eligible are qualified to receive an award under the IASG program. The amount of the IASG award is the same as the maximum Pell Grant for the award year, adjusted for the student's enrollment status and cost of attendance. All other federal student aid will be awarded based on the student's calculated EFC. Students may not receive both a Pell Grant and an IASG award. Students may receive the IASG from only one school at a time.

Washington State Funding

Students who are residents of Washington State may qualify for one of the following two grants based on their financial need. Grants are free money given to students to help pay for their education and do not need to be repaid. DigiPen students who are not residents of Washington State should inquire with their state's Office of Higher Education to determine if they are eligible for any of its financial aid programs.

Opportunity Grant

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, you must demonstrate financial need based on your FAFSA and submit a separate Opportunity Grant application. For eligibility requirements and a link to the application, visit www.digipen.edu/financial-aid.

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 your financial need. All eligible students who submit the FAFSA and the DigiPen Financial Aid Application will be considered for this grant. For a full list of eligibility requirements, visit www.digipen.edu/financial-aid.

Direct Loans

Direct Loans are low-interest loans offered to students and parents by the U.S. Department of Education rather than a bank or other financial institution. Unlike grants, you must pay back Direct Loans after you graduate. If you or your parents need to borrow money to help finance your education, Direct loans are the most affordable option. With Direct loans, you:

- Have one contact – the Direct Loan Servicing Center – for everything related to the repayment of your loans, even if you receive Direct loans at different schools;
- Have online access to your Direct loan account information 24 hours a day, seven days a week at www.studentloans.gov;

- Can choose from several repayment plans that are designed to meet the needs of almost any borrower, and you can switch repayment plans as needed.

The following Direct loans are available to qualifying DigiPen students. Note that you may be eligible for more than one type of Direct loan at a time.

Direct Subsidized Stafford Loans

Direct Stafford Subsidized loans are awarded to undergraduate and graduate students based on financial need. To be eligible for this loan, you must be enrolled as at least a half-time student. With Direct Stafford Subsidized loans, the federal government pays for the interest accrued while you are in school and during the six-month grace period after you graduate, leave school, or enroll as less than a half-time student

Direct Unsubsidized Stafford Loans

Direct Stafford Unsubsidized loans are awarded to undergraduate and graduate students regardless of their financial need. To be eligible for this loan, you must be enrolled as at least a half-time student. With Direct Stafford Unsubsidized loans, interest accrues while you are in school and during the six-month grace period after you graduate, leave school, or enroll as less than a half-time student.

Direct Parent Loan for Undergraduate Students (Direct PLUS Loans)

Direct Parent PLUS loans are unsubsidized, non-need-based loans awarded to parents of undergraduate students. This loan can cover a larger amount of your educational costs than a Direct Stafford loan, but its interest rate is based on your parent's credit rating and is generally higher. Your parents must pay an origination fee on each Direct Parent PLUS loan they receive. They must also submit a "Consent to Obtain Credit Report" form to be eligible for this loan, which is available at www.digipen.edu/financial-aid.

Direct Graduate PLUS Loans

Direct Graduate PLUS loans are unsubsidized, non-need-based loans awarded to graduate students. Like the Direct Parent PLUS loan, this loan can cover a larger amount of your educational costs and has an interest rate that is based on your credit rating. To receive a Direct Graduate PLUS loan, you must submit a "Consent to Obtain Credit Report" form, which is available at www.digipen.edu/financial-aid.

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 based on your credit score and typically 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 does not participate in any preferred lender arrangements, nor does it endorse any lenders.

Scholarship Information

Scholarships are monetary awards given to students by a private organization or donor to help pay for their education. Like grants, scholarships do not need to be repaid. Students must meet the organization or donor's criteria, which may include pursuing a certain program of study, having financial need, or being an exemplary student.

Institutional Scholarship Information

DigiPen offers various need- and merit-based scholarships to both undergraduate and graduate students. Eligible students may receive up to two institutional scholarships simultaneously. For more information, visit www.digipen.edu/financial-aid.

Veterans Affairs Benefits

The Higher Education Coordinating Board's State Approving Agency (HECB/SAA) has approved DigiPen's academic programs 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
- 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

To be eligible for VA educational benefits, you must be a degree-seeking student with a declared major at DigiPen. Eligibility for the various VA educational benefits programs is determined, in part, by your date of enlistment. In all cases, the Department of Veterans Affairs makes the final determination of eligibility. Application forms for your VA benefits are available at www.va.gov.

If you are a prospective student and believe you might be eligible for educational benefits, contact DigiPen's Financial Aid Office for more information and to begin the application process. The Financial Aid Office may assist veterans in seeking other sources of financial aid in addition to their VA educational benefits.

Enrollment Requirements

Full-time enrollment for traditional undergraduate students consists of 12 credits per semester; for graduate students, it is 9 credits per semester. At a minimum, an undergraduate student must be enrolled at least half-time (6-11 credits) in order to be eligible for federal financial aid; half-time graduate student enrollment is 6-8 credits. Changes in a student's enrollment may require an adjustment and/or repayment of financial aid funds awarded.

Financial Aid Eligibility

To be eligible to apply for financial aid at DigiPen, you 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 you are a returning DigiPen student). For more information about Satisfactory Academic Progress, see the Course Catalog.

**DigiPen was granted approval by the Accrediting Commission of Career Schools and Colleges (ACCSC) and has been authorized by the Washington Higher Education Coordinating Board (HECB) to offer the Bachelor of Science in Engineering and Sound Design and Bachelor of Arts in Music and Sound Design. As of March 26, 2012, DigiPen is awaiting approval to qualify for Federal Financial Aid for the Bachelor of Science in Engineering and Sound Design and Bachelor of Arts in Music and Sound Design programs. In the meantime, students may apply for any internal DigiPen scholarships or private educational funding options for which they qualify. Please check with the DigiPen Financial Aid Department for more information and status updates.*

Deadlines

In order to obtain federal financial aid, the Financial Aid Office must have confirmation that you have completed and finalized your Free Application for Federal Student Aid (FAFSA) and that your FAFSA has been approved by the last day of enrollment. You will not be able to receive any disbursement of federal funding until the Financial Aid Office has determined that your application information, including confirmation of your immigration status, is complete and correct. If you do not meet the above deadlines, you will lose your eligibility to receive federal funding for the current award period.

Satisfactory Academic Progress for Financial Aid

Warning

The history of the student's academics from all periods of enrollment, in spite of enrollment status, will be reviewed at the end of each semester to determine if the student is maintaining the standards established in the SAP policy. This includes all courses attempted regardless of whether Financial Aid was received. Students who fail to meet the SAP standards will be placed on Financial Aid warning for the next semester. Students placed on Financial Aid warning are eligible for Financial Aid during the warning term. If the student does not meet the SAP standards by the next SAP evaluation, future financial aid will be terminated effective with the next term

of enrollment. Students whose Financial Aid is terminated may appeal to the Financial Aid Appeals Committee for reinstatement of Financial Aid.

Appeals for Undergraduate and Graduate Students

A student who loses eligibility for financial aid may have opportunity to appeal to the Financial Aid Appeals Committee, aside from the loss of eligibility due to time frame. Appeals must be submitted in writing to the Director of Financial Aid outlining any extenuating circumstance(s) that influenced the student's academic performance. Extenuating circumstances are those events that are beyond the student's control, e.g. serious injury, illness or mental health condition, death of an immediate family member, and other extenuating circumstances beyond the student's control. The appeal should include a description of the extenuating circumstance, documentation of circumstance, and the manner by which the deficiency will be resolved. Each appeal will be considered on a case-by-case basis. Individual cases will not be considered as precedent. Financial aid cannot be reinstated for a prior semester. Your appeal should be submitted within 21 days of the beginning of the semester you want aid reinstated.

The Financial Aid Appeals Committee will review the appeal within two weeks of its receipt to determine whether the financial aid disqualification or suspension is justified. Students filing an appeal will be advised in writing of the decision at the student's home address and/or campus e-mail account. The committee's decision is final, and it cannot be appealed to a higher level. If your appeal is approved, reinstatement of aid is dependent on availability of funds. In addition, a student whose appeal is approved will receive financial aid on probationary status for the next term of enrollment. The student is encouraged to take advantage of counseling, tutoring, and the academic support center.

Reestablishing Financial Aid Eligibility

A student whose appeal has been denied for reinstatement of their Financial Aid or a student who does not have an extenuating circumstance that warrants an appeal can only 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 Financial Aid Office and request a SAP evaluation. The SAP evaluation will be documented and placed in the student's Financial Aid file.

Washington State Need Grant Satisfactory Academic Progress Policy

To be eligible for financial aid, federal regulations require students to make satisfactory progress in an eligible degree or certificate program. Students must be in good academic standing with DigiPen Institute of Technology, and the policy applies to all semesters of enrollment, regardless of receiving financial aid. All credits attempted at DigiPen will be considered when determining students' academic progress.

If students do not meet the requirements, they will be placed on financial aid probation or suspended from financial aid. If

placed on probation, students must make satisfactory progress in their next semester of enrollment or their financial aid eligibility will be terminated. Eligibility can be reinstated using one of the options in this policy.

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

Withdrawal from the Institute

If at any time, a student decides to leave DigiPen Institute of Technology, it is absolutely necessary for him or her to see the Financial Aid Office or to make an appointment with the Financial Aid Office 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, as well as incurring a potential liability to DigiPen for not maintaining compliance with a federal requirement. Students who withdraw may be subject to the return of Title IV Funds.

Return of Title IV Funds Policy and Institutional Refund 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 Institution: FDLP Unsubsidized loans, FDLP Subsidized loans, FDLP PLUS loans, FDLP Grad PLUS loans, Pell Grants and. IASG Iraq and Afghanistan Service Grant.
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 Institution 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:
 - FDLP Unsubsidized Federal Stafford loans
 - FDLP Subsidized Federal Stafford loans
 - FDLP PLUS loans
 - FDLP Grad PLUS loans
 - Federal Pell Grant
 - IASG Iraq and Afghanistan Service Grant
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 Institution and the student. For example, the calculation may require the Institution to return a portion of the federal funds to the Title IV programs.

Once the Institution has calculated the amount to return, the Institution will return the funds within 45 calendar days. The Institution will return the loan funds and make adjustments to EdExpress and export to COD. The Bursar will refund the funds via G5 to (a) the original lender (no longer applicable) to the Direct Loan Program or (b) a subsequent holder, if the loan has been transferred and the school knows the new holder's identity, if applicable.

In addition, the student may also be obligated to return funds based on the calculation. A student returns funds to the FDLP Stafford loan programs based on the terms and conditions of the promissory not of the loan. A student who receives a Federal Grant may be required to repay 50% of the funds received.

Institution's Responsibility

- The Institution makes this policy readily available by request to any enrolled and/or prospective students by request to the Financial Aid Department. In addition, the Financial Aid Department 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 Institution 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 Institution must offer a post-withdrawal disbursement. The institution is required to make a post-withdrawal disbursement within 180 days of the date the institution 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 Institution 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 Financial Aid Department.

III. To Officially Withdraw from DigiPen Institute of Technology

Please refer to the course catalog regarding the withdrawal policy.

IV. Cancellation and Refund Policies

Please refer to the section regarding Cancellation and Refund Policies.

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

DigiPen's Financial Aid Code of Conduct

In response to the enactment of the Higher Education Opportunity Act in August of 2008, DigiPen's Financial Aid Office 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

NASFAA's Statement of Ethical Principles provides that the primary goal of the institutional financial aid professional is to help students achieve their educational potential by providing appropriate financial resources. To this end, this statement provides that the financial aid professional shall:

1. Be committed to removing financial barriers for those who wish to pursue postsecondary learning.
2. Make every effort to assist students with financial need.
3. Be aware of the issues affecting students and advocate their interests at the institutional, state, and federal levels.
4. Support efforts to encourage students, as early as the elementary grades, to aspire to and plan for education beyond high school.
5. Educate students and families through quality consumer information.
6. Respect the dignity and protect the privacy of students, and ensure the confidentiality of student records and personal circumstances.
7. Ensure equity by applying all need analysis formulas consistently across the institution's full population of student financial aid applicants.
8. Provide services that do not discriminate on the basis of race, gender, ethnicity, sexual orientation, religion, disability, age, or economic status.
9. Recognize the need for professional development and continuing education opportunities.
10. Promote the free expression of ideas and opinions, and foster respect for diverse viewpoints within the profession.
11. Commit to the highest level of ethical behavior and refrain from conflict of interest or the perception thereof.
12. Maintain the highest level of professionalism, reflecting a commitment to the goals of the National Association of Student Financial Aid Administrators.

NASFAA Code of Conduct for Institutional Financial Aid Professionals

An institutional financial aid professional is expected to always maintain exemplary standards of professional conduct in all aspects of carrying out his or her responsibilities, specifically including all dealings with any entities involved in any manner in student financial aid, regardless of whether such entities are involved in a government sponsored, subsidized, or regulated activity. In doing so, a financial aid professional should:

1. Refrain from taking any action for his or her personal benefit.
2. Refrain from taking any action he or she believes is contrary to law, regulation, or the best interests of the students and parents he or she serves.
3. Ensure that the information he or she provides is accurate, unbiased, and does not reflect any preference arising from actual or potential personal gain.
4. Be objective in making decisions and advising his or her institution regarding relationships with any entity involved in any aspect of student financial aid.
5. Refrain from soliciting or accepting anything of other than nominal value from any entity (other than an institution of higher education or a governmental entity such as the U.S. Department of Education) involved in the making, holding, consolidating or processing of any student loans, including anything of value (including reimbursement of expenses) for serving on an advisory body or as part of a training activity of or sponsored by any such entity.
6. Disclose to his or her institution, in such manner as his or her institution may prescribe, any involvement with or interest in any entity involved in any aspect of student financial aid.

State Grant Assistance from Other States

There may be state grant availability to students who attend college out of state. Please check your state's local authorizing agency.

Study Abroad for Federal Student Aid Eligibility

DigiPen does not offer study abroad programs at this time.

Federal Student Financial Aid Penalties for Drug Law Violations

Federal law states that any student who has been convicted of an offense under any federal or state law that involves the possession or sale of a controlled substance during a period of enrollment in which the student was receiving financial aid assistance shall not be eligible to receive any federal or institutional grant, loan, or work assistance for a specified period of time following his or her conviction.

Terms and Conditions under the Direct Stafford Loan Program

DigiPen participates in the William D. Ford Direct Loan Program. Students who wish to receive their Federal Stafford Subsidized and/or Unsubsidized Stafford loans must complete a Master Promissory Note (MPN).

There are two types: Direct Subsidized Loans, for which the government pays the interest while you are in college and during the grace period (six months after the student graduates or falls below half-time attendance); and Direct Unsubsidized Loans, for which you are responsible for paying all the interest on the loans, during college and after. The student is not required but can make payments on the interest portion of the Unsubsidized loan. You may receive both types of loans at the same time. To receive loan funds, you must be enrolled at least as a half-time student. In addition, depending on financial need and grade level students may receive a Subsidized or Unsubsidized loan, or a combination of both.

For more information please visit www.studentloans.gov.

Federal Direct Master Promissory Note (MPN)

If you decide to accept and choose the Federal Direct Subsidized and/or Unsubsidized Stafford loan in your financial aid award offer letter, you must complete the steps below. All Undergraduate and Graduate students MUST complete the MPN in order to receive Federal Direct loans.

Step 1: Login to the student portal at www.studentloans.gov and complete your federal government requirement: Entrance Counseling.

Step 2: After completing Entrance Counseling, you must complete the Federal Direct Loan Master Promissory Note (MPN) also available at www.studentloans.gov.

Please be prepared to have your required U.S. Department of Education issued PIN number to complete the electronic MPN. This is the same PIN number that was used to complete the signature on the FAFSA. If you misplaced your PIN number or have questions regarding this process please visit www.pin.ed.gov/PINWebApp/pinindex.jsp

APPLYING TO DIGIPEN

Visiting DigiPen

DigiPen offers regular information sessions 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 information sessions, please visit our website at www.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 admissions department 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 one week in advance. To learn more about this program and to schedule a time for your visit, please contact the Office of Admissions.

