



COURSE CATALOG

2014–2015

Updated: June 23, 2014

Notices

Authorization

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

Nonimmigrant Alien Students

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

Accreditation**

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

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DigiPen Institute of Technology Europe-Bilbao 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 Europe-Bilbao 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.es/degree-programs/course-catalog/

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

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

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Rules and Policies for the Academic Year 2014–2015

General Information

Name of the School (Branch Campus)

DigiPen Institute of Technology Europe-Bilbao

CONTACT INFORMATION

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

Telephone: 34- 94 636 51 63
Email: info.es@digipen.es
Web: www.digipen.es

Name of School (Main Campus)

DigiPen Institute of Technology

CONTACT INFORMATION

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

Telephone: (866) 478-5236 or (425) 558-0299
Facsimile: (425) 558-0378
Email: info@digipen.edu
Web: www.digipen.edu

Local Degree Authorization

DigiPen Institute of Technology Europe-Bilbao has been permitted by the Basque Ministry of Education to establish its presence in the Basque Country as a foreign specialized institution.

DigiPen Europe-Bilbao offers the following degree programs for the 2013-2014 academic year: Bachelor of Science in Computer Science in Real-Time Interactive Simulation; Bachelor of Fine Arts in Digital Art and Animation.

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 com-

puter 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 Institute of Technology Singapore*** was granted accreditation by ACCSC as a branch campus of the main school located in Redmond, Washington, USA.

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

***DigiPen began offering the MS in Computer Science program in 2004 before ACCSC expanded its scope of recognition by the United States Department of Education to grant*

approval for master's degree programs. ACCSC granted approval for this degree in 2006.

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

***DigiPen's Singapore campus falls 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 every year for the last 12 consecutive years. Since 2001, the IGF has granted 44 awards to 34 DigiPen student games. In 2007, 2008, and 2009, DigiPen projects also won the coveted Best Student Game award (for Toblo, Synaesthete, and Tag: The Power of Paint, respectively). In the IGF Main Competition, five DigiPen student games have been nominated for awards in various professional categories, and in 2004 Bontago won the "Innovation in Game Design" award while competing against professional developers. In 2011, the Independent Games Festival China, part of the annual Game Developers Conference China, selected three DigiPen games for its Student Competition which honors six of the top regional student games. DigiPen Singapore student game Pixi won the "Excellent Student Winner" award, while DigiPen Singapore student game Void won the "Best Student Game" award, as well as the "Excellence in Technology" award in IGF China's Main Competition.

Other competition highlights for DigiPen students include five finalist positions at the Slamdance Guerrilla Gamemaker Competition with two of those games winning their award categories, wins at the Northwest Games Festival, the Intel Games Demo, the IndieCade International Festival of Independent Games, and the PAX 10, as well as wins at the Indie Game Challenge, which in 2010 awarded the \$100,000 nonprofessional Grand Prize to the DigiPen student game GEAR and in 2012 gave the Gamer's Choice Award to the DigiPen game Nitronic Rush. In 2011 at the Tokyo Game Show, only two of the 10 games showcased at the annual Sense of Wonder Night were from North America, with one of those, Solstice, being a DigiPen student project. Additionally, DigiPen students have won numerous awards at the Austin Game Developers Conference in Game Narrative Reviews and Poster Competitions.

Continuing Education Program

Authorized by the Washington Workforce Training Board to grant Continuing Education Units, DigiPen Institute of Technology offers a series of continuing education courses each semester and during the summer session. These courses are 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. The Pre-College Program is currently offered at DigiPen's Redmond campus.

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 19th year, the ProjectFUN workshops engage elementary, middle and high school students in the arts and sciences by immersing them in the tools and techniques of today's high-tech careers. The workshops in Animation, Game Design, Video Game Programming, Multimedia Production, and Robotics enhance students' critical thinking skills, improve their knowledge of core subjects like math and physics, and excite their interest in the academic concepts underlying modern technology.

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

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

Institutional Mission

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

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

Notice of Non-Discrimination

DigiPen Institute of Technology Europe-Bilbao is committed to maintaining a diverse community in an atmosphere of mutual respect and appreciation of differences. DigiPen Institute of Technology Europe-Bilbao does not discriminate in its educational and employment policies on the basis of race, color, creed, religion, national/ethnic origin, sex, sexual orientation, or age.

Student Right to Know Act and Campus Crime Act Disclosure Notice

In compliance with the Higher Education Act of 1965, as amended, and the Student Right to Know Act, DigiPen is pleased to provide copies of the retention, graduation, and employment rates as well as campus crime reports to prospective and current students upon request. Please send a request to the 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:

1. Bachelor of Science in Computer Science in Real-Time Interactive Simulation
2. Bachelor of Fine Arts in Digital Art and Animation

About DigiPen Europe-Bilbao's Facilities

DigiPen Europe Bilbao has a modern facilities located at Virgen del Puerto 34, at the village of Zierbena. The building houses 17 rooms spread over 3 floors. They have different configurations and sizes and are equipped with audiovisual media (projectors, microphones, computers, Internet access, and Wi-Fi connection).

Weekly student access to the DigiPen Bilbao campus is from 9:00 A.M. to 10:00 P.M., Monday through Friday, and from 10:00 A.M. to 6:00 P.M. on Saturday. Core office hours for administrative staff run from 9:00 A.M. to 10:00 P.M., Monday through Friday, and from 10:00 A.M. to 6:00 P.M. on Saturday.

Major equipment items include microphones and LCD projection systems in many of the classrooms. The majority of the student computers currently range from Intel Core 7-960 3,2GHz, Quadcore with 8GB RAM to 7-960 3,2GHz, Quadcore with 12GB RAM. All computers are on internal network and have access to printers, servers, and archival media. DigiPen upgrades the computer equipment on a regular basis.

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 reference books relevant to their program of study. The library also checks out other equipment like video-cameras or console controllers.

INTERNET ACCESS

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

Student Network and Internet Usage Policy

GENERAL POLICIES

DigiPen's computer and network resources are provided exclusively for educational purposes. To ensure that these resources remain available for legitimate academic usage, DigiPen requires compliance with the following policies:

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

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

Internet Filter Policy

Internet access through DigiPen's network is filtered to ensure that students are better able to access information and materials related to their education. All internet traffic from within DigiPen's network, including labs, classrooms, and administrative offices, are sent through a system of proxies, filters, and analyzers to protect school resources from outside disruption, prevent network abuse, and prioritize legitimate educational usage. 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. Copyright may result in civil and criminal penalties. 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.

