

# DIGIPEN INSTITUTE OF TECHNOLOGY

Redmond, Washington

**Catalog for the Academic Year  
2005/2006**

Updated: Aug. 23, 2005

## Notices

### Registration:

DigiPen Institute of Technology is authorized by the Washington State Higher Education Coordinating Board and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree Authorization Act. This authorization is valid until \*May 15, 2006 and authorizes DigiPen Institute of Technology to offer the following degrees:

**Associate of Applied Arts in 3D Computer Animation**  
**\*\* Associate of Science in Real-Time Interactive Simulation**  
**Bachelor of Fine Arts in Production Animation**  
**Bachelor of Science in Computer Engineering**  
**Bachelor of Science in Real-Time Interactive Simulation**  
**Master of Science in Computer Science**

Any person desiring information about the requirements of the Act or the applicability of those requirements to the institution may contact the board office at P.O. Box 43430, Olympia, WA 98504-3430.

\*DigiPen Institute of Technology has been authorized since 1996 and strictly adheres to the bi-annual authorization renewal process.

\*\*DigiPen is not accepting applications for the A.S. in Real-Time Interactive Simulation program for the Fall 2005 academic year.

### Accreditation:

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

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### Important Notices:

**\*All items including, but not limited to, application forms, transcripts, reference letters, resumes, software, and any accompanying documentation or works of art (collectively "the Items"), forwarded to DigiPen by any person (the "Sender") whether at the request of DigiPen or otherwise, become the exclusive property of DigiPen unless otherwise agreed to in writing by DigiPen, and DigiPen shall be under no obligation whatsoever to return the Items to the Sender. At DigiPen's discretion, the Items may be destroyed after being reviewed.**

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

Caution: The course offerings and requirements of DigiPen Institute of Technology are under continual examination and revision. This catalog is not a contract; it merely presents the offerings and requirements in effect at the time of publication and in no way guarantees that the offerings and requirements will not change. The Institute specifically reserves the right to change requirements for any major during any particular year. Whenever changes in course offerings or requirements occur, students will be notified by a posting outside the Office of the Registrar. 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.

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# Rules and Policies for the Academic Year 2005/2006





## General Information

### **Name of the School**

DigiPen Institute of Technology

### **Contact Information**

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### **Degree Authorization**

DigiPen Institute of Technology is authorized by the Washington State Higher Education Coordinating Board (HECB) and meets the requirements and minimum educational standards established for degree-granting institutions under the Degree Authorization Act. This authorization was first received in 1996. HECB authorizes the DigiPen Institute of Technology to offer the following degree programs:

- Associate of Science in Real-Time Interactive Simulation
- Bachelor of Science in Real-Time Interactive Simulation
- Bachelor of Science in Computer Engineering
- Associate of Applied Arts in 3D Computer Animation
- Bachelor of Fine Arts in Production Animation
- Master of Science in Computer Science

Any person desiring information about the requirements of the Act or the applicability of those requirements to the institution may contact the HECB office at P.O. Box 43430, Olympia, WA 98504-3430.

### **Accreditation**

Accreditation is a voluntary system of non-government, self-regulation of the nation's education institutions. Through the accrediting process, institutions and their programs are evaluated and recognized for quality education. This recognition is extended through national, specialized, or regional accrediting agencies who themselves are recognized by the U.S. Department of Education.

Accreditation is a formal status granted to an institution meeting or exceeding stated educational quality criteria. The purposes of accreditation are to assess and enhance the educational quality of an institution, assure consistency in institutional operations, promote institutional improvement, and provide for public accountability.

DigiPen Institute of Technology applied for accreditation with the Accrediting Commission of Career Schools and Colleges of Technology (ACCSCCT), recognized by the U.S. Department of Education as a national accrediting agency. One of the steps in the application process is a team visit by the ACCSCCT. During the visit, the team met with the institution's administrative staff, faculty, and students to assess its educational programs and overall effectiveness. DigiPen Institute of Technology received three "Items of Excellence" in the Team Summary Report:

- The team commends the school (DigiPen Institute of Technology) for its two innovative training opportunities offsite. The training is to motivate high school students to become more interested in mathematics and sciences through the implementation and programming of video games.

- The team commends the school on its facilities, which provide an environment highly conducive to learning. In addition, extensive equipment in the laboratories is available to students for thirteen hours each day, six days a week.
- The team commends the school for the level of student satisfaction achieved at the school. Specifically, of the students surveyed, 93% (84 of 90) felt good about their decision to attend the school and would recommend the school to a friend.

At its November 2002 meeting, the ACCSCT voted to grant accreditation to DigiPen Institute of Technology.

By becoming an accredited institution, DigiPen has joined in partnership with other educators and institutions committed to providing programs of quality and conducting their affairs with honesty, integrity, and dignity. We take this responsibility seriously and proudly embrace accreditation as a means of continuous self-analysis and the achievement of our educational mission and goals.