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 late 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 may 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.
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.
 - 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.
 - For home-schooled applicants, please see the "Home-Schooled Applicant Admission Requirements" section below.
 - 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 Institute of Technology. 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. The writing portion is not required but may be taken into consideration if sent. Applicants to DigiPen's undergraduate degree programs do not need to submit these 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 ten years ago. However, any applicant coming directly from high school will need to submit SAT/ACT scores regardless of whether or not he or she 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 your academic background and/or work ethic, i.e. an instructor, guidance counselor, or employer. Recommendation letters from family members will not be considered. 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 <https://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, TOEFL scores, 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 (BFA) degree program. Please see the 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 recognized 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 essays are an important part of the application for admission to the DigiPen Institute of Technology. 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 you are applying for.
 - Discuss your reasons for applying to DigiPen and explain how these reasons relate to your future goals (personal, education, and professional). Make sure you explain why you are applying to the specific program you are interested in, not just DigiPen in general (although you can certainly explain that as well). Explaining why you are applying to one particular program instead of another is also good, as is writing about what other programs you would be interested in (some uncertainty about which program you are most interested in will not hurt your chances of admission). 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. **Character Analysis:** Applicants specifically interested in the BSGD or BAGD programs must submit this essay, but for all other undergraduate applicants, this is optional.

- Choose one of these character images to analyze. Once you have made your choice, write an essay in which you describe a basic personality and history of the character you have chosen, plus a bit about the world he or she came from. Do not go overboard on this first part--just a third of the essay at most. Then describe the character's abilities, equipment, and weaknesses. Finally, describe what type of game the character is for (this does not have to be a video game) and what purpose the character would have in that game, both in terms of the story and game mechanics (not just one or the other). The character cannot be the primary hero or villain of the game--he or she must be a secondary, non-player character. The essay must be at least 800 words long (and no more than 1200 words), with good structure, excellent grammar, and perfect spelling.

3. **Card or Dice Game:** Applicants specifically interested in the BSGD or BAGD programs must submit rules for an original card or dice game, but for all other undergraduate applicants, this is optional.

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

4. **Personal Game History:** Applicants specifically interested in the BSGD or BAGD programs must submit this history, but for all other undergraduate applicants, this is optional.

- The Personal Game History is a list all the games you have ever played. Start with video games and list all the ones you can remember. Follow that with a list of all the non-video games you have ever played. List everything you can think of, whether you liked those games or not (it is okay if the list is very long). Finally, list the names of any original games you have created yourself (of any kind). In parenthesis after each game listed, write a short description of what you have done with that game (played it a

little, played it a lot, played it professionally, made modifications to it, made levels for it, etc.). For any games you created, describe the type of game and the most interesting thing about it. Below is a sample of the required format, with some sample games and comments listed. Follow this format exactly (including the headers, capitalization, parenthesis, etc.):

VIDEO GAMES

Halo (Played it a lot.)

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

Farmville (Played it a little.)

NON-VIDEO GAMES

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

Spades (Played it a lot.)

Chess (Played it a little.)

ORIGINAL GAMES

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

5. **Optional Essay:** Use this optional essay to explain any unusual circumstances or situations that you think may have an impact on your application.

Submission

Applicants may choose to type the answers to the application essays directly into the online application (in which case, there is an electronic signature and date stamp), to mail a hardcopy 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 essays 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:

- Applicant's name and program to which s/he is applying should be printed at the top of each page.
- Each page should be typed and double-spaced.
- The completed personal statement should be signed and dated on the last page.

Math and Science Requirements and Recommendations for Bachelor of Science and Bachelor of Arts in Game Design Applicants

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" average (3.0 GPA) 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, he or she 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 through Precalculus.

Admissions will try to evaluate his or her 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' portfolios to ensure that students have the appropriate foundational skills to succeed in the degree programs to which they are applying.

Applicants to the Digital Art and Animation (BFA) degree are required to submit an art portfolio. This portfolio must contain between 15 to 20 samples of original artwork created by the applicant. At least 10 pieces must be drawings from direct observation, rather than from photos, other 2D references, or the student's imagination. The remaining pieces should demonstrate the applicant's artistic range and skill. Animations, figure/animal studies, character designs, architectural renderings, landscape studies, sculptures, and paintings are preferred for this part of the portfolio. If necessary, DigiPen may request more samples for review.

Applicants to the Bachelor of Arts in Game Design program are not required to submit an art portfolio. Those who elect to do so may include sketches of level designs for games in addition to other types of work.

The Portfolio Should Demonstrate The Following:

1. The applicant has sufficient foundational drawing skills to meet the challenges of DigiPen's rigorous curriculum. The portfolio should include at least 10 drawings directly from live observations, preferably of people and animals (not from the applicant's imagination or from 2D references such as a photograph or another artist's work). These drawings should clearly communicate the structure and 3D form of the subject. The applicant should focus on representational accuracy rather than on cartooning or heavy stylization.
2. The applicant is a serious amateur artist. The portfolio should include five to ten samples of the applicant's best work, regardless of the subject matter or medium. Sustained drawings (i.e. those that took two to three hours to complete) are encouraged to demonstrate the applicant's skill and concentration. These works should be selected with an eye toward quality, design, composition, and a dedication to craft.

Guidelines for All Art Portfolio Submissions:

- Submit the portfolio via Slideroom (<https://digipen.slideroom.com>). Slideroom requires a \$10 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 either .jpeg or .png files (each image must be under 5MB).
- Label all artwork with the date of completion and the medium used. Please note: DigiPen prefers that the artwork submitted be less than one year old.
- Avoid samples that rely heavily on exaggerated physical features such as large eyes, big hair, and elongated limbs, or samples copied directly from Manga, Animé, Disney, etc. Instead, focus on creating works that demonstrate your ability to draw from observation and your own imagination.

Performance Portfolio

DigiPen's intent in reviewing applicants' performance portfolios is to ensure that students have appropriate foundational skills relative to the degree program to which they are applying. Applicants should have some background studies in music and some aptitude for music.

Performance Portfolio Requirements for BA in Music and Sound Design Applicants

Applicants to the Music and Sound Design degree program must submit a performance portfolio. This portfolio should contain two live, unedited performances in contrasting styles on the applicant's instrument of choice, as well as one (1) to five (5) examples of musical involvement.

The performance portfolio must adhere to the following requirements:

- For the two (2) live, unedited 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.

- Each performance should be between two and 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.

- The rest of the applicant's portfolio should include evidence of musical involvement. This should be a combination of the following types of items:
 - 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 performances ensembles, such as orchestras, bands, or other musical performance groups
 - Video soundtracks (include video)
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 Institute of Technology. GRE code: 4193. Students applying to the Master's Program in Computer Science should note that the preferred combined GRE verbal and math scores should be in the 60th percentile or better. All applicants with an undergraduate degree in any major other than Computer Science or Computer Engineering are required to submit scores for the GRE Subject Test in Computer Science† as well. An acceptable score for the GRE Computer Science subject test is 700 or higher. In special cases of highly qualified applicants, we will consider those who do not meet this minimum acceptable score but who have other overriding strengths in the areas of specialization relevant to this program.
 4. Official transcripts from ALL colleges and universities attended. 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.
 - 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.
 - 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.

Guidelines for All Performance Portfolio Submissions

- Submit the performance portfolio via Slideroom (<https://digipen.slideroom.com>). Slideroom requires a \$10 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 Master of Science 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.
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 Institute of Technology. GRE code: 4193. Students applying to the Master's Program in Computer Science should note that the preferred combined GRE verbal and math scores should be in the 60th percentile or better. All applicants with an undergraduate degree in any major other than Computer Science or Computer Engineering are required to submit scores for the GRE Subject Test in Computer Science† as well. An acceptable score for the GRE Computer Science subject test is 700 or higher. In special cases of highly qualified applicants, we will consider those who do not meet this minimum acceptable score but who have other overriding strengths in the areas of specialization relevant to this program.
4. Official transcripts from ALL colleges and universities attended. 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.
 - 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.
 - 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.
5. Two letters of recommendation. These MUST be from individuals familiar with your academic background and/or work ethic, i.e. an instructor, guidance counselor, or employer. Recommendation letters from family members will not be considered. 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 <https://management.digipen.edu/srs-app/>; alternatively, references may write their own letters without using the templates.
6. Statement of Purpose. Guidelines for the Statement of Purpose will be included on the Application for Admission.
7. Other official documentation, if applicable. This includes, but is not limited to, TOEFL scores, copy of Permanent Resident card, etc.

**Effective December 2010, graduates of DigiPen's Bachelor of Science in Computer Science in Real-Time Interactive Simulation program are no longer required to complete the GRE to apply to the Master of Science in Computer Science program.*

† Applicants who are unable to take the GRE Subject Test in Computer Science may request to take DigiPen's Internal Computer Science Exam as an alternative. A score of 75% is the minimum acceptable score. Please keep in mind that meeting the minimum requirement does not guarantee admission. For more information on DigiPen's Internal Computer Science Exam, including a list of topics covered and sample questions, please contact admissions@digipen.edu to be directed to the testing services coordinator.

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 Application for Admission. The preferred submission method is online, but all applications will be given equal consideration.
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
 - 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.
 - 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.
4. Other official documentation, if applicable. This includes, but is not limited to, TOEFL scores, copy of the Permanent Resident card, etc.
5. Two letters of recommendation. These MUST be from individuals familiar with your academic background and/or work ethic, i.e. an instructor, guidance counselor, or employer. Recommendation

letters from family members will not be considered. 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 <https://management.digipen.edu/srs-app/>; alternatively, references may write their own letters without using the templates.

6. Statement of Purpose. Guidelines for the Statement of Purpose will be included on the Application for Admission.
7. Portfolio. DigiPen's intent in reviewing applicants' portfolios is to ensure that students have appropriate foundational skills relative to the degree program to which they are applying.
8. Interviews. An interview may be required of selected students. This will be arranged on an as needed basis.

Art Portfolio

Applicants to the Digital Arts and Production (MFA) degree program must submit an art portfolio. This portfolio should contain between 15-20 samples of original artwork by the applicant for review. At least ten pieces of the portfolio must be drawings from direct observation; they may not be from photos or other 2D reference or from the student's imagination. 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 program without digital media samples will be required to take prerequisite class(es) 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 classes.

The portfolio should demonstrate the following:

1. The applicant has the strong foundational art and observational skills necessary to handle the rigors of the curriculum. The portfolio should include at least ten drawings directly from live observations, 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 applicant is a serious artist. The portfolio should include five to ten samples of the applicant's best work regardless of the subject matter or medium. Sustained drawings (at least 2-3 hours each) are highly encouraged to demonstrate the applicant's skill and concentration. This work should be selected with an eye toward quality, design, composition, and a dedication to craft.

Guidelines for Art Portfolio Submissions: See the section “Art Portfolio” in Undergraduate Admissions for submission guidelines

International (Non-U.S. Resident) Applicants

DigiPen Institute of Technology 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 to allow time to process required documents for the U.S. Immigration and Customs Enforcement (ICE).

In addition to attested copies 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 section *Proof of Proficiency in the English Language*)
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 his or her residence abroad. International students should note their citizenship on the application form for admission. If accepted, DigiPen will send you 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 I-20 form 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 early. Applicants must also take copies of the Financial Responsibility Form and support 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 www.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 he or she 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 (www.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 post-secondary degree in the United States at an English-speaking school, or an International School where the primary language of instruction is English.
- Completion of a bachelor's degree at an English-speaking institution.
- DigiPen may accept other proof of English proficiency, such as through the submission of internationally recognized standardized English test scores, the completion of English preparatory coursework, or internal English assessments on a case-by-case basis.

- DigiPen may use its discretion and own internal assessments in determining sufficient English proficiency for students transferring from one DigiPen campus or program to another.

Admission/Denial to DigiPen's Programs

DigiPen considers every part of an applicant's materials and qualifications when evaluating him or her 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 enrollment 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 he or she wishes to reapply in subsequent years. Please see the section on re-applying 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, 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

Applicants should include a formal appeal for the Disciplinary Committee to review along with their application for readmission. Applicants 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 Readmission for Personal Reasons.

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 Registrar's Office. 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 (i.e. art portfolio, game modification, character/world analysis, 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 Registrar's Office 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).

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 the Non-Matriculated Studies program must show proof of graduation from high school and a recommended minimum 2.5 GPA in their most recent studies for acceptance into the program.
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 the student feels he or she has achieved proficiency.
4. Students must earn a "C-" 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 the Non-Matriculated Studies program. Enrollment is on a continuous basis unless students do not register for classes for a given semester at which time they will be withdrawn.

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

WAIVER CREDIT, AP EXAMINATIONS, CLEP, AND OTHER CREDIT

Students may apply for course waivers if they can demonstrate that their knowledge and skills - whether they were gained by formal education, exam, work experience, or life experience - are equivalent to those gained by courses offered at DigiPen Institute of Technology. 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. A maximum of nine credits per semester may be earned by these means. For undergraduate programs, no less than 75% of a student's total program must be taken at DigiPen. Graduate programs allow a maximum of nine transfer credits from other colleges and other DigiPen programs. 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 of residence 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 the **SRS** system. Once submitted, approval of waiver requests are decided 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 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 Exams of the College Entrance Examination Board taken within the last ten years. An exam score of four or above earns from three to seven course waiver credit hours. 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 students' transcripts, but no grades or quality points are awarded. Official results must be sent to the Registrar before course waivers or transfers are granted.

A maximum of two courses may be waived or transferred through AP examinations, and these may be applied to satisfy DigiPen's degree requirements. The examinations and the courses for which waiver hours or credit are granted are listed below. Waivers/credit granted for a specific course count toward the satisfaction of any requirement toward which the listed course counts.

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 150
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 ten 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 www.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 ten years may be transferred, provided such credit meets the guidelines used by DigiPen Institute of Technology. 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 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 direct, formal institutional exchange 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.

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 Registrar for a list of colleges with articulation agreements.

Credit Evaluation Forms

Application forms for challenge and waiver examinations may be obtained from 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 hour credits. As a rule, one semester credit hour of academic credit is given for at least 15 hours of classroom contact, at least 30 hours of supervised laboratory time, at least 30 hours of documented independent study activities, or at least 45 hours of internship or work-related experience. In addition, undergraduate students typically will be expected to spend two hours in preparation outside of class for each hour of lecture. Additional outside work may be required for laboratory or studio classes. During the summer session, the student earns semester credit hours for class contact hours that are equivalent to those provided in the fall and spring semesters. Whenever “semester hour” is used in this Catalog, it is synonymous with “semester credit hour” (SCH). A classroom contact hour is 53 minutes in length.

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 section.

The following grading system is in use and, except where otherwise specified, applies to both examinations and term work. 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 to earn credit
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 “F,” 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 term, 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 Registrar’s Office. 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.

DigiPen requires that each course syllabus contain 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 Administration Office, 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” through “F”) 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 will help you calculate your grade point average:

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 100	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

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.

Satisfactory Progress

Federal Regulations mandate that Institutions of Higher Education create a Satisfactory Academic Progress (SAP) standard for students receiving financial assistance under the federally supported Title IV programs. The point of SAP standards are to measure a student’s progress toward the completion of their education program. The Financial Aid Office 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 Institution. This includes Unsubsidized FFEL loans, Subsidized FFEL loans,

FFEL PLUS loans, FFEL Grad PLUS loans, Federal Pell Grant, Federal Academic Competitiveness Grant, and the National Science and Mathematics Access to Retain Talent 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

A 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 or more than 1.5 times the recommended time required to complete the program. For example, the BFA program normally takes 144 credits to complete. Students in this program have up to 216 credits to complete their program. The Registrar will withdraw from the Institute full-time students who do not complete their studies during this time frame.

In addition, frequent withdrawals from courses or from the Institution, 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 Institution 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 section Change of Major and Graduation for information about how to change majors.

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. Good academic standing is as follows:

Milestone – Undergraduate	Minimum GPA Requirement
Up to 50% of program 77 attempted credits* for BSCS, BSCE, or BSGD 73 attempted credits for BAGD 72 attempted credits for BFA 70 attempted credits for BSESD 67 attempted credits for BAMSD	1.8 or better cumulative GPA
Over 50% of program 78-153 attempted credits for BSCS, BSCE, or BSGD 74-146 attempted credits for BAGD 73-143 attempted credits for BFA 70-139 attempted credits for BSESD 67-133 attempted credits for BAMSD	2.0 or better cumulative GPA
100% of program 154 attempted credits or greater for BSCS, BSCE, or BSGD 147 attempted credits or greater for BAGD 144 attempted credits or greater for BFA 140 attempted credits or greater for BSESD 134 attempted credits or greater for BAMSD	2.0 or better cumulative GPA

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

Graduate Students

Graduate students who take the undergraduate-level classes to make-up an admission deficiency must earn a “B” (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 3.0 in graduate-level classes during their academic warning will be academically terminated. Terminated students may apply for readmission after a 12-month suspension.