Important Dates

Institutional Calendar

- **September 5, 2014**
Orientation Day
- **September 8, 2014**
Classes Begin—Fall Semester
- **October 12, 2014**
Día del Pilar
No Classes—Labs Closed
- **November 1, 2014**
Todos los Santos
No Classes—Labs Closed
- **December 6, 2014**
Día de la Constitución
No Classes—Labs Closed
- **December 8, 2014**
La Inmaculada Concepción
No Classes—Labs Closed
- **December 15-19, 2014**
Fall Semester Final Exams
- **December 19, 2014**
Fall Semester Ends
- **December 22, 2014–January 7, 2015**
Winter Break/Intersession
No Classes—Labs Closed
- **January 8, 2015**
Classes Begin—Spring Semester
- **February 3, 2015**
Founder's Day
No Classes—Labs Closed
- **March 30–April 6, 2015**
Spring Break/Easter Break
No Classes—Labs Closed
- **April 27–May 4, 2015**
Spring Semester Final Exams
- **May 4, 2015**
Spring Semester Ends
- **May 5–May 10, 2015**
Intersession
No Classes—Labs Closed
- **May 1, 2015**
Labor Day
No Classes—Labs Closed
- **May 11, 2015**
Classes Begin—Summer Session
- **July 20-24, 2015**
Summer Session Final Exams
- **July 24, 2015**
Summer Session Ends
- **July 25, 2015**
Santiago
No Classes—Labs Closed
- **July 31, 2015**
San Ignacio
No Classes—Labs Closed

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, 2014**

Tuition deposit due for Fall 2014 semester

- **July 9, 2014**

Last day to submit Request for Change of Major for Fall 2014 Semester

Last day to submit Application for Readmission for Fall 2014 Semester

- **July 30, 2014**

Tuition balance due for Fall 2014 Semester

- **September 14, 2014**

Last day to drop Fall 2014 Semester courses for 100% refund

Last day to add classes for Fall 2014 Semester

- **September 22, 2014**

Final day to drop classes without academic penalty

- **October 7, 2014**

Withdrawal deadline for 50% refund

- **November 5, 2014**

Final day to receive a "W" on transcript for Fall 2014 Semester withdrawals

Withdrawals from the Institute after this date will receive "F" grades on transcript

Final day to drop a class

- **November 26, 2014**

Last day to submit Request for Change of Major for Spring 2015 Semester

Last day to submit Application for Readmission for Spring 2015 Semester

- **December 1, 2014**

Tuition deposit due for Spring 2015

- **January 14, 2015**

Last day to drop Spring 2015 Semester courses for 100% refund

Last day to add classes for Spring 2015 Semester

- **January 22, 2015**

Final day to drop classes without academic penalty

- **February 6, 2015**

Withdrawal deadline for 50% refund

- **March 11, 2015**

Final day to receive a "W" on transcript for Spring 2015 Semester withdrawals

Withdrawals from the institute after this date will receive "F" grades on transcript

Final day to drop a class

- **April 8, 2015**

Last date to submit Request for Change of Major for Summer 2015 session

Last day to submit Application for Readmission for Summer 2015 session

- **May 8, 2015**

Tuition balance due for Summer 2015 Session

- **May 10, 2015**

Last day to drop Summer 2015 Session courses for 100% refund

Last day to add classes for Summer 2015 Session

Automatic Withdrawal date from classes missing pre-requisites

- **May 25, 2015**

Final day to drop classes without academic penalty

- **June 9, 2015**

Last day to receive 50% Summer 2015 tuition refund

- **June 29, 2015**

Final day to receive a "W" on transcript for Summer 2015 Session withdrawals

Withdrawals from the Institute after this date will receive "F" grades on transcript

Final day to drop a class

- **July 1, 2015**

Tuition deposit due for Fall 2015 semester

- **July 30, 2015**

Tuition balance due for Fall 2015 Semester

Tuition and Fees

All tuition and fees are in euros.

Application Fee

There is a 35€ application fee. 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.

Enrollment Fee

Upon acceptance into a degree program, a 150€ 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.

Payment of tuition and fees can be made by credit card, personal check, electronic fund transfer (eCheck), or cash. DigiPen accepts credit card payments (VISA, Mastercard, American Express and Discover), online with a 2.75% convenience fee charge.

Separate payments are required for tuition and housing invoices.

To process a credit card payment, you will need:

- Student's full name
- Student's DigiPen ID number
- Credit card information
- Amount of payment

To process an electronic fund transfer or eCheck with no convenience fee you can also use the website and will need:

- Bank routing number
- Bank account number

All payments made by personal check should be sent to:

DigiPen Institute of Technology
Accounts Receivable Department
9931 Willows Road NE
Redmond, WA 98052

Late Registration Fee

Students are responsible for registering for courses and re-registering for courses that need to be retaken each semester by the posted date. All late class registrations will cost an additional 100€ to cover administrative fees.

Books & Supplies

Text and reference books are estimated to be approximately 243€ per year. This cost is not included as a part of the tuition.

Tuition*

The flat-rate structure at DigiPen Europe-Bilbao is based on a semester basis. The tuition costs below are for full-time students (those students taking a minimum of 16 credits or more during each of the fall and spring semesters). In order for a student to complete the degree program in the typical four years, he or she must take an average of 16-20 credits per semester.

NO. OF CREDITS	EU	NON-EU
16 or more credits	13.500€* per year	18.000€* per year

**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 fees.*

Administrative Fee

This fee covers a limited number of transcript requests, add/drop requests, enrollment verifications, and re-registrations. This fee is 40€ per semester for all students.

Technology Fee

This fee covers supplies and maintenance costs for the students' use of equipment and upkeep of the computer labs. This fee is 40€ per semester for all students.

Graduation Fee

This 75€ fee covers the cost of processing the graduation application. This fee must accompany the graduation application.

Transfer and Waiver Fees

Course transfers and waivers are processed at 25 € per credit.

Course Fees

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

Cancellation and Refund Policies 2014-2015

Cancellation Policies

- Applicants who have not visited the school prior to enrollment will have the opportunity to withdraw without penalty within three business days following either the regularly scheduled orientation procedures or following a tour of the school facilities and inspection of equipment where training and services are provided.
- All monies paid by an applicant who withdraws will be refunded if requested within three days after signing an enrollment agreement and making an initial payment.
- An applicant requesting cancellation more than three days after signing an enrollment agreement and making an initial payment, but prior to entering the school, is entitled to a refund of all monies paid minus a registration fee of 15% of the contract price of the program. However, in no event will the school retain more than 150€.

Tuition Refund Schedule

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

- Before the close of the seventh calendar day from the beginning of the semester: Students receive a 100% tuition refund.
- Before the close of the eighth calendar day through the thirtieth calendar day from the beginning of the semester: Students receive a 50% tuition refund.
- After the thirtieth calendar day from the beginning of the semester: Students are required to pay 100% of the tuition and no refund is available.

Except for the enrollment fee, all other assessed fees are refunded on the same schedule as tuition payments.

Tuition Account Reimbursement

REIMBURSEMENT REQUESTS

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.

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

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.

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

Loans

DigiPen Institute of Technology Europe-Bilbao has arranged agreements with a select number of local banks for students to acquire student loans. Interested students should contact the banks directly for details, but may find a list of available options by contacting the Administration Office or by visiting the website (www.digipen.es).

Applying to DigiPen

Visiting DigiPen

DigiPen offers regular information sessions for the general public. Anyone interested in finding out more about DigiPen Institute of Technology Europe-Bilbao and its programs is welcome to attend. For information on dates and times for these information sessions, please visit our website at www.digipen.es or email admissions@digipen.es.

Visitors interested in learning about DigiPen's admission requirements, application process, and degree programs are encouraged to schedule a one-on-one meeting and school tour with an admissions representative. To schedule an appointment, please contact the Office of Admissions at admissions@digipen.es preferably one week before your intended visit.

Undergraduate Application Process

DigiPen Institute of Technology works on a rolling admissions basis and only enrolls new students for the fall semester that begins each September. DigiPen will evaluate applications as they are completed and submitted.

Applicants normally receive a decision within two to four weeks after their application has been completed. DigiPen encourages new applicants to apply during the first quarter of each calendar year, but the Institute will continue to accept qualified applicants after that date until all programs have reached their 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.es.

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

1. DigiPen Institute of Technology Europe-Bilbao's Online Application for Admission. This application form is available at: <https://management.digipen.edu/es-srs-app/ApplicationMenu.aspx>.
2. A 35€ application fee.
3. Certified-true copies of transcripts from all high schools or secondary/post-secondary institutions attended. Applicants must have completed at least a high school diploma or recognized equivalency certificate. If the documents are written in a language other than English or Spanish, applicants must submit certified-true copies of both the original document and a literal English translation. Please note that applicants should not convert or interpret their grades in any way when providing this translation. As it may take some time to certify and send all of the required materials by mail, please request official transcripts and records from your current and previous educational institutions as soon as possible.

4. Application Essay: Please see the Application Essay section below for the requirements and recommendations about completing this important component of the application.
5. Letters of recommendation (optional). Two letters of recommendation from individuals familiar with the applicant's academic background and/or work ethic, e.g., an instructor, guidance counselor, or employer. Recommendation letters from family members will not be considered. 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/es-srs-app/> or contact the Office of Admissions at 946365163 for copies to be mailed to you.
6. Official scores for the Selectividad. Applicants from outside of Spain may submit scores for the SAT I and should contact the Office of Admissions.
7. Proof of Proficiency in the English Language if English is not the Applicant's first language. See below for further details.
8. Other official documentation (when applicable). This includes, but is not limited to, SAT scores, certified transcripts from all institutions of tertiary education (e.g., university transcripts), and other information as requested by the Office of Admissions.
9. Art portfolio. This is only required of applicants to the Digital Art and Animation degree program. Please see the Portfolio section below for complete details about this important component of the application.

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

APPLICATION ESSAYS

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

Topics

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

Obtaining a degree from DigiPen will prepare you to be a professional software engineer/game programmer (BS in Computer Science in Real-Time Interactive Simulation or digital artist (BFA in Digital Art and Animation). Write an essay that conveys what your chosen profession means to you and why you want to devote your life to it. Also state why you think you are ready to enroll at such a challenging school, why you think DigiPen is a good fit for you, and what you have done (and what are you doing now) to prepare yourself to succeed at DigiPen. Spelling, grammar, and sentence structure, along with the correct use of punctuation, capitalization, quotation marks, etc. are all considered, so proofread your essay carefully.

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

Submission

Applicants may choose to type the answers to the application essays directly into the online application (in which case, there is an electronic signature and date stamp) or to mail a hardcopy to DigiPen's Office of Admissions, or email a copy to admissions@digipen.es 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 essay in hardcopy format:

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

MATHEMATICS REQUIREMENTS FOR BS IN COMPUTER SCIENCE IN REAL-TIME INTERACTIVE SIMULATION APPLICANTS:

In addition to meeting the regular admissions requirements, all applicants to DigiPen Europe-Bilbao's Bachelor of Science in Computer Science in Real-Time Interactive Simulation (RTIS) program must have completed Bachillerato with 7 average in mathematics, including a minimum of Algebra, Geometry, and (when possible) Calculus. Relevant courses in Physics, Chemistry, and Computer Science will also be considered in the evaluation process.

MATH ASSESSMENT

Applicants to the RTIS program must demonstrate (through grades, exam results, and coursework) sufficient knowledge of a number of topics in mathematics to be considered for admission. DigiPen's Math Assessment covers various topics in algebra, geometry, trigonometry, and pre-calculus. It is not used as a strict measure for determining the admissibility of a candidate, nor is it used to compare any one applicant to another. Rather, it is used for informational purposes and to supplement an application that is lacking in mathematics coursework. Satisfactory performance on the math assessment, combined with other strong application materials, may improve an applicant's chances of admission.

BFA IN DIGITAL ART AND ANIMATION 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.

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 still life (not from the applicant's imagination, memory, 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 10 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 Art Portfolio Submissions

Note: Applicants should avoid including samples of work that rely heavily on exaggerated physical features such as large eyes, big hair, or elongated limbs. In general, portfolios should not include samples copied directly from manga, animé, Disney or the like. These types of work have a very specific visual language, and relying on this language will hinder one's growth as an artist. Instead, applicants should demonstrate how they draw from observation or their own imagination.

Submission Guidelines

All BFA applicants should submit a physical portfolio that adheres to the following guidelines:

- Applicants should label portfolios clearly with their full name on the front.
- All artwork should be labeled with the date of completion and medium used.
- Portfolios will not be returned. However, we will accept color copies, photocopies, slides, photographs, or work contained on CDs.
- Applicants who submit hard copies of artwork should place their portfolios in A4-sized binders.
- Applicants should submit copies of work only as the portfolios will not be returned.