Graduate students who fail to complete their program within 1.5 times the attempted credits will be placed on academic warning. Students on 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.

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

During their course of study, graduate students must have an overall 3.0 GPA to graduate.

Academic Warning

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

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

Failing to Meet Minimum GPA Requirement

Students who fail 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 reapply for admission.

Students with a cumulative GPA of 0.5 or lower are not eligible for Academic Warning and become academically ineligible to continue. They will not be allowed to re-register for a period of one academic year. Any student in this circumstance may reapply for admission after a 12-month period. For financial aid recipients, please also refer to the Financial Aid section of the catalog 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 institution. Terminated students may reapply for admission 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 being 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 of the catalog. 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.

An institution 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 page 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 reapply for admission for 12 months. For financial aid recipients, please also refer the Financial Aid section of the catalog for information regarding the SAP policy for financial aid.

Please contact the Student Affairs office if you have any questions regarding how pace is calculated or whether 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-" in a core course, below a "D" 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 Student Affairs or Financial Aid.

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 Student Affairs. Once all documents are received, 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 his or her 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.

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

1. You must be matriculated.
2. You 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 (“A,” “B,” “C,” and “D”) in credit-bearing courses are counted for eligibility.
5. No failing grades: a grade of “F” 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 transcripts 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. 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 Higher Education Coordinating Board of the State of Washington at:

Higher Education Coordinating Board of the State of Washington
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. If the student is still dissatisfied with the decision, he or she may appeal to the President of the Institute. If the student remains unsatisfied with the decision, he or she may appeal to the Executive Director of the Higher Education Coordinating Board of the State of Washington.

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 Blvd.
Suite 302
Arlington, VA 22201
(703) 247-4212

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

Meighan Shoemsmith
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. Should you have any questions, please contact the Administration office at (425) 558-0299.

To request an official transcript, students should complete a transcript request form (available online at www.digipen.edu, or from the front office) and either mail or fax it to the Administration office. Requests are usually processed within three business days. Unofficial grade reports can be viewed or printed anytime 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).

Should a student miss a final exam and notify his or her 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 students, 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. They 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., BSCS students may not register for more than 10 internship credits and MSCS 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 his or her degree program. More detailed information about student internships can be found in the Internship Guidelines available in the Administration Office.

CHANGE OF MAJOR AND GRADUATION

Requesting a Change of Major

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

1. Submit a Request for Change of Major Form to the Office of Admissions; forms are available in front office or on DigiPen's website. Admissions will print an unofficial grade report to include with your change of major application.
2. Submit a Change of Major Statement addressing the following topics:
 - Discuss your 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 here: <https://www.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 <https://www.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 mail or email. Students approved for a change of major will be emailed a Student Enrollment Agreement corresponding to the new program. They must sign this agreement either 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

- Change of Majors will only take effect on the first day of a new semester. To be considered, requests must be submitted at least fifteen working days before the start of a new semester; otherwise, the request will be considered for the next available semester. Specific deadlines for submitting a request for change of major can be seen 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 speak 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 to 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 Registrar's Office.

Important Financial Aid Information

If you are a recipient of federal financial aid, you could potentially lose some or all of your financial aid eligibility should you change your major. Please notify the Financial Aid office in person as your financial aid will need to be revised.

Graduation Requirements

Degrees and certificates 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 his or her final semester, he or she 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 is used to assist 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 Registrar's Office.

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 \$75.00 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 he or she has completed all courses satisfactorily to date, and, if upon satisfactory completion of courses for which the student is currently registered, he or she 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 are mailed to the correct address.

STUDENT AFFAIRS

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 a few of the services provided by Student Affairs.

Student Advising

DigiPen has adopted a faculty-advisor model to provide academic and career-related advising for degree seeking students. Your advisor can be either a full-time faculty member from your major or a staff member who is familiar with the requirements of your 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, override forms and alternate schedules, degree audits and graduation, classroom success, career advising, mentoring, and referrals to other resources..

Placement Assistance

Advice on career options is available to enrolled degree seeking students. With the assistance of Student Affairs and faculty members, the Career Services team works to establish relationships with prospective employers on an on-going basis. It offers resume and job-hunting workshops to supplement career education found in the curriculum.

The Institute has a career bulletin board, including an electronic bulletin board, and uses an email mailing list to post current job openings in the industry. The Institute also provides placement services in the form of internships that may be available during the summer. The placement program bases its recommendations of students on their academic performance. Additionally, DigiPen hosts an annual career day that attracts employers from around the country to the campus to review student portfolios and conduct interviews. DigiPen also attends industry events, such as the Game Developers Conference, to promote the Institute's programs and its students. Placement assistance continues beyond graduation as these services are extended to alumni. For further information, please email the Career Services department 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 strives to ensure that all students are provided with an equal opportunity to participate in the Institute's programs, courses, and activities. Students desiring special assistance should identify themselves to the Disability Support Services Coordinator and provide current documentation supporting their disability. Students must assist in identifying the proper accommodations they need, and they must negotiate these accommodations at the beginning of each semester. As outlined by the Americans with Disabilities Act As Amended and Section 504 of the Rehabilitation Act of 1973, DigiPen will provide reasonable accommodations and academic adjustments as long as provisions do not fundamentally alter the nature of the program or the academic requirements that are considered essential to the program of study.

Graduate Follow Up

The Institute maintains a database of all graduates, and DigiPen alumni are encouraged to report back regarding changes to their professional status. DigiPen hosts an annual reunion at the Game Developers Conference and extends placement services to all alumni.

Housing

DigiPen offers services to assist students with relocation and housing.

First-Year Housing

DigiPen Housing LLC (“DHL”) offers apartment-style housing each year to a limited number of first-year DigiPen. 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 www.digipen.edu/housing.

Off-Campus Living Resources

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 Student Affairs Department administers these programs with help from the Admissions department. 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: <https://www.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: https://www.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 the student’s 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 he or she does not wish any information released:

1. Name
2. Local 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

“NO” to 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, he or she may restrict access through the Administration Office. No information will be released on students or to students who have restricted release of directory information, including degrees awarded and dates of attendance.

Change from “NO” to “YES”

If a student restricted the release of directory information and now wishes to allow this information to be released, he or she must go to the Administration Office 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 the term 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 department. 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, washrooms, elevators, or 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.

6. All student projects must receive approval from DigiPen's instructors prior to commencement of any production. 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
7. Plagiarism will not be tolerated. Any student who submits the work of another person as his or her 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, he or she 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, he or she 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 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 Student Affairs Director, Dean of Faculty, Senior Vice President of Administration, or the Chief Operating Officer.
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 of 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. 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

Procedures

Any student suspected or apprehended in the commitment of an offense shall be given the opportunity to explain the incident and, if he or she requests, to meet with department heads, a Student Affairs Officer, or other appropriate person, before the alleged offense is reported to the Discipline Committee.

An alleged instance of student misconduct deemed serious enough for action by the Institute shall be referred to the Discipline Committee. After an investigation and hearing at

which the student is invited to appear, the committee reports its decision to the Dean of Faculty. If he or she wishes, the student then has the opportunity to meet with the Dean of Faculty to appeal the decision.

Dismissal by the Institute

By written notice to a student, the Institute may, at its sole discretion, dismiss a student at any time if he or she 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 he or she is unable to maintain the minimum required GPA in his or her courses at the end of each semester. Upon dismissal, the student shall immediately return to the Institute all materials in his or her 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

A student has the right to dispute a disciplinary decision of the Dean of Faculty. A student who wishes to make an appeal must notify the Chief Operating Officer in writing and must provide a full explanation of the reasons for appealing.

Appeal hearings take place before a committee called together by the Chief Operating Officer. A student is entitled to be represented or assisted throughout the appeal process by an advocate who may be a friend, relative, or legal counsel. The student is entitled to explain the reasons for appealing either orally or in writing, and he or she may call witnesses. The Dean of Faculty is also present and puts forth the reasons for the original decision.

The members of the committee may ask questions of both the student and the Dean of Faculty. As soon as possible after the hearing is completed, the Chief Operating Officer will notify the student of the final decision in writing.

Degree Programs
for the Academic Year
2012-2013

BACHELOR OF SCIENCE IN COMPUTER SCIENCE IN REAL- TIME INTERACTIVE SIMULATION

Program Overview

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

The BSCS 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, BSCS 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. BSCS students gain the experience of designing, programming, and testing a variety of simulations and games, including text-based, scrolling, simulation, and 2D and 3D games.

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

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

game objects must interact intelligently with each other. Therefore, in order to make games challenging and interesting, students must design and implement good artificial intelligence algorithms, which serve as the cognitive processes for the computer-controlled game objects.

- Could be designed for either a single-player or multi-player environment. The development of the latter requires the understanding of subjects such as computer networks, TCP/IP, and Internet programming.
- Are excellent examples of large and complex productions. Teamwork is essential to the successful completion of such productions. Therefore, students are divided into teams and are rigorously trained in object-oriented programming languages, paradigms, and software engineering techniques and practices.

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

Students in the BSCS 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 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 can successfully complete their BSCS degree and Master of Science in Computer Science in five years sequentially. Please refer to the section about the "Accelerated Schedule" for more details.

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

Degree Requirements

Number of Credits and GPA

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

Humanities and Social Sciences Requirement

Required courses are 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: 14 credits)

Art Requirement

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

Computer Science Requirement

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 or PHY 350. (Total: 60 credits)

Mathematics Requirement

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

Physics Requirement

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

Game Projects Requirement

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)

Electives

Students must complete seven to nine credits of elective courses, which students can choose from any department at DigiPen. (Total: 7-9 credits)

Grade Requirement and Core Courses

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

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

Listed on the following page is the recommended course sequence for the Bachelor of Science in Computer Science in Real-Time Interactive Simulation. Please note the following: Students must achieve a grade of "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BSCS)

Semester	Course	Course Title	Core	Credits
Semester 1	MAT 140	Linear Algebra & Geometry	X	4
	CS 100	Computer Environment I	X	3
	CS 100L	Computer Environment Lab I	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
	ART 210	Art Appreciation		2
			Semester Total	20
Semester 2	MAT 150 or MAT 180	Calculus & 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 & Work Communication		3
	HSS Elective	One humanities & social science elective from any three-credit HIS, PSY, or SOS course		3
			Semester Total	20
Semester 3	MAT 200 or MAT 230	Calculus & Analytic Geometry II or Vector Calculus II	X	4
	CS 200	Computer Graphics I	X	3
	CS 225	Advanced C/C++	X	3
	CS 180	Operating System I, Man-Machine Interface	X	3
	GAM 200	Project II	X	4
	PHY 200	Motion Dynamics	X	3
			Semester Total	20
Semester 4	PHY 250	Waves, Optics, and Aerodynamics		3
	CS 250	Computer Graphics II	X	3
	CS 260	Computer Networks I, Interprocess Communication	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
			Semester Total	19

Semester	Course	Course Title	Core	Credits
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 315	Low-Level Programming	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 258	Discrete Mathematics	X	3
	CG 130	3D Computer Animation Production I		3
	GAM 300	Project III	X	5
	Semester Total			
Semester 6	MAT 300	Curves and Surfaces	X	3
	CS 350	Advanced Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	GAM 350	Project III	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 7	Art Elective	Select one: ANI 125, ART 400, FLM 115, FLM 151, FLM 152, FLM 275, or ART 410		2-3
	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	GAM 400	Project IV	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
Semester 8	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	GAM 450	Project IV	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	Semester Total			
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 in the Bachelor of Science in Computer Science in Real-Time Interactive Simulation (BSCS) program the opportunity to complete both BSCS and Master of Science in Computer Science (MSCS) programs 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 BSCS 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 5 years sequentially (i.e., BSCS in 4 years, and then MSCS in 1 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 (BSCS) in Real-Time Interactive Simulation at DigiPen Institute of Technology
- *Junior standing:* students must have completed the 5th semester's study (the first semester of Junior year) or earned 93 or more credits of course work
- *GPA:* 3.00 or higher
- *Petition* to take graduate level CS electives
- *Consent* from the academic advisor in writing

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

Accelerated Schedule Degree Requirements

The recommended course sequence for the BSCS degree program includes 6 electives (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 BSCS and MSCS 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	Physically-based Simulation	3
CS 560	Advanced Animation & Modeling (I)	3
CS 561	Advanced Animation & 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 MSCS 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 2 semesters (i.e., 12 credits during the first semester and 10 during the second). Students taking the accelerated schedule must also satisfy the MSCS 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 (MSCS 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 MSCS schedule for students completing the accelerated schedule:

Semester	Options	Course Name	Credits
Semester 1	MAT Elective	MAT 500 or above	3
	Concentration Elective	<i>See MSCS "Computer Science degree requirements" section for details</i>	3
	GAM 550	Game Project II	3
	Elective or CS 601	CS 500 or above Master's Thesis I	3
Semester 2	CS 598	CS Colloquium	1
	Concentration Elective	<i>See MSCS "Computer Science degree requirements" section for details</i>	3
	GAM 551	Game Project III	3
	Elective or CS 602	CS 500 or above Master's Thesis II	3

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Program Overview

The Computer Engineering (BSCE) degree program at DigiPen educates engineers to understand both sides of the hardware-software interface, from designing circuits to creating operating systems. Multidisciplinary in scope, the BSCE curriculum integrates the fields of electrical engineering and computer science. This program will uniquely prepare BSCE graduates to design and develop embedded, digital, and computer systems. Graduates with a degree in Computer Engineering will be highly skilled and ideally suited for twenty-first-century industries, including the games industry.

Like students in DigiPen's other degree programs, BSCE students will apply their theoretical learning through a variety of semester-long and year-long projects with critical feedback and evaluation from expert instructors. As they develop through the program, students will have increasingly more creative control over their projects. The BSCE curriculum and the student projects will 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.

Applications of the computer engineering knowledge and skills students will gain through this degree include:

Technology Areas

Game Systems
Hardware/Electronic Toys
Virtual Reality Hardware
Human Interface Devices
Robotics & Automation
Artificial Intelligence
Operating Systems
Information Systems
Telecommunications
Signal Processing
Control Systems & Instrumentation
Multimedia

Application Domains

Aerospace & Avionics
Automotive
Consumer Electronics
Medical Sciences
Internet
Entertainment
Military

The field of computer engineering has a real potential for innovation, and there is a growing demand for skilled graduates. For example, hardware design limits game software development, however BSCE graduates possess the proficiency to design and implement new hardware interfaces that will expand the bounds of video games and other interactive media.

Students who successfully complete the BSCE curriculum acquire the following:

- A broad foundation in mathematics, physics, and computer science, which allows students to remain up-to-date in the profession as tools and techniques evolve.
- A foundation in electrical engineering, which includes the principles of circuits with an emphasis on digital electronics, microprocessors, microcontrollers, and embedded systems.
- The ability to work in small teams to design, build, and test prototype systems typi
- Strong foundational skills in system design, software engineering, coding, and system integration.
- Extensive skills in applied technology using industry-standard hardware and software.
- Professional attitude and work habits, including the ability to maintain a production schedule and to respond to professional criticism.
- Social perspective and civic accountability relative to the roles that technology plays in society.

Graduates of DigiPen's Computer Engineering program will have the necessary skills and preparation to work at entry-level positions in computer technologies in general, and embedded systems development in particular. Some of the positions to which graduates from this program may be hired include Software Engineer, Systems Engineer, Embedded Systems Engineer, Design Engineer, Development Engineer, Quality Control Engineer, Computer Architect, Systems Test Engineer, and Video Game Hardware Engineer.

Computer Engineering Degree Requirements

Number of Credits & GPA

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

Humanities and Social Science Requirement

The following courses are required: ENG 110, ART 210, and ECN 350. Students must also take an additional six semester credits of ENG classes numbered 150 and above, or COM 150. Additionally, students must take three semester credits of SOS courses and an additional three semester credits of art electives taken from any ART course, ANI 125, FLM 115, FLM 151, FLM 152, FLM 275, or ART 410. (Total: 20 credits)

Computer Science Requirement

The following computer science courses are required: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS 260, CS 280, CS 315, CS 365, CS 370, and either CS 380 or CS 381. (Total: 36 credits)

Electrical and Computer Engineering Requirement

The following courses are required: ECE 101L, 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: 47 credits)

Mathematics Requirement

The following mathematics 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 Requirement

PHY 200 and PHY 270 are required. (Total: 6 credits)

Projects Requirement

GAM 100 and GAM 150 are required. (Total: 6 credits)

Electives

Twelve semester credits of electives of any non-ECE or CS courses and three semester credits from any CS, MAT, or PHY course are required. (Total: 15 credits)

Grade Requirement and Core Courses

Students must receive a grade of "C-" 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 higher is considered passing.)