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: 6750
- A minimum International English Language Testing System (IELTS) score of 6.5 or higher. (www.ielts.org)
- A minimum Cambridge English: Advanced (also known as a Certificate in Advanced English or CAE) score of C1 or higher

- A certified copy of the Cambridge First Certificate, plus a successful score on DigiPen Europe-Bilbao's internal English Assessment
- Completion of four years of high school 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
- 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 applicants will receive an enrollment packet via standard mail. This packet will include an official letter of acceptance, and, if applicable, a request to furnish proof of high school graduation and official test scores for the Selectividad 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 (i.e. improving grades by taking additional course work, 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, items such as

transcripts, letters of recommendations (optional for applicants to DigiPen's undergraduate degree programs), and test scores can be transferred from an applicant's original file to the new application file.

Students who are re-applying need to supply the following materials only:

- New application form. Please submit online.
- 25€ application fee.
- Any new or updated documents, such as new transcripts, new test scores, etc.
- A short essay describing the progress and improvements that the applicant has made in the areas recommended in the original decision letter.
- After submitting their new application, readmission applicants are encouraged to contact the Office of Admissions by email at admissions@digipen.es 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, certified true copies of 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”.

Submission of Official Transcripts of Non-DigiPen Coursework

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). Finally, readmission applicants who are applying for readmission more than one year after withdrawing and who are not native English speakers may have to submit additional Proof of English language proficiency. Please see the Proof of English Language Proficiency section in the Undergraduate Admissions section.

Non-Matriculated Studies

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

1. Applicants to 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 receive a grade of “C-“ (or 1.7 quality points) or better to pass courses that are core to their chosen track.
5. Students must maintain a minimum 2.0 GPA in order to remain enrolled in 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.
6. Applicants who are not native English speakers must

provide Proof of English Language proficiency. Please see the Proof of English Language Proficiency section in the Undergraduate Admissions section.

Please note that courses taken in 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, a student must take a minimum of 75% of the entire program at DigiPen. Graduate programs allow a maximum of 15 transfer credits from other colleges and other DigiPen programs. Course transfers and waivers are processed at 25€ 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 Europe-Bilbao, 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, waiver requests need to be approved by the department appropriate to the courses. For waiver requests received by July 1, students will receive notification by August 1. Waiver requests arriving in the Office of the Registrar after July 1 will be handled on a rolling basis, as faculty schedules allow. Results of waiver requests received after the deadline are not guaranteed to be available before the start of classes.

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

The following restrictions apply to all waiver examinations:

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

Advanced Placement Examinations

Course waivers or credit may be granted for satisfactory achievement on Advanced Placement Exams of the College Entrance Examination Board taken within the last ten years. An exam score of four or above earns from three to six 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. DigiPen course credits 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.

Accepted AP Scores and DigiPen Course Equivalents

AP EXAM	MINIMUM SCORE	DIGIPEN COURSE
Art - History of Art	4	ART 210
English - Literature and Composition	4	ENG 110
English - Language and Composition	4	ENG 110
History - World History	4	HIS 100
Japanese	4	JPN 101
Mathematics - Calculus AB	4	MAT 150
Mathematics - Calculus BC	4	MAT 150
Music Theory	4	MUS 120 & MUS 120L
Physics B - Physics (Introduction)	4	PHY 115
Physics C - Physics (Mechanical)	4	PHY 200
Psychology	4	PSY 101

International Baccalaureate (IB)

In general, three semester credit hours are waived for each Higher Level subject in which a score of five or greater was earned in the last 10 years. The IB courses and scores listed below are eligible for waiver hours at DigiPen.

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

College-Level Examination Program (CLEP)

There are two types of CLEP examinations: General and Subject. The Institute 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 courses other than those listed above should consult the appropriate departmental chair. The Institute 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 10 years may be transferred, provided such credit meets the guidelines used by DigiPen Institute of Technology Europe-Bilbao. A student must take a minimum of 75% of the entire program at DigiPen (unless the student attended an institution with which DigiPen has established an articulation agreement). The Registrar will evaluate college credits earned elsewhere with respect to graduation requirements at DigiPen Europe-Bilbao. 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 Europe-Bilbao 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-" "B-"(or 2.7 quality points) or better is recorded.
4. Courses transferred to a student's major may also require a validation examination in order to be accepted.
5. "Credit" or "Pass" grades will not be accepted for transfer.

If a course is accepted for credit, it will be counted as a transfer credit. No grade points from such transfer courses will be calculated in the DigiPen Europe-Bilbao grade point average. However, grades transferred for courses taken in residence at institutions with which DigiPen Europe-Bilbao 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 Europe-Bilbao.

Articulation Agreements

Credits from a college with an articulation agreement with DigiPen Institute of Technology Europe-Bilbao 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 Europe-Bilbao 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 Europe-Bilbao does not grant credit for work experience.

Standards of Progress

Semester Credit Hour

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

Over any semester, one semester credit hour of academic credit equals:

- at least 15 hours of classroom contact, or
- at least 20 hours of supervised laboratory time, or
- at least 30 hours of documented independent study activities, or
- at least 45 hours of internship or externship experience.

In addition, each semester credit also assumes:

- a minimum of 30 hours over the semester for external preparation, project work, or homework by the student, except for independent studies or internship or externship experience.

A classroom contact hour is 53 minutes in length. Whenever “semester hour” is used in this Catalog, it is synonymous with “semester credit hour” (SCH) and does not always represent “hours per week in class.” Students taking courses over the summer should be aware that the total number of hours for a course is compressed into the 11 weeks, but is not reduced. The number of courses that a student is recommended to take during the shorter summer semester is therefore fewer than the fall or spring semesters..

Grading System

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

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

The following grades do not affect the GPA:

AU - AUDIT

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

IP - IN PROGRESS

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

I - INCOMPLETE

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

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

If make-up work requires classroom or laboratory attendance in a subsequent 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 Office of Registrar. Should the work not be completed within the agreed upon time frame, the Institute will assign a grade of “F.”

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

W - WITHDRAWAL

Indicates withdrawal from the course before the end of the eighth week of classes or withdrawal from the Institute. The grade of “W” will not be assigned to any student who has taken the final examination in the course. An instructor may not withdraw a student from a course.

P - PASS

Given for internship, seminar, and thesis courses.

Assessment Process

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

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

Grade Reports

Reports of the final grade in each course will be made available online to students soon after the close of each semester. However, grade reports may be withheld from students who have delinquent accounts with the 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" (or 4.0 quality points) through "F" [or 0 quality points]) to obtain the GPA.

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

The following example 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 140	4	A-	14.8 (4 x 3.7)
CS 105	3	B	9.0 (3 x 3.0)
ENG 110	3	D	3.0 (3 x 1.0)
CS 120	3	B+	3.0 (3 x 1.0)
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

Satisfactory progress toward a degree by a full-time student is defined as a full attempt of 24 credits during an academic year. This should include registration for at least 12 credits per semester and successful completion of at least 12 credits per semester. "Full attempt" is defined as the receipt of a final letter grade ("A" to "F") but not the receipt of a "W" or an "I". Successful completion is defined as the receipt of a passing letter grade ("A" to "C-" in a degree's core courses, and "A" to "D" in non-major courses). Core courses and non-major courses are denoted under each individual degree program's recommended sequence of required classes chart. The Registrar makes decisions on student status.

A program of study must be completed within a reasonable period of time for a student to be eligible for graduation; that is, the credit hours attempted cannot exceed 1.5 times the credit hours or more than 1.5 times the recommended time required to complete the program. The Registrar will withdraw from the Institute full-time students who do not complete their studies during this time frame.

To maintain satisfactory progress, undergraduate students must attain a minimum cumulative grade point average at various milestones in their program of study.

UNDERGRADUATE STUDENTS

To maintain satisfactory progress, undergraduate students must attain a minimum cumulative grade point average at various milestones in their program of study.

Students Who Began in the 2011 Cohort or Earlier

MILESTONE	MINIMUM GPA REQUIREMENT
Up to 50% of program <ul style="list-style-type: none"> • 77 attempted credits* for the BS in Computer Science in Real-Time Interactive Simulation • 72 attempted credits for the BFA in Digital Art and Animation 	1.8 or better cumulative GPA
Over 50% of program <ul style="list-style-type: none"> • 78-153 attempted credits for the BS in Computer Science in Real-Time Interactive Simulation • 73-143 attempted credits for BFA in Digital Art and Animation 	2.0 or better cumulative GPA
100% of program <ul style="list-style-type: none"> • 154 earned credits or greater for the BS in Computer Science in Real-Time Interactive Simulation • 144 earned credits or greater for the BFA in Digital Art and Animation 	2.0 or better cumulative GPA

Students that Began in the 2011 Cohort or Later

MILESTONE	MINIMUM GPA REQUIREMENT
Up to 50% of program <ul style="list-style-type: none"> • 77 attempted credits* for the BS in Computer Science in Real-Time Interactive Simulation • 73 attempted credits for the BFA in Digital Art and Animation 	1.8 or better cumulative GPA
Over 50% of program <ul style="list-style-type: none"> • 78-153 attempted credits for the BS in Computer Science in Real-Time Interactive Simulation • 73-144 attempted credits for the BFA in Digital Art and Animation 	2.0 or better cumulative GPA
100% of program <ul style="list-style-type: none"> • 154 earned credits or greater for the BS in Computer Science in Real-Time Interactive Simulation • 145 earned credits or greater for the BFA in Digital Art and Animation 	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.*

Appeals

Appeals involving extenuating circumstances may be addressed respective Department Chair for action and resolution.

Passing Classes and Graduation

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

Academic Warning

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

FAILING TO MEET MINIMUM GPA REQUIREMENT

Any student who 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.

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.

Grade Changes and Appeals

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

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

Repeating Courses

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

Course Overload

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

Attendance

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

Withdrawing from Individual Classes

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

Withdrawing from the Institute

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

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

Hardship Withdrawal

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

If the Administration 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 a decision regarding their tuition refund shall file a written request to the Executive General. If dissatisfied with the decision of the Executive General, students may file a second appeal with the Chief Operating Officer – International. If they are still dissatisfied, students may appeal to the President of the Institute. If still unsatisfied with the decision, students may appeal to the Executive Director of the Washington Student Achievement Council at.

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

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

OTHER DISPUTES

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

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 34- 94 636 51 63.

To request an official transcript, students should complete a transcript request form (available online 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. All registered juniors and seniors 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, but must be approved in advance by the Institute.

Objectives of Internship Programs

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

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

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

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.

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 through the Student Record System. Admissions will print an unofficial grade report to include with the change of major application.
2. Submit a Change of Major Statement addressing the following topics:
 - Discuss 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 an 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 15 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.

Graduation Requirements

Degrees will be granted at the end of the semester in which students complete the final requirements. For example, if a student receives an "I" grade in a course required for graduation in 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.

Graduate 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€ 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 sections below detail some aspects of a few of the services provided by Student Affairs.

Placement Assistance

Advice on career options is available to enrolled degree seeking students. DigiPen 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 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. DigiPen also attends industry events to promote the Institute's programs and its students. Placement assistance continues beyond graduation as these services are extended to alumni. 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 Europe-Bilbao 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 Administration 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. 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 Developer's Conference and extends placement services to all alumni. DigiPen Europe-Bilbao graduates will be welcome to attend these U.S. alumni events.

Education Rights and Privacy of Student Records

DigiPen Institute of Technology Europe-Bilbao 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. Students may ask the Institute to amend a record that they believe is inaccurate. They should write to the Institute official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate. If the Institute decides not to amend the record as requested by the student, the Institute will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.
3. The right to consent to disclosures of personally identifiable information contained in the student's education records. One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is defined as a person employed by the Institute in an administrative supervisory, academic, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the Institute has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his or her professional responsibility. Upon request, the Institute discloses education records without consent to officials of another school to which a student intends to enroll.

Release of Student Academic and Financial Records

If a student's parent, guardian, family member, or other individual wishes to obtain any of the student's information (including but not limited to account balance, tuition payments due, class registration, etc.), the student must fill out and submit the Student Consent for Release of Records Form listing the names of the individuals to whom his or her information may be released. This form will be distributed to all students during Orientation and can also be obtained from the Administration.

Release of Student Directory Information

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. Additionally, it is forbidden to bring in any personal computers or software, as well as any video or audio recording equipment, without first agreeing to and signing a Network and Internet Usage Agreement. 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/subject.

- 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. 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 local law. 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 Office of Admissions or the Director General.
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 or physical, including conduct 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 faculty/staff and students and between students and students because of race, sex, color, national origin, ancestry, religion, physical or mental disability, veteran status, age, or any other basis protected by local law. Any such harassment may violate the law and will not be tolerated. DigiPen's policy prohibits inappropriate conduct even though it may not reach the legal standard for harassment.
21. It is forbidden to attempt to engage in, aid and abet others to engage in, or attempt to engage in conduct which would be considered an offense.
22. Failing to comply with any penalty imposed for misconduct is considered an offense.

Penalties

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

1. A failing grade or mark of zero for any course, examination, or assignment in which the academic misconduct occurred.
2. Suspension from the Institute for a specified period of time or indefinitely. Students will not receive credit for courses taken at another institution during a suspension.
3. Reprimand, with the letter placed in the student's file.