A Note on General Education Courses

The following courses satisfy the general education requirement for the BS in Computer Engineering: ENG 110 (3), ENG electives (6), SOS elective (3), ART 210 (2), Art elective (3), MAT 150 or MAT 180 (4), PHY 200 (3), ECN 350 (3), and a Humanities and Social Sciences elective (3), for a total of 30 credits.

Recommended Course Sequence

Listed on the following page is the recommended course sequence for the Bachelor of Science in Computer Engineering. Please note the following: Students must achieve a grade of "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BSCE)

Semester	Course	Course Title	Core	Credits
Semester 1	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	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		3
	ENG 110	Composition		3
	ART 210	Art Appreciation		2
			Semester Total	20
Semester 2	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	ECE 101L	Introduction to Engineering Projects	X	1
	CS 170	High-Level Programming II - The C++ Programming Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 180	Operating System I, Man-Machine Interface	X	3
	GAM 150	Project I		3
	PHY 200	Motion Dynamics	X	3
			Semester Total	18
Semester 3	MAT 140	Linear Algebra and Geometry	X	4
	CS 225	Advanced C/C++	X	3
	CS 315	Low-Level Programming	X	3
	ECE 210	Digital Electronics I	X	4
	ECE 220L	Introduction to Robotics	X	3
	PHY 270	Electricity and Magnetism	X	3
			Semester Total	20
Semester 4	MAT 256	Introduction to Differential Equations	X	3
	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
	MAT 258	Discrete Mathematics	X	3
			Semester Total	19

Semester	Course	Course Title	Core	Credits
Semester 5	CS 260	Computer Networks I, Interprocess Communication	X	3
	CS 380	Artificial Intelligence for Games	X	3
	ECE 270	Real-Time Operating Systems	X	3
	ECE 310L	CE Project III: Gaming System	X	5
	MAT 225	Calculus and Analytic Geometry III	X	3
	Elective	Any course from the Department of Humanities and Social Sciences		3
	Semester Total			
Semester 6	MAT 340	Probability and Statistics	X	3
	CS 365	Software Engineering	X	3
	CS 370	Computer Imaging	X	3
	ECE 350	Control Systems	X	3
	ECN 350	Engineering Economics		3
	ECE 360L	CE Project IV: Gaming System	X	5
	Semester Total			
Semester 7	ECE 400 or ECE 420	Motors and Sensors or Digital Signal Processing	X	3
	ART Elective	Any ART course or: ANI 125, FLM 115, FLM 151, FLM 152, FLM 275, or ART 410		3
	ENG/COM Elective	One ENG elective chosen from ENG 116 or higher, or COM 150		3-4
	ECE 410L	CE Senior Project	X	5
	Elective	Any elective (excluding ECE and CS courses)		3
	Semester Total			
Semester 8	ENG/COM Elective	One ENG elective chosen from ENG 116 or higher, or COM 150		3-4
	ECE 460L	CE Senior Project	X	5
	Social Science Elective	Any SOS course		3
	Electives	Any two electives (excluding ECE and CS courses)		6
	Elective	An elective in CS, MAT, or PHY	X	3
	Semester Total			
Degree Program Total				154 Minimum

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

GAME DESIGN DEGREE PROGRAMS

Overview

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

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

BACHELOR OF SCIENCE IN GAME DESIGN

Program Overview

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

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

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

BSGD Degree Requirements

Number of Credits and GPA

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

Grade Requirements and Core Courses

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

Humanities and Social Science Requirement

The following courses are required: COM 150, ENG 110, ENG 120, and PSY 101. Three credits must be selected from any courses in the Humanities and Social Sciences department (SOS, HIS, PHL, PSY, or other) offered at DigiPen. (Total: 15 credits)

Art Requirement

The following courses are required: ART 102 or ART 101, ART 126 or ART 125, ART 260, ART 310, CG 102 or CG 201, and CG 125 or CG 225. (Total: 18 credits)

Projects Requirement

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

Computer Science Requirement

The following courses are required: CS 101 or CS 100, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS230, CS 251, CS 280, CS 330, and CS 380. (Total: 33 credits)

Mathematics Requirement

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

Physics Requirement

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

Electives

Complete six credits selected from any courses in any departments at DigiPen. (Total: 6 credits)

Note on General Education Courses

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

Recommended Course Sequence

Listed on the following page is the recommended course sequence for the Bachelor of Science in Game Design. Please note the following: students must receive a "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BSGD)

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

Semester	Course	Course Title	Core	Credits
Semester 5	CS 380	Artificial Intelligence for Games	X	3
	CS 251	Introduction to Computer Graphics	X	3
	ART 126	Principles of Composition and Design		3
	ART 260	Graphic Design, User Experience, and Input		3
	GAT 250	2D Game Design I	X	3
	GAM 302	Project for Game Designers	X	5
	Semester Total			
Semester 6	ART 310	Architectural Spaces, Design, and Lighting I		3
	CG 125	Introduction to 3D Production for Designers		3
	CG 102	2D Raster and Vector Graphics for Designers		3
	GAT 251	2D Game Design II	X	3
	GAM 352	Project for Game Designers	X	5
	MAT 258	Discrete Mathematics	X	3
	Semester Total			
Semester 7	CS 330	Algorithm Analysis	X	3
	GAT 315	3D Game Design I	X	3
	Elective	An elective of the student's choice from any department at DigiPen		3
	CS 311	Introduction to Databases	X	3
	MAT 364	Combinatorial Game Theory	X	3
	GAM 400	Project IV	X	5
	Semester Total			
Semester 8	GAT 316	3D Game Design II	X	3
	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.		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 ARTS IN GAME DESIGN

Program Overview

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

The game industry requires designers to be versatile and skilled in more than just design. Artistic designers must be able to create written or visual content, so the BAGD program allows students to select either an emphasis in visual design or an emphasis in writing and storytelling. Graduates with a visual design emphasis will build on their general art skills and be able to create art assets for games, such as vector art, textures, and models. Graduates with a writing and storytelling emphasis will build on their general writing skills and be able to create characters, history, dialogue, and interactive stories for games.

Graduates of this degree program will be prepared to work in the video game industry as entry-level writers, scripters, level designers, system designers, and game designers. Some of the job titles that graduates of this program may aspire to are Writer, Artist, Game Scripter, Level Designer, System Designer, User Interface Designer, Content Designer, Quest Designer, Game Designer, Design Director, and Creative Director.

Degree Requirements

Number of Credits & GPA

The Bachelor of Arts in Game Design (BAGD) requires completion of at least 147 semester credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of fifteen weeks each, or four academic years.

Grade Requirements and Core Courses

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

Humanities and Social Science Requirement

The following courses are required: COM 150, ENG 110, ENG 120, HIS 100, HIS 150, MGT 451, and PSY 101. Three credits must be selected from any courses in the Humanities and Social Sciences department (SOS, HIS, PHL, PSY, or other) offered at DigiPen. (Total: 24 credits)

Art Requirement

The following courses are required: ART 102 or ART 101, ART 125 or ART 126, ART 260, ART 310, CG 102 or CG 201, CG 125 or CG 225, FLM 151, and FLM 275. (Total: 24 credits)

Projects Requirement

The following courses are required: GAM 100, GAM 152, GAM 202, GAM 252, GAM 302, GAM 352, GAT 110, GAT 210, GAT 211, GAT 212, GAT 240, GAT 250, GAT 251, GAT 315, GAT 316, GAT 330, and GAT 405. Two courses from the following list are also required: GAM 375, GAM 390, GAM 400, GAM 450, and GAM 490. (Total: 61 credits)

Mathematics Requirement

Students must take MAT 103. (Total: 4 credits)

Science Requirement

Students must take PHY 115 or PHY 200. An additional three credits must be selected from courses labeled BIO or PHY. (Total: 6 credits)

Computer Science Requirement

The following courses are required: CS 116, CS 175 or CS 170, 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)

Specialization

Students are required to take 15 credits of “specialization” courses, which must be selected from any of the following offered at DigiPen: any ENG, ART, CG, or ANI course, any 200 level or higher FLM, SOS, HIS, PHL, PSY, MAT, CS, PHY, or BIO course. The following cannot be counted as “specialization” courses: ENG 450, ART 210, ART 299, ART 400, ART 410. (Total: 15 credits)

Electives

Complete three credits selected from any courses in any departments at DigiPen. (Total: 3 credits)

Note on General Education Courses

The following courses satisfy the general education requirement for the BAGD: COM 150 (3), ENG 110 (3), ENG 120 (3), HIS 100 (3), HIS 150 (3), MAT 103 (4), PSY 101 (3), PHY 115 or PHY 200 (3), one additional BIO or PHY course (3), and one Humanities and Social Sciences elective (3), for a total of 31 credits.

Recommended Course Sequence

Listed on the following page is the recommended course sequence for the Bachelor of Arts in Game Design. Please note the following: students must receive a “C-” or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BAGD)

Semester	Course	Course Title	Core	Credits
Semester 1	ENG 110	English Composition	X	3
	CS 116	Introduction to Computer Technology and Programming	X	4
	GAM 100	Project Introduction	X	3
	GAT 110	Game History	X	3
	PSY 101	Introduction to Psychology	X	3
	MAT 103	Precalculus with Discrete Mathematics	X	4
	Semester 1 Total			
Semester 2	ART 102	Fundamentals of Visual Expression	X	3
	ENG 120	Research, Reasoning, and Writing	X	3
	GAT 210	Game Mechanics I	X	3
	GAM 152	Scripting Project	X	3
	CS 175	Scripting Languages	X	3
	PHY 115	Introduction to Applied Math and Physics		3
	Semester 2 Total			
Semester 3	GAM 202	Game Usability and Analysis	X	1
	FLM 151	Visual Language and Film Analysis		3
	CS 176	Advanced Scripting	X	3
	GAT 211	Game Mechanics II	X	3
	GAT 250	2D Game Design I	X	3
	ART 126	Principles of Composition and Design	X	3
	Science Elec.	Any course labeled BIO or PHY		3
	Semester 3 Total			
Semester 4	GAT 251	2D Game Design II	X	3
	GAM 252	Advanced Usability and Process	X	1
	ART 310	Architectural Spaces, Design, and Lighting I	X	3
	COM 150	Interpersonal and Work Communication		3
	GAT 212	Advanced Game Mechanics	X	3
	CG 102	2D Raster Graphics and Animation for Designers	X	3
	CG 125	Introduction to 3D Production for Designers	X	3
	Semester 4 Total			

Semester	Course	Course Title	Core	Credits
Semester 5	GAT 315	3D Game Design I	X	3
	Specialization Course	Any course from the "specialization" list.	X	3
	FLM 275	Fundamentals of Music and Sound Design		3
	Specialization Course	Any course from the "specialization" list.	X	3
	ART 260	Graphic Design, User Experience, and Input	X	3
	GAM 302	Project for Game Designers	X	5
	Semester 5 Total			
Semester 6	Specialization Course	Any course from the "specialization" list.	X	3
	GAT 316	3D Game Design II	X	3
	GAT 240	Technology for Designers	X	3
	Specialization Course	Any course from the "specialization" list	X	3
	GAM 352	Project for Game Designers	X	5
	Semester 6 Total			
Semester 7	HIS 100	Introduction to World History		3
	GAT 330	Interactive Narrative and Character Creation for Games	X	3
	GAT 405	Advanced Game Design	X	3
	Specialization Course	Any course from the "specialization" list.	X	3
	GAM 400	Project IV	X	5
	Semester 7 Total			
Semester 8	HIS 150	Introduction to World History II		3
	HSS Elective	Any three-credit course from the Department of Humanities and Social Sciences offered at DigiPen		3
	Elective	An elective of the student's choice from any department at DigiPen.		3
	MGT 451	Project Management		3
	GAM 450	Project IV	X	5
	Semester 8 Total			
Degree Program Total				147 minimum

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

BACHELOR OF SCIENCE IN ENGINEERING AND SOUND DESIGN

Program Overview

The BS in Engineering and Sound Design 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 experts 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.

Graduates of this program will have the training necessary to enter the software industry in entry-level positions such as: software engineer/developer, sound engine developer, audio programmer, or sound designer for video games. They will also be prepared for roles in the recording and music production industries in positions such as recording engineer, audio engineer, sound technician, and audio production editor.

Degree Program Requirements

Number of credits and GPA

The Bachelor of Science in Engineering and Sound Design requires completion of 140 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of fifteen weeks each, or four academic years.

Computer Science Requirement

Required 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, and 6 CS elective credits. (Total : 39 credits.)

Electrical and Computer Engineering Requirement

Required courses are: ECE 200. (Total : 3 credits.)

Game Projects Requirement

Required courses are: GAM 100, GAM 100L, GAM 150, GAM 150L, GAM 200, GAM 200L, GAM 250, GAM 250L, GAM 300, GAM 300L, GAM 350, GAM 350L. (Total : 24 credits.)

Humanities and Social Sciences Requirement

Required courses are: COM 150, ENG 110, LAW 115, and 3 HSS elective credits. (Total : 12 credits.)

Mathematics Requirement

Required courses are: MAT 140, MAT 150, MAT 200, MAT 220, and 3 MAT elective credits. (Total : 18 credits.)

Music Requirement

Required courses are: 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 3 MUS elective credits. (Total: 23 credits.)

Physics Requirement

Required courses are: PHY 200, PHY 250, PHY 320, PHY 321. (Total : 12 credits.)

General Electives Requirement

Number of General Elective Credits Required: 6.

Internship Option:

Students have the option to replace the pair of courses: GAM 350 and GAM 350L, 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.

Grade Requirements and Core Courses

Students must receive a grade of C- 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 is considered passing.) The core courses are: CS 100, CS 100L, CS 120, CS 120L, CS 170, CS 170L, CS 180, CS 225, CS 245, CS 246, CS 251, CS 280, ECE 200, GAM 100, GAM 100L, GAM 150, GAM 150L, GAM 200, GAM 200L, GAM 250, GAM 250L, GAM 300, GAM 300L, GAM 350, GAM 350L, 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 3 MUS elective credits.

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 3 HSS elective credits. Total general education credits: 33. Students must receive special permission in writing from their academic advisor to take more than 20 credits in either of their first two semesters.

Note: HSS stands for Humanities and Social Sciences, and includes courses with prefixes: COM (Communications), ECN (Economics), ENG (English), HIS (History), LAW (Law), MGT (Management), PHL (Philosophy), PSY (Psychology), and SOS (Social Sciences).

Recommended Course Sequence

Listed below is the recommended course sequence for the Bachelor of Science in Engineering and Sound Design. Please note: students must receive a "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BSESD)

Semester	Course	Course Title	Core	Credits
Semester 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	2
	GAM 100L	Project Introduction Lab	X	1
	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 1 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	2
	GAM 150L	Project I Lab	X	1
	MAT 150	Calculus and Analytic Geometry I	X	4
	MUS 121	Music Theory and Musicianship II	X	2
	MUS 121L	Music Theory and Musicianship II Lab	X	1
	Semester 2 Total			
Semester 3	CS 180	Operating System I: Man-Machine Interface	X	3
	ECE 200	Electric Circuits	X	3
	ENG 110	English Composition		3
	MAT 200	Calculus and Analytic Geometry 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 3 Total			
Semester 4	CS 225	Advanced C/C++	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 4 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	2
	GAM 200L	Project II Lab	X	2
	MUS 250	Sound Design Project III	X	1
	MUS 250L	Sound Design Project III Lab	X	2
	PHY 320	Acoustics I	X	3
	Semester 5 Total			
Semester 6	CS 280	Data Structures	X	3
	CS Elec.	Computer Science Elective	X	3
	GAM 250	Project II	X	2
	GAM 250L	Project II Lab	X	2
	MUS 251	Sound Design Project IV	X	1
	MUS 251L	Sound Design Project IV Lab	X	2
	PHY 321	Acoustics II	X	3
	Semester 6 Total			
Semester 7	COM 150	Interpersonal and Work Communication		3
	CS Elec.	Computer Science Elective	X	3
	GAM 300	Project III	X	2
	GAM 300L	Project III Lab	X	3
	Gen Elec.	General Elective		3
	MAT Elec.	Math Elective		3
	Semester 7 Total			
Semester 8	GAM 350	Project III	X	2
	GAM 350L	Project III Lab	X	3
	Gen. Elec.	General Elective		3
	HSS Elec.	Humanities and Social Sciences Elective		3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	MUS Elec	Music Elective	X	3
	Semester 8 Total			
Degree Program Total				140 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 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.