4. Restitution, in the case of damage to property or unauthorized removal of property.
5. A notation on the student's permanent record of the penalty imposed.
6. Expulsion from the Institute
7. Legal action against the student committing the offense.

The members of the committee may ask questions of both the student and the Department Chair. As soon as possible after the hearing is completed, the Executive Director will notify the student of the final decision in writing.

Warnings

1. The penalty for plagiarism or for cheating is normally suspension from the Institute.
2. Charges filed under the local or international law and/or the commencement of legal proceedings do not preclude disciplinary measures taken by the Institute.

Procedures

Any student suspected or apprehended in the commission 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 Department Chair. A student who wishes to make an appeal must notify the Executive Director in writing and must provide a full explanation of the reasons for appealing.

Appeal hearings take place before a committee called together by the Executive Director. 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 Department Chair is also present and puts forth the reasons for the original decision.

Degree Programs for the Academic Year 2014–2015

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

Program Overview

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

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

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

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

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

Graduates of this degree program will be prepared to enter the video game industry as entry-level computer scientists and software engineers. Possible entry-level position titles include computer scientist, software engineer, software developer, software development engineer, software development engineer in test, software analyst, computer programmer, gameplay programmer, engine programmer, physics programmer, graphics programmer, networking programmer, artificial intelligence programmer, user interface programmer, tools programmer, web programmer, or game scripter. After several years in the industry, graduates may attain titles such as lead engineer, lead developer, development manager, principal engineer, technical director, and chief technology officer. This degree program also includes secondary training that can contribute directly to a graduate obtaining positions with titles such as producer, program manager, technical program manager, technical writer, and technical designer.

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

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

Degree Requirements

NUMBER OF CREDITS AND GPA

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

GRADE REQUIREMENTS AND CORE COURSES

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

ART AND MUSIC REQUIREMENTS

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

COMPUTER SCIENCE REQUIREMENTS

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)

HUMANITIES AND SOCIAL SCIENCES REQUIREMENTS

Required courses are COL 101, ENG 246 and COM 150. Five additional ENG credits are required from ENG 116 and above. Students must take an additional three credits in HIS, PSY, or SOS. (Total: 15 credits)

MATHEMATICS REQUIREMENTS

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

PHYSICS REQUIREMENTS

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

PROJECTS REQUIREMENTS

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

OPEN ELECTIVES REQUIREMENTS

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

NOTE ON GENERAL EDUCATION COURSES

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

RECOMMENDED COURSE SEQUENCE CHART FOR BS IN COMPUTER SCIENCE AND REAL-TIME INTERACTIVE SIMULATION

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 1	MAT 140	Linear Algebra and Geometry	X	4
	CS 100	Computer Environment	X	3
	CS 100L	Computer Environment Lab	X	1
	CS 120	High-Level Programming I—The C Programming Language	X	3
	CS 120L	High-Level Programming I Lab	X	1
	GAM 100	Project Introduction	X	3
	ENG 110	Composition	X	3
	ART 210	Art Appreciation		2
	Semester Total			
Semester 2	MAT 150 or MAT 180	Calculus and Analytic Geometry I or Vector Calculus I	X	4
	CS 170	High-Level Programming II—The C++ Programming Language	X	3
	CS 170L	High-Level Programming II Lab	X	1
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	COM 150	Interpersonal and Work Communication		3
	HSS Elective	One humanities & social science elective from any three-credit HIS, PSY or SOS courses		3
	Semester Total			
Semester 3	MAT 200 or MAT 230	Calculus and Analytic Geometry II or Vector Calculus II	X	4
	CS 180	Operating System I, Man-Machine Interface	X	3
	CS 200	Computer Graphics I	X	3
	CS 225	Advanced C/C++	X	3
	GAM 200	Project II	X	4
	PHY 200	Motion Dynamics	X	3
	Semester Total			
Semester 4	PHY 250	Waves, Optics, and Aerodynamics		3
	CS 250	Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
	Semester Total			

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

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 260	Computer Networks I, Interprocess Communication	X	3
	CS 330	Algorithm Analysis	X	3
	MAT 258	Discrete Mathematics	X	3
	CG 130	3D Computer Animation Production I		3
	GAM 300	Project III	X	5
	Semester Total			
Semester 6	MAT 300	Curves and Surfaces	X	3
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
	CS 350	Advanced Computer Graphics II	X	3
	CS 315	Low-Level Programming	X	3
	Computer Science 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				21
Semester 7	English Elective	One English elective chosen from any ENG course, ENG 116 and above		2-4
	Computer Science or Physics Elective	Any 200-level or higher CS course not required or PHY 350	X	3
	Math Elective	MAT 256 or any MAT course greater than 300	X	3
	GAM 400	Project IV	X	5
	Elective	An elective of the student's choice from any department at DigiPen		3
	Art & Music Elective	Select one: ANI 125, ART 400, ART 410, FLM 115, FLM 151, FLM 152, or MUS 115		2-3
Semester Total				18-21
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				16-18
Degree Total				154 minimum

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

Bachelor of Fine Arts in Digital Art and Animation

Program Overview

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

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

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

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

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

be thoroughly familiar with modern interface and workflow conventions. They will also understand how to learn new software while maintaining a production schedule.

- A solid foundation in professional work habits and attitude. Students will understand how to utilize and integrate professional criticism into their work. Additionally, they will be able to identify and create work that meets professional quality standards. They will also understand production flow and be able to generate and maintain appropriate schedules and production goals for their work.
- Social perspective and civic accountability relative to the roles that animation plays in society. Students will explore the long-term ramifications of this industry and be able to intelligently discuss their responsibilities to the betterment of the animation industry and society as a whole.

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

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

Degree Requirements

NUMBER OF CREDITS AND GPA

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

GRADE REQUIREMENTS AND CORE COURSES

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

ANIMATION REQUIREMENTS

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

ART REQUIREMENTS

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

COMPUTER GRAPHICS REQUIREMENTS

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

ELECTIVE REQUIREMENTS

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

FILM REQUIREMENTS

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

HUMANITIES AND SOCIAL SCIENCE REQUIREMENTS

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

PROJECTS REQUIREMENTS

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)

SCIENCE REQUIREMENTS

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

NOTE ON GENERAL EDUCATION COURSES

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

RECOMMENDED COURSE SEQUENCE CHART FOR BFA IN DIGITAL ART AND ANIMATION

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

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

**Note: Please refer to the Elective Requirements section under Degree Requirements on the previous page.

SEMESTER	COURSE	COURSE TITLE	CORE*	CREDITS
Semester 5	ANI 300 or Elective	Acting Through an Interface or **any course from the Elective Requirements 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
	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 Requirements list	X	3
	ART 301 or Elective	Concept Art Resources or **any course from the Elective Requirements list	X	3
	PHY 115	Introduction to Applied Math and Physics		3
	CG 350 or Elective	Graphics for Gaming or **any course from the Elective Requirements list	X	3
	PRJ 350	3D Animation Production	X	5
	COL 499	Career Search Preparation: Materials, Logistics, and Communication	X	1
Semester Total				18
Semester 7	ART 401	Conceptual Illustration and Visual Development	X	3
	FLM 250 or Elective	Digital Post-Production or **any course from the Elective Requirements list	X	3
	ART 205 or Elective	Character and Environment Design or **any course from the Elective Requirements list	X	3
	ART 450	Portfolio	X	3
	PRJ 400	Capstone Project I	X	5
	Semester Total			
Semester 8	ART 299 or Elective	Special Topics in Arts or **any course from the Elective Requirements list	X	3
	SOS 115	Media and Ethics: A Social Science Perspective		3
	CS 115	Introduction to Scripting and Programming		3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	PRJ 450	Capstone Project II	X	5
	Semester Total			
Degree Total				145 minimum

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

**Note: Please refer to the Elective Requirements section under Degree Requirements.

Course Descriptions
for the Academic Year
2014–2015

Department of Fine Arts

Art Courses

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

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 110 **Fundamentals of Visual Communication and Design Process** (3 cr.)

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

ART 115 **Art and Technology** (3 cr.)

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

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

Prerequisite(s): ART 101

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

students practice extrapolating basic human life drawing strategies to other animals.

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

Prerequisite(s): ART 125, ART 151

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

ART 205 **Character and Environment Design** (3 cr.)

Prerequisite(s): BIO 150

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.)

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 **3-Dimensional Design and Sculpture** (3 cr.)

Prerequisite(s): ART 201 or BIO 150

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 230 **Painting** (3 cr.)

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

ART 234 Survey of Sequential Art (3 cr.)

Prerequisite(s): ART 125, ART 151

In this course, students will learn to explore and to exploit the power of sequential images as a medium to craft stories beyond storyboarding, photography, and film. Through the formats of the graphic novel and related forms, students will tackle problems of character and events; their solutions will be limited only by their imaginations. The course will begin with 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.)

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.)

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): ART 201, CG 201

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

ART 301 Concept Art Resources (3 cr.)

Prerequisite(s): ART 251 or CG 201 or 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.)

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 or ART 251, 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 (3 cr.)

Prerequisite(s): ART 310, CG 301

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

ART 399 Special Topics in Art (3 cr.)

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.)

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

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.

Department of Animation and Production

Animation Courses

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

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.)

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

Prerequisite(s): ANI 300

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

ANI 399 **Special Topics in Animation** (3 cr.)

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): ART 401 or CG 400, ANI 350, 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.

Film Courses

FLM 115 **History of Film and Animation** (3 cr.)

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.)

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

FLM 201 **Cinematography** (3 cr.)

Prerequisite(s): FLM 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 250 **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 399 **Special Topics in Film** (3 cr.)

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

Internship Courses

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

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

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

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

Music Courses

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

This course offers an introduction to the fundamentals of music and sound design, and an overview of the production of music and sound for animation, film, and video games. Topics include music notation, key, meter, rhythm, melody, harmony, texture, tempo, genre and form; historical musical styles; dialog and timing; and digital audio production methods and techniques. Credit may be received for MUS 115 or for FLM 275, but not for both.

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): ART 251, ART 300, ART 350, CG 275, PRJ 251

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

PRJ 350 **Applied 3-D Animation Production**

Problems (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

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

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.

Department of Computer Science

Computer Science Courses

CS 102 **Computer Environment** (4 cr.)

This course provides an introduction to digital computer organization. Topics covered include basic electricity, electrical circuits, encoding of numeric and non-numeric data, digital systems, logic circuits and algebra, arithmetic and logic unit, memory unit, basic computer architecture and introduction to operating systems. The outcome of this course is to provide students with sound knowledge of the fundamental building blocks of the functional units of digital computer systems.

CS 115 **Introduction to Scripting and Programming** (3 cr.)

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 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 controlled environment. This class must be taken concurrently with CS 120, the associated lecture course.

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

Prerequisite(s): CS 120, CS 120L

Concurrent Course(s): CS 170L

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

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

Prerequisite(s): CS 120, CS 120L

Concurrent Course(s): CS 170

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. This class must be taken concurrently with CS 170, the associated lecture course.

CS 180 **Operating Systems I, Man-Machine Interface** (3 cr.)

Prerequisite(s): CS 170 or CS 170L, CS 102

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

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

Prerequisite(s): CS 170, CS 170L, MAT 140

CS 200 presents fundamental mathematical elements, data structures, and algorithms useful for animating and viewing 2D primitives. The course aims to fulfill two objectives. The first objective is to provide students with a sufficient mathematical and algorithmic background to design and implement 2D graphics applications. The second objective is to prepare students with the knowledge required for writing 3D graphics applications. The first half of the course deals with scanconversion 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, CS 170L

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 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 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 Database** (3 cr.)

Prerequisite(s): CS 170, CS 170L

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

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

Prerequisite(s): CS 100 or CS 102, CS 120, CS 120L, CS 180

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

CS 330 **Design and Analysis of Algorithms** (3 cr.)

Prerequisite(s): CS 225, CS 280

This course provides students with an introduction to the analysis of algorithms, specifically proving their correctness and making a statement about their efficiency. Topic for discussion may include loop invariants, strong mathematical

induction and recursion, asymptotic notation, recurrence relations, and generating functions. Students examine examples of algorithm analysis from searching and sorting algorithms.

CS 350 **Advanced Computer Graphics II** (3 cr.)

Prerequisite(s): CS 300

This course deals with the efficient representation and processing of complex 3D scenes in order to avoid bottlenecks in the use of the CPU and the GPU. Specific topics include a variety of spatial data structures (binary space-partitioning trees, octrees, kd-trees, and grid data structures), several object-culling methods (occlusion, viewport, and portal), and finally the construction and uses of 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 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 380 **Artificial Intelligence for Games** (3 cr.)

Prerequisite(s): CS 280

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

CS 381 **Introduction to Artificial Intelligence** (3 cr.)

Prerequisite(s): CS 330, MAT 258

This course 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 391 **Code Analysis and Optimization** (3 cr.)

Prerequisite(s): CS 280, CS 315

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

CS 399 **Special Topics in Computer Science** (3 cr.)