Graduates of this program will have the training necessary to enter the music and software industries in positions such as entry-level sound designer for animation or video games. They will also be prepared for roles in the recording and music production industries in positions such as recording engineer, assistant audio engineer, sound technician, manager of post production and media assets, and audio production editor. Additionally, graduates will be qualified to join the ranks of musicians/performers as freelance performers, composers and teachers.

Degree Program Requirements

Number of Credits and GPA

The Bachelor of Arts in Music and Sound Design requires completion of 134 credits with a cumulative GPA of 2.0 or better. The program usually spans eight semesters of fifteen weeks each, or four academic years.

Computer Science Requirement:

Required courses are: CS 116, CS 175. (Total : 7 credits.)

Game Application Techniques Requirement

Required courses are: GAT 240, and 3 GAT elective credits. (Total : 6 credits.)

Humanities and Social Sciences Requirement

Required courses are: COM 150, ENG 110, ENG ELEC, LAW 115, and 9 HSS elective credits. (Total : 21 credits.)

Mathematics Requirement

Required courses are: MAT 120. (Total : 3 credits.)

Music Requirement

Required courses are: MUS 110, MUS 111, MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 150, MUS 150L, MUS 151, MUS 151L, MUS 210, MUS 211, 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 320, MUS 321, 1 MUS 322, MUS 330, MUS 331, MUS 350, MUS 350L, MUS 351, MUS 351L, MUS 410, MUS 411, MUS 450, MUS 450L, MUS 451, MUS 451L, and 9 MUS elective credits. (Total: 79 credits.)

Physics Requirement

Required courses are: PHY 115, PHY 116. (Total : 6 credits.)

General Electives Requirement

Number of General Elective Credits Required: 6.

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.

Grade Requirements and Core Courses

Students must receive a grade of C- 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 is considered passing.) The core courses are: MUS 110, MUS 111, MUS 120, MUS 120L, MUS 121, MUS 121L, MUS 150, MUS 150L, MUS 151, MUS 151L, MUS210, MUS 211, MUS 220, MUS 220L, MUS 221, MUS 221L, MUS 230, MUS 231, MUS 250, MUS 250L, MUS251, MUS 251L, MUS 260, MUS 261, MUS 310, MUS 311, MUS 320, MUS 321, MUS 322, MUS 330, MUS 331, MUS 350, MUS 350L, MUS 351, MUS 351L, MUS 410, MUS 411, MUS 450, MUS 450L, MUS 451, MUS 451L, and 9 MUS elective credits.

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 9 HSS elective credits, and 3 ENG elective credits. Total general education credits: 30. Students must receive special permission in writing from their academic advisor to take more than 20 credits in either of their first two semesters.

Note: HSS stands for Humanities and Social Sciences, and includes courses with prefixes: COM (Communications), ECN (Economics), ENG (English), HIS (History), LAW (Law), MGT (Management), PHL (Philosophy), PSY (Psychology), and SOS (Social Sciences).

Recommended Course Sequence

Listed on the following page is the recommended course sequence for the Bachelor of Arts in Music and Sound Design. Please note the following: students must receive a "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BAMSD)

Semester	Course	Course Title	Core	Credits
Semester 1	ENG 110	English Composition		3
	FLM 115	History of Film and Animation		3
	MAT 120	Mathematics of Music and Sound		3
	MUS 110	Private Lessons I: Instrumental or Vocal	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 1 Total	17
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 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 2 Total	17
Semester 3	CS 116	Introduction to Computer Technology and Programming		4
	MUS 210	Private Lessons III: Instrumental or Vocal	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
	PHY 116	Physics of Music and Sound		3
			Semester 3 Total	19
Semester 4	CS 175	Scripting Languages		3
	HSS Elective	Any course from the Department of Humanities and Social Sciences at DigiPen		3
	MUS 211	Private Lessons IV: Instrumental or Vocal	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 4 Total	18

Semester	Course	Course Title	Core	Credits
Semester 5	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 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
	Semester 5 Total			
Semester 6	GAT 240	Technology for Designers		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 6 Total			
Semester 7	GAT Elec.	Game Application Techniques Elective		3
	Gen. Elec.	General Elective		3
	HSS Elec.	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 Elec	Music Elective	X	3
	Semester 7 Total			
Semester 8	Gen Elec	General Elective		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 Elec.	Music Elective	X	3
	MUS Elec.	Music Elective	X	3
	Semester 8 Total			
Degree Program Total				134 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 animation and video game 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.

Digital art and animation remain viable career opportunities for graduates possessing these abilities. 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 demand highly structured curricula and programmed sequencing simply to enable most students to be successful. Some students are capable of the rapid assimilation of the integrated knowledge the studios now require, but most are better served by a deeper and more sequential approach to the material.

DigiPen's Bachelor of Fine Arts in Digital Art and Animation seeks to address these needs. Examples of student projects can be found in the DigiPen's Digital Gallery. Students who successfully complete this curriculum will possess the following skills and appropriate samples of professional work:

- A broad foundation of production experiences 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.

This degree prepares a graduating student for a career in digital art and digital 3D animation, digital 2D animation, and video game or animation pre-production. Some of the careers for which graduates of the BFA in Digital Art and Animation are trained include Props and Environment Modelers, Texture Artists, Level Designers, Character Modelers, Character Riggers, Character Animators, 3D Lighting and Camera Design, Effects Animator, Conceptual Illustration and Character Design, and Storyboard Artists.

Digital Art and Animation Degree Requirements

Number of Credits and GPA

The Bachelor of Fine Arts in Digital Art and Animation requires completion of at least 144 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 better (2.0 GPA). The program usually spans eight semesters of fifteen weeks each, or four academic years.

Humanities and Social Science Requirements

The following courses are required: LAW 115, SOS 115, ENG 116, and ENG 315. (Total: 14 credits)

Art Requirement

The following art courses are required: ART 101, ART 115, ART 125, ART 151, ART 201, ART 251, ART 300, ART 350, ART 401, and ART 450. (Total: 31 credits)

Animation Requirement

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

Computer Graphics Requirement

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

Film Requirement

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

Science Requirement

The following courses are required: CS 115, PHY 115, BIO 100, BIO 150, BIO 200. (Total: 15 credits)

Projects Requirement

The following projects 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)

Electives

Students must take 24 credits from the following: ART 225, ART 228, ART 230, ART 260, ART 301, ART 399, ART 405, CG 251, CG 303, CG 305, CG 315, CG 350, CG 360, CG 399, CG 410, ANI 300, ANI 350, ANI 399, ANI 400, ANI 450, BIO 225, BIO 399, FLM 210, FLM 215, FLM 250, FLM 275, FLM 350, FLM 360, FLM 399, ENG 242, ENG 243, ENG 245. (Total: 24 credits)

Note on General Education Courses

The following courses satisfy the general education requirement for the BFA in Digital Art and Animation: ART 115 (4), BIO 100 (3), BIO 150 (3), BIO 200 (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 36 credits.

BFA Grade Requirement and Core Courses

Certain non-elective courses which are part of the DigiPen BFA 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 better). All other courses, required or elective, are core courses and students must receive a grade of "C-" or higher to pass.

Recommended Course Sequence

Listed on the following page is the recommended course sequence for the Bachelor of Fine Arts in Digital Art and Animation. Please note the following: students must receive a "C-" or higher in the core courses to earn credit toward this degree.

Recommended Course Sequence Chart (BFA)

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 115	Art and Technology	X	4
	BIO 100	Visual Perception	X	3
	ENG 116	Storytelling	X	4
	FLM 115	History of Film and Animation	X	3
	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	ART 225 or Elective	Three-Dimensional Design and Sculpture or any course from the Elective Requirement list.	X	3
	ART 251	Character Design	X	3
	CG 251 or Elective	Two-Dimensional Vector Graphics or any course from the Elective Requirement list.	X	3
	CG 275	3D Character Animation	X	3
	PRJ 251	2D Vector Animation	X	5
	Semester Total			

Semester	Course	Course Title	Core	Credits
Semester 5	ANI 300 or Elective	Acting Through an Interface or any course from the Elective Requirement list.	X	3
	ART 300	Perspective, Backgrounds, and Layouts	X	3
	CG 300	3D Environment and Level Design	X	3
	ENG 315	Story through Dialogue	X	4
	ART 350	Storyboards	X	3
	PRJ 300	Limited-Scope 3D Production	X	5
	Semester Total			
Semester 6	ANI 350 or Elective	Voice Acting for Animation or any course from the Elective Requirement 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 Requirement list.	X	3
	FLM 201 or FLM 210	Cinematography or Cinematography for Visual Effects	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 Requirement list.	X	3
	FLM 275 or Elective	Fundamentals of Music and Sound Design or any course from the Elective Requirement 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 Requirement 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				144 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 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 that 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 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. Our literature courses provide critical inquiry into great writings from our earliest myths and epics to contemporary post-modern works. Our 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 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 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 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 BSCS or CE 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 that 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 better to earn a physics minor. Additionally, students must achieve a grade “C-” 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 is inadequate and limits them from advancing professionally in careers related to the theory and technology involved in real-time simulations. More directed, extensive education at a postgraduate level is needed.

DigiPen Institute of Technology has been teaching the Bachelor of Science in Computer Science in Real-Time Interactive Simulation since 1998. This degree provides both academic and practical training for programming computer games. It has been highly successful, and DigiPen has received much recognition for this achievement. Building on this success, the Institute offers a Master of Science in Computer Science (MSCS) 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 MSCS 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, simulation programming, and networking are in great demand. These include the computer

game, aerospace, and medical industries. Graduates of this program may attain occupations as software engineers, engine and tools programmers, game graphics programmers, and solution architects.

Computer Science Degree Requirements

Number of Credits & GPA

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

Computer Science Requirement

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

Mathematics Requirement

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

Projects Requirement

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

Elective Requirement

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)

Note: Thesis or Extra Course Requirement

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 nor for CS 602.

Waived Required Courses

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

Length Restrictions

Full-time students in the MS in CS degree program must complete the requirements for the degree in 36 months. Students in the PT MS in CS degree program must 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 CS student is employed full time, or when he or she cannot maintain the full-time student status for two consecutive semesters (summer semesters are not included), he or she should transfer from the full-time program to the part-time program.

All graduate-level credits earned in the full-time MS in CS 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, he or she will be automatically withdrawn from the full-time program.

Note on Capstone Experience

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

Thesis and Examination Tracks

Students in the Master of Science in Computer Science program must select to focus their studies through the completion of one of three tracks: research thesis, project thesis, or extra coursework. The research thesis option is designed for those students who wish to develop analytic research skills and to make an original contribution to the field. The project thesis option allows students to advance their professional careers through a hands-on experience or practical application of their study. The extra coursework option is intended for those preferring extended knowledge and broader skills in computer science or a related discipline.

1. Research Thesis (CS 601 and CS 602)

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

2. Project Thesis (CS 601 and CS 602)

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

3. Extra Coursework with Comprehensive Exam

This option allows a student to take 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 his or her academic advisor need to sign the form.

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

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

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

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

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

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

Full-Time Status

Full-time enrollment for graduate students consists of nine credits per semester.

Part-Time Status

Part-time enrollment for graduate students consists of nine to twelve credits per academic year.

Graduate Student Grading System

The following system applies to graduate students. If you are an undergraduate student, 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.

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 section *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 Administration Office, Billing Office, 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 he or she 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 2 years and 4 years, respectively. See 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 fifteen (15) semester credits into the MSCS program.
- Of those 15 semesters credits, nine (9) of which 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 BSCS in RTIS and MSCS programs.
- Regardless of the BS/MS accelerated schedule, students must successfully complete a minimum of 22 semester credits in order to earn a MSCS degree. Please also refer to the BS/MS Accelerated Schedule section for more details.

All credits earned through DigiPen's full-time MSCS program are transferable to the part-time MSCS program.

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

Recommended Course Sequence for MSCS

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			9
Semester 2	GAM 541	Game Project	R	3
	CS 541	Advanced Computer Graphics	R	3
	Elective	CS, MAT, or PHY elective*	E	3
	Semester Total			9
Semester 3	Concentration Elective	See Degree Requirements section	R	3
	GAM 550	Advanced Game Project	R	3
	CS 601 or Elective	Master's Thesis I or CS, MAT, or PHY elective*	R/E	3
	CS 598	Computer Science Seminar***	R	1
	Semester Total			10
Semester 4	Concentration Elective	See Degree Requirements section	R	3
	GAM 551	Advanced Game Project	R	3
	CS 602 or Elective	Masters Thesis II or CS, MAT, or PHY elective*	R/E	3
	Semester Total			9
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 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 BSCS degree and Master of Science in Computer Science in five years sequentially. Please refer to the section Accelerated Schedule (after the BSCS Course Sequence) for more details.

MASTER OF FINE ARTS IN DIGITAL ART

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

Degree Requirements

Number of Credits and GPA

The MFA in Digital Arts requires completion of at least 60 semester credits with cumulative GPA of 3.0 or better. The program typically spans 4 semesters of 15 weeks each, generally accomplished in two calendar years.

Fine Arts Requirement

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

Digital Arts Requirement

The following computer graphics courses are required: CG 521, CG 525, CG 620, CG 661, CG 675, CG 501, CG 605. (Total: 21 credits)

Projects and Thesis Requirement

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

Elective Requirement

Students must take three electives for a total of nine 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: 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 must complete the requirements in three (3) calendar years. Students in the part-time MFA in Digital Arts must 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 he or she cannot maintain the full-time student status for two consecutive semesters (summer semesters are not included), he or she 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 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, he or she will automatically be withdrawn from the full-time program.

Graduation Requirements

In order to graduate from the MFA 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:

- *Rejection:* The thesis proposal is not acceptable. The student is required to meet with their thesis advisor to create a new proposal and develop a new schedule for their proposed work. The student, at the discretion of the thesis committee, must repeat PRJ 690 to develop and refine their thesis proposal.
- *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.
- *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.

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 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 MFA project proposal, is expected to meet professionally technical 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 Thesis is work created specifically in response the approved thesis proposal by a candidate. It includes not only the project work but also marketing and branding materials, schedules and timelines, project scope, and design documentation as appropriate. Candidates are required to

present to a thesis review panel and to the public. The final work and all documents will be archived in the DigiPen library and gallery.

The MFA Thesis is not a retrospective of all work produced since the student entered the graduate program.

MFA 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 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 shown to the committee and public. A question and answer session will follow the presentation, during which the candidate will be required to defend their work.

There are two possible outcomes of the thesis defense:

- *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.
- *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 their thesis and has received approval of their thesis defense is recognized as having completed requirements of DigiPen MFA in Digital Arts and will receive their degree.

Full-time status

Full-time enrollment for graduate students consists of fifteen credits per semester.

Part-Time Status

Part-time enrollment for graduate students consists of fifteen credits per academic year.

Graduate Student Grading System

The following system applies to graduate students. If you are an undergraduate student, 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 Administration Office, Billing Office, 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 he or she 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 re-admission after a 12-month suspension.

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 2 years and for part-time graduate program is 4 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 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 Masters of Fine Arts in Digital Arts program. Courses designated with an “R” are required for the MFA, courses designated with an “E” are appropriate as electives within the program.

The MFA in Digital Arts requires 60 credits total, 51 of which are specifically required and nine (9) credits 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 & Production	3	R
CG 521	Organic and Hard Surface Modeling	3	R
CG 525	Digital Painting: Color & Composition	3	R
CG 605	Digital Sculpting	3	R
CG 620	Lighting and Rendering	3	R
CG 661	Advanced Character Creation	3	R
CG 675	Character Rigging	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
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: Color and Composition	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
	CG 661	Advanced Character Creation	R	3
	CG 620	Lighting and Rendering	R	3
	PRJ 701	Thesis II	R	3
	ART 517	Art History: Research Seminar	R	3
	Semester Total			
Semester 4	CG 675	Character Rigging	R	3
	Elective	ART or CG Elective*	E	3
	Elective	Any course offered at DigiPen*	E	3
	Elective	CS, CSX, MGT, GAM or GAMX 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 their 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			9
Semester 2	ART 522	Character Design	R	3
	ART 528	Advanced Figure Sculpting	R	3
	CG 605	Digital Sculpting	R	3
	Semester Total			9
Semester 3	CG 525	Digital Painting Color and Composition	R	3
	ART 515	Art History: Classical to Renaissance	R	3
	CG 521	Organic and Hard Surface Modeling	R	3
	Semester Total			9
Semester 4	ART 516	Art History: 19th to 21st Century	R	3
	CG 675	Character Rigging	R	3
	Semester Total			6
Semester 5	CG 620	Lighting and Rendering	R	3
	CG 661	Advanced Character Creation	R	3
	Semester Total			6
Semester 6	Elective	Art Elective*	E	3
	Elective	Any Elective*	E	3
	PRJ 690	Thesis I: Proposal Pre-Production	R	3
	Semester Total			9
Semester 7	PRJ 701	Thesis II	R	3
	ART 517	Art History: Research Seminar	R	3
	Semester Total			6
Semester 8	Elective	CS, CSX, MGT, GAM or GAMX Elective*	E	3
	PRJ 702	Thesis III	R	3
	Semester Total			6
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 their advisor.

Course Descriptions for the Academic Year 2012-2013

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 ANI 151 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 350 Animation for Dialogue (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 Art (3 Cr.)

Prerequisite(s): PRJ 251

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

ANI 400 Cinematic Animation (3 Cr.)

Prerequisite(s): ANI 350, ART 401, & FLM 275

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 class 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 gain advanced instruction on more focused ‘acting’, ‘physicality’, and ‘creature’ animation. This class provides students with an ideal opportunity to improve an area of their portfolio work that will better represent animated ‘body mechanics’ and ‘acting’ skills.

Film Courses

FLM 115 History of Film and Animation (3 Cr.)

Prerequisite(s): None

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

FLM 151 Visual Language and Film Analysis (3 Cr.)

Prerequisite(s): None

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

FLM 152 Introduction to Visual Storytelling (3 Cr.)

Prerequisite(s): None

Students will review 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 will also examine the fundamental theories underlying visual storytelling. Ultimately, students will gain insight into effective cinematic sequences. Not for BFA, BAGD and BSGD students.

FLM 201 Cinematography (3 Cr.)

Prerequisite(s): FLM 151

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

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 275 Fundamentals of Music and Sound Design (3 Cr.)

Prerequisite(s): None

Every good animation relies on a well-designed soundtrack to enhance the production. While most animators do not produce the soundtrack themselves, they need to understand the effect of music, voice, and sound effects on an audience. Animators must be able to communicate their ideas to a musician and understand the technological possibilities of modern sound design. Initially students survey a broad range of music from different cultures. Emphasis is on developing basic listening skills in hearing rhythm, melody, harmony, color, texture, and form. Students then learn how to apply this to the production needs of animation. The course gives special attention to the generation of sound, how to use sound to advance a story, and how it can create mood, a sense of place, and emphasis.

There may be course fees associated with this class. Please see the course registration packet for details.

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 508 Cinematography and the Art of the Story (3Cr.)

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

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. PRJ 201 concentrates on pre-production for the project.

PRJ 251 2D Vector 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 PRJ201, PRJ251 concentrates on the production and animation for the project.

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

Prerequisite(s): CG 275 & PRJ 251

PRJ 300 addresses two of the more serious affective learning challenges facing commercial animators: professional focus and realistic expectations. The goal of this course is to build on the experience gained in production pipeline procedures in PRJ 201/251 as well as the modeling and animation skills developed in CG 225 and CG 275. Students apply skills learned concurrently in ART 300 and CG 300 to produce an animated short film of limited duration.

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 Capstone Project I (5 Cr.)

Prerequisite(s): ART 350, ENG 116, PRJ 350, & Senior class standing

Working effectively as producers, the Animation Faculty team will select from student submissions one or more team projects to be produced. They then assign students to specific teams, based upon their artistic strengths and career goals. Wherever possible, individual students are introduced to specialist advisers from outside the faculty.

Each student's individual effort is assessed as well as the overall teamwork and professional success of the team. As in a professional work environment, student teams are not allowed to exclude individual members due to production conflicts or performance. The faculty alone retains the right to remove a team member for failure to perform.

PRJ 450 Capstone Project II (5 Cr.)

Prerequisite(s): ART 401, PRJ 400, & Senior class standing

Having completed the pre-production work for a team-based animated production in PRJ 400, students then complete final rendering and post-production. Students face the challenges of commercial art direction, quality control, production deadlines, and team dynamics, as well as the many technical challenges.

INT 390/450 Internship I/II (5 Cr.)

Prerequisite(s): Permission of Instructor

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

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 I (3 Cr.)

Concurrent Course(s): CS 100L

This course provides students with a solid understanding of the fundamental elements on which computers are based. Topics covered include number systems, operations in and conversions between number systems, representation of numbers in computation, basic electricity, electric circuits, digital systems, logic circuits, Boolean algebra, data representations, digital memory, microcontrollers, embedded systems, and an overview of operating systems. The theoretical lectures are followed up by labs, during which students work together in small teams to build and test autonomous robotic car projects. This understanding of hardware enables students to expand the limits of their future games with unique interface devices, while the practical experience of low-level programming provides students with the skills essential for code optimization. This class meets weekly for three hours of lecture and two additional hours of supervised labs.

CS 100L Computer Environment Lab (1 Cr.)

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 managing autonomous robot navigation.

**CS 101 Introduction to Computer Environment
(1 Cr.)**

Prerequisite(s): None

This course provides students with an introductory overview of the fundamental elements on which computers are based. Topics covered by the curriculum include basic computer hardware systems, operations, and structures. An introduction to basic programming logic is also included. This knowledge provides students with a well-rounded overview of how computers operate.

CS 115 Introduction to Scripting and Programming (3 Cr.)

Prerequisite(s): CG 350

This class introduces programming environments to students who are not experienced programmers. This course covers simple logic, programming flow, and the use of variables. It introduces students to the history of programming and the basic vocabulary of the programming industry. The course culminates in a series of hands-on exercises using this knowledge to solve problems. At his or her discretion, the instructor may cover special topics in programming or scripting. Credit may be received for CS 115 or for CS 120, but not for both.

CS 116 Introduction to Computer Technology and Programming (4 Cr.)

Prerequisite(s): None

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

CS 120 High-Level Programming I - The C Programming Language (3 Cr.)

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.)

Concurrent Course(s): CS 120

CS 120L 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 lab environment.

CS 170 High-Level Programming II - The C++ Programming Language (3 Cr.)

Prerequisite(s): CS 120

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. Concurrent enrollment in CS 170L is required.

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

Concurrent Course(s): CS 170

CS 170L 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 class will cover such relevant topics as data-driven technology, modular coding, function calls, and procedures.

CS 176 Advanced Scripting (3 Cr.)

Prerequisite(s): CS 170 or CS 175

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

CS 180 Operating System I, Man-Machine Interface (3 Cr.)

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

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 & MAT 140

CS 200 presents fundamental mathematical elements, data structures, and algorithms useful for animating and viewing two dimensional 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 three dimensional 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 225 Advanced C/C++ (3 Cr.)

Prerequisite(s): CS 170

This course builds on the foundation created in the first two high-level programming courses (CS 120/170). It presents advanced topics of the C/C++ programming language in greater detail. Such topics include advanced pointer manipulation, utilizing multi-dimensional arrays, complex declarations, and standard library functions. Advanced C++ topics include class and function templates, operator overloading, multiple inheritance, runtime type information, the standard template library, and performance issues.

CS 230 Game Implementation Techniques (3 Cr.)

Prerequisite(s): CS 120
Concurrent Course(s): CS 170

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

CS 241 Fundamental Computer Graphics (3 Cr.)

Prerequisite(s): MAT 140, & MAT 200 or MAT 230

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): CS 170, CS 180, MAT 140 & 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 250 Computer Graphics II (3 Cr.)

Prerequisite(s): CS 200

CS 250 examines the mathematical elements and algorithms used in the design and development of real-time 3D computer graphics applications, such as games, cockpit simulators, and architectural walk-throughs. 3D computer graphics involve drawing pictures of 3D objects, usually on a 2D screen. This process of generating a 2D image of a 3D graphics application can be described as a series of distinct operations performed on a set of input data. Each operation generates results for the successive one. This process is called the graphics rendering pipeline, and it is the core of real-time computer graphics. The graphics pipeline can be conceptualized as consisting of three stages: application, transformation, and rasterization. The course begins by introducing the 3D graphics pipeline. The application stage is examined from the viewpoint of the representation, modeling, and animation of 3D objects. Topics include user interaction, camera animation techniques, simulation of dynamic objects, and collision detection techniques. Next, the course examines the process of mapping 3D graphic objects from model-space to viewport coordinates. The transformation stage implements this process. Finally, the conversion of a geometric primitive in viewport coordinates into a 2D image is studied. The rasterization stage implements this final process.

CS 251 Introduction to Computer Graphics (3 Cr.)

Prerequisite(s): CS 170

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

CS 260 Computer Networks I, Interprocess Communication (3 Cr.)

Prerequisite(s): CS 170

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

CS 261 Computer Networks II (3 Cr.)

Prerequisite(s): CS 260

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

CS 280 Data Structures (3 Cr.)

Prerequisite(s): CS 225

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

CS 300 Advanced Computer Graphics I (3 Cr.)

Prerequisite(s): CS 250

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

CS 311 - Introduction to Databases (3 Cr.)

Prerequisite(s): CS 170

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

CS 315 Low-Level Programming (3 Cr.)

Prerequisite(s): CS 100, CS 100L, CS 120, CS120L & 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 330 Algorithm Analysis (3 Cr.)

Prerequisite(s): CS 225, CS 280, & MAT 200 or MAT 230

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 365 Software Engineering (3 Cr.)

Prerequisite(s): CS 225

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

CS 370 Computer Imaging (3 Cr.)

Prerequisite(s): CS 280

The course is taught at the upper division/graduate level and, brings image analysis and image processing into a unified framework that provides a useful paradigm for both computer vision and image processing applications. Course material covers methods students can apply in creating special effects with digital images and preparing graphics information for either human or computer interpretation. Course content covers both image processing, which transforms an image, and computer vision, which extracts a measurement or description.

CS 380 Artificial Intelligence for Games (3 Cr.)

Prerequisite(s): CS 225, CS 280

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

CS 381 Machine Learning (3 Cr.)

Prerequisite(s): CS 280

This course deals with constructing computer programs that automatically improve with experience. Observed events are used to inductively construct decision trees, which can be used by computer-controlled game characters to change behaviors. Students explore concept learning, partial ordering, reinforcement learning, conditional probability, Bayesian learning, the evaluation of hypotheses and instance-based learning. Types of neural networks examined include perceptrons, back-propagation, radial basis functions, and adaptive resonance theory. The effectiveness of genetic algorithms and power of a neuro-genetic approach are demonstrated. The class concludes by looking at inductive analytical learning..

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 of the computer, compiler, and language, specifically how to apply these toward the practical problem of solving crashes and performance issues. The emphasis is not only on knowing what and why, but also on taking that knowledge and creating useful tools and techniques for solving these problems.

CS 399 Special Topics in Computer Science (3 Cr.)

Prerequisite(s): Permission of instructor

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

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 I (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): GAM 250 & CS 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 or Entrance into the Master of Science in Computer Science program

In this class, 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): Entrance into the Master of Science in Computer Science program

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): Entrance into the Master of Science in Computer Science program

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 low-level 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 560 Advanced Animation Algorithms 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 460 or CS 560

This course is the continuation of CS 460/560. 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, advance 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): Senior or graduate-level standing in Computer Science

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 the learning activity with hands-on implementation approach.

CS 572 Digital Signal Processing (3 Cr.)

Prerequisite(s): MAT 256 or equivalent

Credit may be received for either ECE 420 or CS 572 but not both.

In this course, students are presented with discrete signal processing techniques, starting from understanding signals in the time domain. They then learn the theory and application of signal transformation into frequency and Z domains. Lectures are reinforced with DSP implementation.

CS 580 Artificial Intelligence in Games (3 Cr.)

Prerequisite(s): Entrance into the Master of Science in Computer Science program

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): Entrance into the Master of Science in Computer Science program

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 and the skills relevant to modern AI techniques, practices, and design solutions.

CS 582 Reasoning under Uncertainty (3 Cr.)

Prerequisite(s): CS 580 & 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 590 Computational Complexity (3 Cr.)

Prerequisite(s): CS 280, CS 330, or Equivalent

The study of computational complexity is at the core of theoretical computer science. The key issue to understand in complexity theory is the nature of efficient computation. Hence, it is a natural extension of computability theory, which studies the nature of computation without regard for resource bounds. This course addresses questions such as: What is an algorithm? What problems can or cannot be solved by an algorithm? What problems can or cannot be solved efficiently by an algorithm? How can we classify and compare problems according to their intrinsic computational complexity? Exploring this last question will constitute the bulk of the course. Students are introduced to ways to compare computational problems, even when we do not know how to solve them efficiently. They also study the complexity classes (e.g. P, NP, PSPACE, L, NL, BPP, etc.) into which they fall. As the course progresses, students are led to examine more questions, such as: Is it easier (more efficient) to simply seek approximate solutions? Can flipping coins help in designing efficient algorithms? Can biology and/or physics lend a hand?

CS 598 Computer Science Seminar (1 Cr.)

Prerequisite(s): Upon approval of academic advisor

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): Upon approval of academic advisor

This course is an upper-level graduate class. It is offered infrequently to explore various subjects that may be topical or of special interest. Subjects might include (but are not limited to) 3D graphics rendering algorithms, advanced animation and modeling techniques, artificial intelligence, numerical solutions, and the applications of mathematics and physics in real-time interactive simulations and video game software.

CS 601 Master's Thesis I (3 Cr.)

Prerequisite(s): Upon approval of academic advisor

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): Approval of thesis advisory committee and 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 class, the student must submit his or her formal written thesis to the advisory committee to summarize the entire 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 - Master's Continuous Matriculation (1 Cr.)

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 and Vector Graphics for Designers (3 Cr.)

Prerequisite(s): 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. (Earlier catalogs listed this course as GAT 300.)

CG 135 3D Computer Animation Production II (3 Cr.)

Prerequisite(s): CG 130

This course builds on the fundamentals taught in CG 130. Students learn about key framing, special effects, final rendering, and recording. (Earlier catalogs listed this course as GAT 350.)

CG 175 Introduction to 3D Character Animation for Designers (3 Cr.)

Prerequisite(s): CG 102 & CG 125

This course introduces students to the basics of character design and animation. Students are introduced to the 3D character animation pipeline in progressively more complex sequences. Each iteration goes through the same basic principles of creating, editing, material/mapping, rigging, skinning, animating, camera/lighting setup, and implementation of the assets into a game engine.

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 151, 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, and the course concludes with a series of applied problems in 2D vector animation.

CG 275 3D Character Animation (3 Cr.)

Prerequisite(s): CG 105 or 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 125 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 modelling, texturing and lighting skills within the framework of a 3D modelling 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 CG275 "3D Character Animation," 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 workflow 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 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 320 Materials and Textures (3 Cr.)

Prerequisite(s): CG 175

This course builds on foundational knowledge from CG 175 and CG 102, delving further into the art and science of painting textures for game characters and environments. Students focus on generating multiple maps for materials to define complex shader properties. Emphasis is placed on effective texture layout and detail for use in games and cinematic applications. Students are also trained on the use of digital sculpting tools that combines 3D/2.5D modeling, texturing, and painting.

CG 340 Game Art Production Tools (3 Cr.)

Prerequisite(s): CG 320

This course looks beyond 2D digital painting and 3D animation software to introduce students to specialized modeling, texturing, animation, and special effects tools.

CG 350 Graphics for Gaming (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 350

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 aBSCStic levels, students explore rendering techniques and strategies that efficiently produce a more convincing result.

CG 399 Special Topics in Computer Graphics (3 Cr.)

Prerequisite(s): CG 275

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

CG 501 3D Concepts & 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, CG 505

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, pallet 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): CG 505, 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 (3 Cr.)

Students occasionally propose unique and unorthodox ideas that defy categorization. This course is strictly approved on a case-by-case basis by the Director of the DIT MFA program.

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): ART522, CG505

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 to this course.

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. Enrollment priority is given to freshmen in the Computer Engineering degree program.

ECE 200 Electric Circuits (3 Cr.)