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

CS 420 **Graphics File Format and Data Compression Techniques** (3 cr.)

Prerequisite(s): CS 250, CS 280

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

CS 460 **Advanced Animation and Modeling** (3 cr.)

Prerequisite(s): CS 300, MAT 300

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

Department of Digital Arts

Computer Graphics Courses

CG 130 **3D Computer Animation Production I** (3 cr.)

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

CG 201 **2D Raster Graphics and Animation** (3 cr.)

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

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

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

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

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

CG 251 **2D Vector Graphics and Animation** (3 cr.)

Prerequisite(s): CG 201

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

CG 275 **3D Character Animation** (3 cr.)

Prerequisite(s): CG 225

Students continue to explore and exercise the concepts and techniques of 3D animation through a series of assignments applied to characters. Exercises in this course are considerably more demanding than those completed in CG 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 **Environments and Backgrounds** (3 cr.)

Prerequisite(s): CG 275

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

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 399 **Special Topics in Computer Graphics** (3 cr.)

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.

Department of Game Software Design and Production

Game Projects Courses

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

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

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

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

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

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

This project is divided into two semesters during which students design and implement a 2D scrolling game engine. Similar to Project I, they start by writing a Game Design Document and a Technical Design Document. Along with creating a scrolling engine, students will also explore multilayer functionality within conventional games, sound, and music as it affects game design for a multilayer environment. Additionally, students will explore basic enemy programming and level design while learning to work in a team environment.

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

Prerequisite(s): CS 225, GAM 200

Concurrent Course(s): CS 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 300 **Project III** (5 cr.)

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

Concurrent Course(s): CS 26

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

GAM 350 Project III (5 cr.)
Prerequisite(s): GAM 300
Concurrent Course(s): CS 250

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

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

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

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

GAM 450 Project IV (5 cr.)
Prerequisite(s): GAM 400 or GAM 490 or GAM 390, MAT 300

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

GAM 490 Internship II (5 cr.)
Prerequisite(s): GAM 250

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

Department of Humanities and Social Sciences

Communications Courses

COM 150 Interpersonal & 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.

English Courses

ENG 110 Composition (3 cr.)

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

ENG 116 Storytelling (4 cr.)

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

ENG 150 Mythology for Game Designers (3 Cr.)
Prerequisite(s): ENG 110

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

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

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

ENG 243 **Epic Poetry** (3 cr.)

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

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

ENG 245 **Introduction to Fiction Writing** (3 cr.)

Prerequisite(s): ENG 110 or ENG 116

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

ENG 246 **American Ethnic Literatures** (3 cr.)

Prerequisite(s): ENG 110 or ENG 116

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

ENG 315 **Story Through Dialogue** (4 cr.)

Prerequisite(s): ENG 116 or ENG 245

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

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

Prerequisite(s): ENG 110 or ENG 116

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

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

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

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

Prerequisite(s): ENG 150 or ENG 110

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

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

Prerequisite(s): ENG 110

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

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

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

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

Prerequisite(s): ENG 245 or ENG 315

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 for Game Developers (2 cr.)

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.

Law Courses

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

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.

Psychology Courses

PSY 101 Introduction to Psychology (3 cr.)

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.)

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.)

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.)

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

SOS 180 Race & Gender in 21st 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 399 Special Topics in Sociology (3 cr.)

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

Department of Life Sciences

Biology Courses

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

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

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

Department of Mathematics

Mathematics Courses

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

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.)

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, antiderivatives, and the Fundamental Theorem of Calculus.

MAT 180 **Vector Calculus I** (4 cr.)

Prerequisite(s): MAT 140

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

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

MAT 225 **Calculus and Analytic Geometry III** (3 cr.)

Prerequisite(s): MAT 200

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 threespace 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 250 Linear Algebra (3 cr.)

Prerequisite(s): MAT 200

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

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 Maths (3 cr.)

Prerequisite(s): MAT 200

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

MAT 300 Curves and Surfaces (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 340 Probability and Statistics (3 cr.)

Prerequisite(s): MAT 200, MAT 258

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

MAT 350 Advanced Curves and Surfaces (3 cr.)

Prerequisite(s): MAT 300

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

MAT 351 Quaternions, Interpolation and Animation (3 cr.)

Prerequisite(s): MAT 300

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

MAT 352 Wavelets (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 353 Differential Geometry (3 cr.)

Prerequisite(s): MAT 300

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

MAT 354 Discrete and Computational Geometry (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 355 Graph Theory (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 356 Advanced Differential Equations (3 cr.)

Prerequisite(s): MAT 250, MAT 256

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

MAT 357 Numerical Analysis (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 359 Computational Algebraic Geometry (3 cr.)

Prerequisite(s): MAT 300

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

MAT 361 An Introduction to Number Theory and Cryptography (3 cr.)

Prerequisite(s): MAT 250, MAT 258

This course is an introduction to elementary number theory and cryptography. Among the essential tools of number theory that are covered, are divisibility and congruence, Euler's function, Fermat's little theorem, Euler's formula, the Chinese remainder theorem, powers modulo m , k th roots modulo m , primitive roots and indices, and quadratic reciprocity. These tools are then used in cryptography, where the course discusses encryption schemes, the role of prime

numbers, security and factorization, the DES algorithm, public key encryption, and various other topics, as time allows.

MAT 362 Fuzzy Sets and Logic (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 364 Combinatorial Game Theory (3 cr.)

Prerequisite(s): MAT 258

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

MAT 365 Topology (3 cr.)

Prerequisite(s): MAT 250, MAT 258

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

MAT 399 Special Topics in Mathematics (3 cr.)

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 Physics

Physics Courses

PHY 115 **Introduction to Applied Math and Physics** (3 cr.)

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

PHY 200 **Motion Dynamics** (3 cr.)

Prerequisite(s): MAT 150

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

PHY 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): MAT 200, PHY 200

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

PHY 250L **Waves, Optics and Thermodynamics Lab** (1 cr.)

Concurrent Course(s): PHY 250

This course presents the concepts of PHY 250 in the laboratory. The experiments allow students to experience the physical laws involving oscillations, waves, sound, interference, lift, drag, heat, optics, and entropy. Extended error analysis and statistics are taught and required in experimental reports.

PHY 270 **Electricity and Magnetism** (3 cr.)

Prerequisite(s): PHY 250

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

PHY 270L **Electricity and Magnetism Lab** (1 cr.)

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): PHY 250 or PHY 270, MAT 200, PHY 200

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

PHY 290L **Modern Physics Lab** (1 cr.)

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, MAT 200, 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 399 **Special Topics in Physics** (3 cr.)

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.

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