Prerequisite(s): CS 100 & CS 100L

Usually taken after ECE 210, this course is more theoretical than digital electronics. It emphasizes the basic principles on which digital electronics are based. Exploring these principles leads one to conclude that all electronics are really analog. Effects seen in digital circuits may be due to unanticipated capacitance or inductance. It is important to understand how these transient phenomena arise. It is also often useful to have an analog section in a primarily digital circuit. Topics in this course include passive components, series and parallel circuits, two-terminal networks, two-port networks, circuit reduction techniques, impedance analysis, measurement of waveforms, power, and filters. It also looks at operational amplifiers, step responses of various simple circuits, and the Laplace transform.

ECE 210 Digital Electronics I (4 Cr.)

Prerequisite(s): CS 100 & CS 100L

The objective of this course and the following ECE 260 is to prepare students well enough at hardware design and troubleshooting, so that he or she can determine whether a problem comes from hardware or software. The course uses TTL family integrated circuits to build digital devices. Part of the time is spent in the lab. Topics in this course include, digital logic, programmable logic devices, FPGA, arithmetic circuits, multiplexers and demultiplexers, logic families, memory devices, and flip-flops

ECE 220L Introduction to Robotics (3 Cr.)

Prerequisite(s): CS 100, CS 100L, & GAM 150

Continuing the concepts learned in CS 100 and CS 100L, students design and build a device that uses an embedded microprocessor. This device usually takes the form of a robot or electronic toy. The device must be interactive with either humans or the environment, and it must successfully demonstrate digital communication. Throughout the semester, students document the design, production, and service of their device. This course introduces concepts of software engineering and process documentation, and it emphasizes system-level design so that students can build an initial prototype and then revise key components to be cost-competitive.

ECE 260 Digital Electronics II (4 Cr.)

Prerequisite(s): ECE 210

In this course, students enhance their abilities with digital logic and learn about the trade-offs in putting functionality in circuits or programming them. Students learn how to use the power of a logic analyzer to track down system anomalies. Topics include, counter circuits, shift registers, timers, digital/analog conversion, microprocessor architecture, ports, and interrupt handling. This course also examines the use of logic analyzers and in-circuit emulation (ICE) with particular emphasis on small-scale systems for embedded devices. Lab time enhances concepts covered in the lectures.

ECE 270 Real-Time Operating Systems (3 Cr.)

Prerequisite(s): CS 180 & CS 315

This course explores the theory behind modern, real-time operating systems (RTOS). ECE 270 covers multi-tasking, interrupt handling, threading, synchronization, preemption, resources, scheduling, and messaging, while dealing with fault tolerance and reliability. Students then apply this knowledge by creating their own RTOS for an embedded microprocessor system.

ECE 300 Embedded Microcontroller Systems (3 Cr.)

Prerequisite(s): CS 315 & ECE 260
Concurrent Course(s): ECE 310L

This class covers the remaining concepts needed to build the hardware and software for a hand-held gaming device. By this point, students have studied many pieces needed in electronic systems and have worked with microprocessors. This class aims to bring together additional concepts and expand the understanding of a microprocessor or microcontroller system. Topics include, Harvard architecture, microprocessor systems, analog/digital conversions, timing control, serial ports, peripheral access, and digital signal processor (DSP) applications to real-time audio processing. Students emerge with a better understanding of system architecture and how the key components interact.

ECE 310L CE Project III: Gaming System (5 Cr.)

Prerequisite(s): CS 315, ECE 220L, ECE 260, & ECE 270
Concurrent Course(s): ECE 300

In this course, students work in small teams to design, to build, to program, and to test a small gaming device. Students integrate a microprocessor with storage, input, and display devices into a hand-held game platform. This project makes use of microprocessor and operating system concepts studied earlier. Students are also shown effective techniques in collaborative engineering environments..

ECE 350 Control Systems (3 Cr.)

Prerequisite(s): MAT 256

This course presents mathematical methods of describing systems, with an emphasis on electromechanical systems. Topics covered include signals and systems, state-space description, convolution, frequency analysis of signals, feedback, Bode and Nyquist root locus analyses, stability, phase margin, observability, tracking errors, motor control, PID control, Kalman filters, Laplace transforms, and Fourier transforms.

ECE 360L CE Project IV: Gaming System (5 Cr.)

Prerequisite(s): ECE 300 & ECE 310L

In this course, students work in small teams to finish their gaming device that they started in ECE 310L. Students design and create low-level software to communicate and to provide a framework for games on the team gaming device. Students showcase their final project with a small game.

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 Electrical and Computer Engineering (3 Cr.)

Prerequisite(s): Permission of instructor

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

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 Senior Project I (5 Cr.)

Prerequisite(s): ECE 350 & ECE 360L
Concurrent Course(s): ART 410 & ECE 400

In this course, students work in small teams under the supervision of a professor to design and implement a senior-level CE project.

ECE 420 Digital Signal Processing (3 Cr.)

Prerequisite(s): ECE 350 & MAT 256

In this course, students are presented with discrete signal processing techniques, starting from understanding signals in the time domain. They then learn the theory and application of signal transformation into frequency and Z-domains. Lectures are reinforced with DSP implementation.

ECE 460L CE Senior Project II (5 Cr.)

Prerequisite(s): ECE 410L

In this course, students will work in small teams under the supervision of a professor to complete their senior-level CE project.

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 Administration Office.

DEPARTMENT OF FINE ARTS

Art Courses

ART 101 The Language of Drawing (3 Cr.)

Prerequisite(s): None

Credit may be received for either ART 101 or ART 102, not both.

This course explores the nature of drawing as a language skill and the use of drawing by production artists and animators. 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 either ART 101 or ART 102, not both.

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

ART 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 may be 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 & Design (3 Cr.)

Prerequisite(s): ART 101 or ART 102

Credit may be received either ART 125 or ART 126, not both

This course continues to build 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 155 Basic Life Drawing and Anatomy (3 Cr.)

Prerequisite(s): ART 101

This course introduces students to the challenges of drawing the human form for animation. Students examine the goals of life drawing for animation, and the instructor demonstrates methods for attaining these goals. Additionally, students will study human skeletal and muscular anatomy and learn to apply this knowledge to drawing. 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 and significantly expand their understanding of human kinetics and structure. Finally, they practice extrapolating basic human life drawing strategies to drawing 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 205 Character and Environment Design (3 Cr.)

Prerequisite(s): ART 155

Students apply their drawing and anatomy knowledge to the creation of animation characters. The course introduces 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. The course also covers issues of costume, personality, and story interaction. Additionally, students learn to place these characters into appropriately designed environments. The curriculum emphasizes professional applications, techniques, and standards of quality.

ART 210 Art Appreciation (2 Cr.)

Prerequisite(s): None

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

ART 225 3D Design and Sculpture (3 Cr.)

Prerequisite(s): ART 201

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

ART 226 Gesture Drawing for Animation (3 Cr.)

Prerequisite(s): ART 101, ART 151, & BIO 150

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

ART 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 or 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 an historical overview of sequential art and will then examine storytelling through pictures, focusing on clarity and emotional impact. Students will examine contemporary styles and conventions and will be required to draw from previous art experiences, while honing their skills in drawing, perspective, design, color, typography, writing, editing, and acting. Demonstrations of multimedia techniques and computer technology relative to this field will also be introduced.

ART 251 Character Design (3 Cr.)

Prerequisite(s): ART 201

Students leverage their drawing and anatomy knowledge to the creation of animation characters. This course introduces student 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 299 Special Topics in Art (2 Cr.)

Prerequisite(s): Permission of instructor

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

ART 300 Perspective, Backgrounds, and Layouts (3 Cr.)

Prerequisite(s): None

This course explores the animation pre-production skills of background and layout art. Students review classical depth cue and perspective systems and apply this knowledge to the creation of animation backgrounds and layouts. Additionally, students explore means of using drawing to create camera lens illusions, architectural space, theatrical sets, level design, matte painting, and surface texture. 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 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, & CG 320

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): ART 151

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

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 intents 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 on 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, pallet limitation, paint manipulation and edges, digital simulation and color reproduction are examined. Studies taken from nature using critical 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 Sculpting (3 Cr.)

Prerequisite(s): ART 501 or ART 555

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.

DEPARTMENT OF GAME SOFTWARE DESIGN AND PRODUCTION

Game Projects Courses

GAM 100 Project Introduction (3 Cr.)

Prerequisite(s): None

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

GAM 150 Project I (3 Cr.)

Prerequisite(s): CS 120 & GAM 100

Credit may be received for either GAM 150 or GAM 152, but not for 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 Scripting Project (3 Cr.)

Prerequisite(s): CS 116 & GAM 100

Credit may be received for either GAM 150 or GAM 152, but not for 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 230, GAM 150, & MAT 140

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 pre-existing 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 250 Project II (4 Cr.)

Prerequisite(s): CS 225 & GAM 200

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 Process (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 300 Project III (5 Cr.)

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

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 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 for Game Designers (5 Cr.)

Prerequisite(s): GAT 211, either GAM 250 or (GAT 251 & GAM 252)

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

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 for Game Designers (5 Cr.)

Prerequisite(s): GAM 302

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 390/490 Internship I/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 400 Project IV (5 Cr.)

Prerequisite(s): GAM 350 & CS 250 or GAM 352 & GAT 251

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

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

GAM 541 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, personal networking, and career strategies.

GAM 590/591 Internship I/II (3 Cr.)

Prerequisite(s): Permission of Instructor

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

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 non-verbal 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 210 Game Mechanics I (3 Cr.)

Prerequisite(s): MAT 103 or MAT 140; and GAT 110

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 176 or CS 225, PHY 115 or PHY 200

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): GAT 210, PSY 101, CS 170 or CS 175

Credit may be received for either GAT 250 or for GAT 305, but not for both.

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

GAT 251 2D Game Design II (3 Cr.)

Prerequisite(s): GAT 250 & GAT 211

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

GAT 305 2D Level Design (3 Cr.)

Prerequisite(s): CS 170 or CS 175

Credit may be received for either GAT 305 or for GAT 250, but not for both.

This course is an introduction to level design, focused on how design decisions determine the player experience. Students work to create fully functional levels for one or more professional games. Games used may include any level-centric game with 2D gameplay, such as traditional platformers, real-time strategy games, top-down shooters or brawlers, or isometric RPGs. Topics may include level layout, enemy placement, resource placement, player guidance, and pacing.

GAT 310 3D Level Design (3 Cr.)

Prerequisite(s): GAT 305 or GAT 250

Credit may be received for GAT 310 or for GAT 315, but not for both.

This course is an introduction to level design for 3D games, focusing on the unique design challenges of a 3D environment. Students will work to create fully functional levels for one or more professional games. Games used may include any level-centric game with 3D gameplay, such as first-person shooters, third-person platformers, third-person adventure games or RPGs, or 3D racing games. Topics may include environment building, lighting, texturing, player guidance, and camera controls.

GAT 315 3D Game Design I (3 Cr.)

Prerequisite(s): ART 310 & GAT 251

Credit may be received for either GAT 315 or for GAT 310, but not for both.

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

GAT 316 3D Game Design II (3 Cr.)

Prerequisite(s): GAT 315

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 120 & 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 251

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 Development (3 Cr.)

Prerequisite(s): Permission of instructor

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

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 experience 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 Development (3 Cr.)

Prerequisite(s): Upon approval of academic advisor

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 aBSCStic team projects. Lectures cover various aspects of managing creative teams. Topics may include leadership, communication, team building, marketing, budgeting, long-range project planning, contract negotiations and intellectual property considerations.

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

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.

Economics Courses

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

George Leonard, a leading writer on education, wrote, “To learn is to change. Education is a process that changes the learner.” Writing is also a process that changes the writer. In this practical course in composition, students spend time generating ideas for writing, sharing and critiquing their writing and ideas, revising their ideas, and learning more about themselves as a result. The course emphasizes using writing as a tool to explore and discover their thought processes, beliefs, and world concepts. Students employ writing as a tool to develop critical thinking skills. In the process of organizing ideas and, subsequently, manifesting those ideas into various compositional styles and forms, students become conscious of the concepts which have shaped and are continually shaping their personal realities.

ENG 116 Storytelling (4 Cr.)

Prerequisite(s): None

Storytelling is one of the oldest art forms, yet narrative—the description of an event—is also one of the most complex human endeavors. The art of narrative is endless, and we have created an almost boundless number of forms for telling stories: gesture, speech, writing, painting, photography, cinema, television, comics, newspapers, music, theater, and video games. Contemporary narrative strategies and structures share much in common with the most archaic of storytelling traditions. This course begins by investigating the psychosocial drive to tell stories, and proceeds to examine how the principal elements of narrative assert themselves in a variety of narrative genres and across different media.

Students explore the rhetoric of narrative in its many guises, and gain an appreciation for both classical and contemporary formulations of story structure. In particular, this course focuses on how narrative may be adapted across media and genres. A series of written assignments focuses on the demands of storytelling made by different genres. Such a study discloses the particular attributes of each genre, and exposes the inextricable bond between narrative form and narrative content. Additionally, the class considers several ways to interpret narrative, negotiate the temporal restrictions of commercial storytelling applications, and begin to think about the ethics of storytelling.

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 technologies.

ENG 150 Mythology (3 Cr.)

Prerequisite(s): ENG 110

The power of myth resides in its ability to touch the essence of our humanity and put meaning into our lives. Artists, filmmakers, game designers, and writers have appropriated elemental mythological premises and updated them to create modern myths accessible to contemporary audiences. Whether we are playing a role-playing game wherein the task is to rescue the princess and save the planet, reading the latest cyberpunk novel, or watching an animated Disney classic, the power of mythology touches our psyches. This course is an overview and analysis of cross-cultural mythology presented as poetry, prose, film, drama, and game. This class provides an in-depth discussion of the idea that myths have influenced cultures of the past and continue to inform and influence our culture today. It also examines the practical use of myth. Additionally, it emphasizes the mono-myth of the hero's journey and how a game developer may redefine the archetypal figures and adventures therein and incorporate them in a game design. One central aim of this course is to identify the many characteristics of the hero and suggest reasons why the hero is such a common figure in disparate traditions.

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, ENG 116, or 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

This course provides an introduction to the study and practice of fiction writing. Students learn how to analyze characterization, plot, point of view, and other elements of fiction by reading a variety of stimulating works of short fiction. In examining the elements of fiction, students gain the insights and skills they need to write compelling fiction of their own. Students complete weekly writing assignments, as well as two full-length short stories. In addition, students learn how to give and receive constructive criticism regarding their creative work. Although the focus is on the form of the short story, there are also discussions on how narrative is employed in graphic storytelling and video games. By the end of the course, students gain confidence in their ability to analyze, to discuss, and to write short stories. They acquire a deeper understanding of the creative process, particularly as it applies to writing.

ENG 246 American Ethnic Literatures (3 Cr.)

Prerequisite(s): ENG 110

This course is an opportunity for students to discover and follow the development of American ethnic literatures, such as Native American, African American, Asian American, and Chicano/Latino literatures from the late 18th century to the early 21st century. Texts include classics as well as recent texts that explore contemporary issues and employ modern and post-modern literary techniques.

The course explores the cultural hybridism of this literature as well as the unique visions of the worlds created by these authors. Their narratives are quintessentially American, yet also unique and peculiar to these authors' ethnic experiences.

ENG 315 Story through Dialogue (4 Cr.)

Prerequisite(s): ENG 116

Dialogue is more than just what people say; dialogue is a crucial element that animates contemporary narrative genres, including fiction, graphic novels, film and television, drama, and even video games. Through an intensive reading of fiction and critical texts, film screenings, written and oral exercises, and a series of workshops, this course aims to provide students with an introduction to the centrality of dialogue in a variety of narrative genres. One central aim of this course is to identify the characteristics of effective dialogue and the role dialogue plays in crafting action, characterization, and theme in different narrative modes. Students are also coached to consider reading texts or viewing films as a dialogic exercise—a give and take between reader/viewer and text. Additionally, students learn traditional dialogue and scripting formats and utilize them in their written work, with the eventual goal of producing a pre-production script proposal. This course offers students an opportunity to participate in a hybrid literature-writing class that provides the invaluable experience of reading closely, writing often, and reflecting upon their work in a supportive environment.

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 399 Special Topics in English (3 Cr.)

Prerequisite(s): Permission of instructor

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

ENG 400 Creative Writing for Game Design (3 Cr.)

Prerequisite(s): ENG 110 or ENG 150

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, Equivalent, or Permission of instructor

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, ENG 315, or ENG 340

This course builds upon the concepts and skills taught in previous writing courses. Advanced Fiction Writing 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. Enrollment is limited to a maximum of 12 students. The limited class size will afford the intensive production schedule and frequent discussion of writing.

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): 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.

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 399 Special Topics in Psychology (3 Cr.)

Prerequisite(s): Permission of instructor

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

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 and 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): 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.

DEPARTMENT OF LIFE SCIENCES

Biology Courses

BIO 100 Visual Perception (3 Cr.)

Prerequisite(s): None

This course explores the nature of human visual perception. Beginning with the physics of light and the anatomy of the human eye, the course examines how human beings process light information and use this data to survive. Additionally, students examine neurophysiology, perceptual psychology, and artistic traditions. The course gives special consideration to the modern technological and professional uses of this knowledge.

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

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): 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.

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 103 Precalculus with Discrete Mathematics (4 Cr.)

Prerequisite(s): None

This course presents a review of college algebra and trigonometry, and an introduction to discrete mathematics. The most basic part covers a review of functions and their graphs. The introduction to discrete mathematics includes basic counting and finite probabilities. Topics may include polynomial, rational, trigonometric, exponential and logarithmic functions of a real variable. Other topics include systems of equations and conic sections.

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 103 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

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 & Prior calculus experience

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

This course builds on the introduction to calculus in MAT 150. 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 Music and Sound II (3 Cr.)

Prerequisite(s): MAT 200

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 either 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 290 Linear Algebra and Geometry of Curves (3 Cr.)

Prerequisite(s): MAT 200 or MAT 230

Credit may be received for only one of MAT 290, MAT 250, or MAT 300

This course combines material from MAT 250 and MAT 300 into a single course. Topics from linear algebra include vector spaces, linear transformations, change of basis, function spaces, and piecewise polynomials. Topics from geometry include Bezier curves, splines, interpolation, and constructive curves and surfaces.

MAT 300/500 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 350/550 Advanced Curves and Surfaces (3 Cr.)

Prerequisite(s): MAT 300/500

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 351/551 Quaternions, Interpolation, and Animation (3 Cr.)

Prerequisite(s): MAT 300/500

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 352/552 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 353/553 Differential Geometry (3 Cr.)

Prerequisite(s): MAT 300/500

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 354/554 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 355/555 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 356/556 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 357/557 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 359/559 Computational Algebraic Geometry (3 Cr.)

Prerequisite(s): MAT 300/500

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 361/561 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 362/562 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 364/564 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, 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 365/565 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 399/599 Special Topics in Mathematics (3 Cr.)

Prerequisite(s): Permission of instructor

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

MAT 400 Introductory Analysis I (3 Cr.)

Prerequisite(s): MAT 250

This course introduces the foundations of real analysis by means of a rigorous reexamination of the topics covered in elementary calculus. The course starts with the topology of the real line and proceeds to a formal examination of limits, continuity, and differentiability. The course also covers the convergence of sequences and series of real numbers and the uniform convergence of sequences of real valued functions.

MAT 410 Introductory Analysis II (3 Cr.)

Prerequisite(s): MAT 400

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

MAT 450 Abstract Algebra I (3 Cr.)

Prerequisite(s): MAT 250 & MAT 258

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

MAT 460 Abstract Algebra II (3 Cr.)

Prerequisite(s): MAT 400

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

DEPARTMENT OF MUSIC

Music Courses

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

Prerequisite(s): None

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

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

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 multi-track 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): MUS150

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

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

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

MUS 220 Music Theory and Musicianship III (2 Cr.)

Prerequisite(s): MUS 121

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): MUS221

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 250 Sound Design Project III (1 Cr.)

Prerequisite(s): MUS 151

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

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

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

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

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 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): varies

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

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

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

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

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.

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.)

Concurrent Course(s): MAT 200 or MAT 230

This calculus-based course presents the fundamental principles of mechanics for simulation and engineering majors. Students learn the laws that govern the mechanical world and how to use these laws to form a simulated world. They examine the concepts involved with kinematics, Newtonian dynamics, work and energy, momentum, rotational motion, and statics.

PHY 200L Motion Dynamics Laboratory (1 Cr.)

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 Aerodynamics (3 Cr.)

Prerequisite(s): PHY 200

This calculus-based course provides a fundamental understanding of fluid dynamics, oscillations and waves, optics, and thermodynamics. By understanding the physical laws governing these phenomena, students are able to implement ray casting and ray tracing algorithms, as well as create realistic flight simulators, lens effects, and many-body simulations.

PHY 250L Waves, Optics, and Thermodynamics Laboratory (1 Cr.)

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 200

This calculus-based course studies the basic concepts underlying electrical and magnetic phenomena. It considers the following topics: atoms and free electrons; Coulomb's law; the electric field, Gauss's Law, and potential; capacitance, properties of dielectrics, current, resistance, and EMF; DC circuits and instruments, and Kirchhoff's rules; the magnetic field and magnetic forces on current-carrying conductors; magnetic field of a current; electromagnetic induction and magnetic properties of matter; alternating current; Maxwell's equations; electromagnetic waves; semiconductors and the PN junction; and photoelectric effect.

PHY 270L Electricity and Magnetism Laboratory (1 Cr.)

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 200, & PHY 250 or PHY 270

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

PHY 290L Modern Physics Laboratory (1 Cr.)

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): CS 200, CS 250, MAT 150 or MAT 180, MAT 200 or MAT 230, MAT 250, PHY 200, & 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 350 Physics Simulation (3 Cr.)

Prerequisite(s): MAT 300 & PHY 300

In this course, students gather into teams of two to three and create a physics engine with minimal interface and graphics. Weekly lectures go over the implementation of concepts covered in PHY 300 as well as collision resolution, objects on surfaces, holonomic and non-holonomic constraints, numerical approximations, and special topics that address project-specific physics.

PHY 399 Special Topics in Physics (3 Cr.)

Prerequisite(s): Permission of Instructor

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

PHY 500 Advanced Physically-Based Modeling (3 Cr.)

Prerequisite(s): Entrance into the Master of Science in Computer Science program

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 550 Physics Simulation (3 Cr.)

Prerequisite(s): Entrance into the Master of Science in Computer Science program

Students gather into teams of two to three and create a physics engine with minimal interface and graphics. Weekly lectures detail the implementation of concepts covered in PHY 300, as well as, collision resolution, objects on surfaces, holonomic and non-holonomic constraints, and numerical approximations. Additionally, students study special topics that address project-specific physics.

PHYX 510 Physics for Animation and Modeling (3 Cr.)

Prerequisite(s): None

PHYX 510 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.

FACULTY & STAFF ROSTER

Academic Leadership

Dean of Faculty & Academic Affairs	Xin Li
Associate Dean	Charles Duba
Associate Dean	Jen Sward
Registrar	Meighan Shoesmith
Program Director - Bachelor of Arts in Game Design	Benjamin Ellinger
Program Director - Bachelor of Arts in Music and Sound Design	Lawrence Schwedler
Program Director - Bachelor of Fine Arts in Digital Art and Animation	Raymond Yan
Program Director - Bachelor of Science in Computer Engineering	Charles Duba
Program Director - Bachelor of Science in Game Design	Benjamin Ellinger
Program Director - Bachelor of Science in Computer Science in Real-Time Interactive Simulation	Samir Abou Samra
Program Director - Bachelor of Science in Engineering and Sound Design	Lawrence Schwedler
Program Director - Master of Science in Computer Science	Dmitri Volper
Program Director - Master of Fine Arts in Digital Art	Alecia Rossano
Internship Coordinator - BSCS & Game Design	Jen Sward
Internship Coordinator - Art	Jim Johnson

Department of Computer Science

Samir Abou Samra*	BS Computer Science MS Computer Science	Lebanese American University Lebanese American University
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
Claude Comair	Le diplôme d'Ingenieur Archit. M. Engineering Environmental Engineering	L'Université du Saint Esprit (Lebanon) Osaka University (Japan)
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
Stephen Lee	BS Computer Science Diploma in the Art and Science of 2D and 3D Video Game Programming	University of British Columbia DigiPen Applied Computer Graphics School
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
Patrick Moghames	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
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

Jeff Tucker	BS Computing and Software Systems	University of Washington
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)

Department of Electrical and Computer Engineering

Charles Duba*	BS Physics MS Physics PhD Physics	University of California, San Diego University of Washington University of Washington
Jeremy Thomas	PhD Geophysics	University of Washington
Hao Wu	BS Electrical Engineering MS Electrical Engineering	Tsinghua University (China) University of Washington
Francis Wang	BS Electrical Engineering MS Electrical Engineering PhD Electrical Engineering	Washington State University Washington State University University of Minnesota

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
Suzanne Kaufman	BA Computer Animation and Photography	University of Wisconsin, Madison
Antony de Fato	BFA Drawing BSHE Housing Design Walt Disney Feature Animations	University of Missouri
Bill Jarcho	BFA Visual Design in Media Arts	Emerson College
Pamela Mathues	BFA Illustration and Fine Art Walt Disney Feature Animations	Columbus College of Art and Design
Tito Pagan	AAA Computer Animation	The Art Institute of Seattle
Alain Schneuwley	Diploma, Computer Analyst and Programming 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
Lawrence Schwedler	BA Music MFA Music Performance	University of California, Los Angeles University of California, Los Angeles
Rick Sullivan	BA Journalism	University of Washington

Department of Fine Arts

Donald "BJ" Becker*	BA 3D Design MA Illustration MFA Illustration	West Surrey College of Arts and Design (England) Syracuse University University of Hartford
Debra Baxter	MFA Sculpture BFA Sculpture and Video	The Milton Avery Graduate School of the Arts, Bard College Minneapolis College of Art and Design
Paul Clark	BA	Antioch University Seattle
Robert Kmiec	BFA Illustration MFA Illustration	Massachusetts College of Art Syracuse University

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)
Mark O'Higgins	MFA Painting and Sculpture MA Sociology and Political Science BA 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)
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
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)

Department of Digital Arts

Mark Peasley*	BFA Graphic Design / Illustration	Oregon State University
Kevin Burgess	BS – Computer Graphics MFA – Animation / VFX Certificate – Multimedia Certificate – Oil Painting	Arizona State University Academy of Art University University of Washington University of Washington
Jay Gale	BA Broadcast Communication	University of Colorado
Chun Lu	BS – Interior Design MA – Environmental Design	University of Missouri – Columbia University of Missouri – Columbia
Michelle Lu	BS – Horticulture Certificate – 3D Animation and Modeling	National Chung-Hsing University Vancouver Film School
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

Department of Game Software Design and Production

Benjamin Ellinger *	BS Kinesiology	University of Texas
Scott Brodie	BS in Computer Science	Michigan State University
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
John Feil	BA	University of Nevada, Reno
Bill Morrison	AA Commercial Art	Somerset County Technical Institute
Chris Peters	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Michael Pietraszak	BS Computer & Electrical Engineering	Purdue University
James Portnow	Bachelor of Classics Masters of Entertainment Technology	St. John's College of Santa Fe Carnegie Mellon University
Richard Rowan	BA Gaming Systems & Applications	Western Washington University
Rachel Rutherford	BA Rhetoric	University of California, Berkeley
Douglas Schilling	BS Computer Science	Pacific Lutheran University
Jen Sward	BS Electrical & Computer Engineering	University of California, Davis
David Vronay	BA Philosophy	University of Southern California

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
Brandon Abood	MFA English BA English	University of Washington Miami University
Caroline Froc	MA History BA Anthropology and History	Florida Atlantic University University of Florida
Vanessa Hemovich	PhD Social Psychology MA Psychology BA	Claremont Graduate University Claremont Graduate University University of Washington
Sonia Michaels	BA English MA English	University of Washington University of Washington
Fara Nizamani	BS Ed. Secondary English Education MA English Literature PhD English Literature	University of Miami Barry University City University of Los Angeles
Stephen Schafer	BA Psychology MA English	University of Denver University of Denver

Department of Life Sciences

Charles Wood*	BA Biology BS Medical Illustration Science MS Medical Illustration PhD Physical Anthropology	Kalamazoo College The Medical College of Georgia The Medical College of Georgia University of Washington
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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
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
Steven Saulls	BA in Guitar Performance MFA in Guitar Performance	Western Washington University Western Washington University

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
William Peria	PhD Space Physics MS Physics BS Physics	University of New Hampshire University of New Hampshire University of Minnesota

Learning Resource Center

Judi Windleharth**	Master of Library Science	San Jose State University
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** Director of Learning Resource Center

Research and Development Division

Antoine Abi Chacra	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Elie Abi Chahine	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Joshua Claeys	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Christopher Clark	BS Computer Engineering	DigiPen Institute of Technology
Christopher Comair	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Joshua Davis	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Ryan Edgemon	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Andre Eid	BS Computer Engineering	The Lebanese University
Benjamin Ellinger	BS Kinesiology	University of Texas
Michelle Lu	BS – Horticulture Certificate – 3D Animation and Modeling	National Chung-Hsing University Vancouver Film School
Patrick Moghames	BS Computer Science MS Computer Science	DigiPen Institute of Technology, Lebanon DigiPen Institute of Technology
Christopher Peters	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Alain Schneuwley	Diploma, Computer Analyst and Programming 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
Benjamin Strukus	BS Real-Time Interactive Simulation	DigiPen Institute of Technology
Trevor Sundberg	BS Real-Time Interactive Simulation	DigiPen Institute of Technology

* Department Chair

† Interim Department Chair

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 Technology Officer	Samir Abou Samra
Executive Vice President of Asia-Pacific	Prasanna Ghali
Dean of Faculty & Academic Affairs	Xin Li
Senior Vice President of Administration	Meighan Shoesmith

Senior Vice President of Facilities Management	Melvin Gonsalvez
Vice President of External Affairs	Angela Kugler
Director	Michele Comair

Accounting

Controller	Mayu Davis
Director of Administration/Bursar	Yuki Taber
Accounting Assistant	Hiroko Honda
Accounting Assistant	Carol Jacobs

Admissions

Director of Admissions	Angela Kugler
Admissions Application Manager	Danial Powers
Admissions Outreach Manager	Steph Caron
Admissions Outreach Coordinator	Alice Anderson
Admissions Coordinator	Cassidy Werner
Admissions Communications Coordinator	Gina Corpening
Admissions Outreach Coordinator	Jackie Beehler
Admissions Outreach and Communications Coordinator	Katrina Snow

Compliance

Institutional Compliance Officer	Mandy Wong
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Financial Aid

Director of Financial Aid	Kim King
Assistant Director of Financial Aid	Marti Jackson
Assistant Director of Financial Aid and Scholarships	Trinity Huttner
Financial Aid Administrator	Laeticia Nkinsi
Financial Aid Assistant	Blair Buchmayer

Registration

Registrar	Meighan Shoesmith
Assistant Registrar	Asuka Miyahara

Student Affairs

Director of Student Affairs	Gordon Dutrisac
Assistant Director	Marshall Traverse
International Student Affairs Advisor	Heather Sitt
Career and Alumni Services Coordinator	Teresa Lin
Director of Counseling Services and Disability Support Services Coordinator	Kay Widmer

Youth Development and Continuing Education

Director of K12 Curriculum and Teacher Training	Martin Culbert
Director of Educational Partnerships	John Aultman

Director of Marketing and Administration	Emma Trifari
Program Coordinator	Rosalind Kitikiatisak
Program Coordinator	Catrina Chen

Administration

Academic Administrative Lead Coordinator	Bridget Scott
Front Desk	Michelle Lobb
Human Resource Assistant	Katie Olson

I.T.

Director of I.T.	Atom Powers
Senior Systems Administrator	Ryan Fulcher
Client Services Manager	David Kuehn
Systems Administrator	Mike Hager
Client Services Administrator	Ashley Willis

Marketing and Communications

Director of Marketing and Communications	Linnéa Mobrand
Editorial Manager	Jordan Deam
Creative Director	Steve Haak
Web Designer / Photographer	Jonathan McIntyre
Web Developer	Jered Odegard
Katie Bajema	Graphic Designer
Christian Gaspar	Production Assistant

Facilities

Senior Vice President of Institutional Facilities	Melvin Gonsalvez
Facilities Support	Rosa Campos

Food Services

Director of Food Services	Myrna Meneem
Logistics Café Manager	Sara Mills
Baker	Ian Shores
Bookstore Lead	Chelsea Stevens
Cashier	Michelle Stepp
Deli Cook	Sally Kelly
Lead Cashier	Violetta Kiss
Lead Hot Line	Tye Clinton
Lead Pantry	Stefan Ferguson
Lead Utility Crew	Eduardo Copca
Line Cook	Ryan Dewitt
Pantry	Arianna Scott
Pizza Cook	Melinda Wright
Quality Control Coordinator	Teresa Lycan
Utility Crew	Saul Mora