### **Brief History of DigiPen**

Founded in 1988, DigiPen began as a computer simulation and animation company. Frustrated with the lack of qualified computer graphics employment candidates, DigiPen decided to offer training in the area of 3D computer animation. After three to four years, the city of Vancouver became known as an excellent source of computer animators. In 1991 discussions with Nintendo of America initiated the idea of offering educational training in the area of computer/video game programming. Nintendo and other video game development companies have constantly expressed the need for qualified game programmers.

With advisory support from Nintendo of America, DigiPen's engineers developed a two-year program with a unique curriculum in video game programming. In 1993 DigiPen Applied Computer Graphics School opened in Vancouver, BC, Canada, offering programs in computer/video game programming as well as continuing the training in 3D Computer Animation. Prior to DigiPen's course offering in video game programming, this type of training was unheard of in North America. The inaugural class graduated in 1996, and nineteen graduates gathered about thirty job offers from various game development companies, such as Nintendo, Iguana, Sierra Online, Konami, Electronic Arts, Bandai Entertainment, Sony of America, etc.

To fulfill the growing number of positions available in the digital entertainment industry, DigiPen decided to offer a unique degree program – a Bachelor of Science in Real-Time Interactive Simulation. As many of DigiPen's students came from the U.S., DigiPen decided to apply to the Washington State Higher Education Coordinating Board for the authorization to grant such a degree. The authorization was received in 1996. Thus, DigiPen Institute of Technology became the world's first and only school that offered a Bachelor degree program dedicated to game programming. DigiPen Institute of Technology was opened in Redmond, WA in January 1998, offering both Bachelor and Associate degree programs in Real-Time Interactive Simulation. In September 1999, DigiPen added an Associate degree program in 3D Computer Animation.

Today we continue to fulfill the needs of the interactive simulation and 3D computer animation industries, encouraging our students to learn the skills and knowledge necessary to succeed in their field of training.

### **Mission of Institution**

The mission of DigiPen Institute of Technology is to offer higher education to those who would like to pursue studies and careers in fields of interactive computer technologies, which include graphics and real-time interactive simulation, and provide highly qualified personnel to the interactive computer industries to sustain their growth and productivity.

### **Notice of Non-Discrimination**

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

DigiPen Institute of Technology does not discriminate in its educational and employment policies on the basis of race, color, creed, religion, national/ethnic origin, sex, sexual orientation, age, or with regard to the basis outlined in the Veterans' Readjustment Act and the Americans with Disabilities Act.

## **Program of Studies Offered**

Currently, the Institute offers the following degree programs:

- Associate of Science in Real-Time Interactive Simulation
- Bachelor of Science in Real-Time Interactive Simulation
- Bachelor of Science in Computer Engineering
- Associate of Applied Arts in 3D Computer Animation
- Bachelor of Fine Arts in Production Animation
- Master of Science in Computer Science

## **About our Facilities**

DigiPen encompasses over 52,000 square feet of built space, including a library, lunchroom, auditorium, and dedicated computer labs for each cohort of students, as well as additional classrooms for lectures and instruction. For 2005-2006, our largest auditorium can seat up to 100 students in a classroom setting, and our largest lab can hold up to 140 students.

Major equipment items include microphone and LCD projection systems in several of the classrooms, multiple presentation media in the auditorium including VCR, document camera, DVD, Laser Disc, and CD player. Students also have access to recording equipment. Computers currently range in power depending on program requirements. DigiPen upgrades the computer equipment on a regular basis.

## **Description of the Library Facilities and Internet Access**

### *Library Facilities*

The 1,600 square foot library is a place for study, group work, and research. The library currently holds over 2,500 books, 20 magazines and journal subscriptions related to the fields of gaming, simulation, and animation, and over 200 PC and console video games. Over 600 networked computers, located in dedicated computer labs, form an integral part of the library resources available to students.

### *Internet Access*

Internet access is a regulated service. The Institute provides this service to students free of charge. Students may lose this privilege if they do not abide by the Internet Access rules and regulations.

## Important Dates

### Institutional Calendar

The Institute is closed on all statutory holidays. Exam periods and breaks may be subject to change if necessary.

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.

Aug. 29 – Sept. 2, 2005	Orientation – First Year Students	
Sept. 5, 2005	Labor Day	No Class
Sept. 6, 2005	Classes Begin – Fall Semester	
Nov. 11, 2005	Veterans Day	No Class
Nov. 24-27, 2005	Thanksgiving	No Class
Dec. 12-16, 2005	Final Exams	
Dec. 16, 2005	Fall Semester Ends	
Dec. 17, 2005-Jan. 1, 2006	Winter Holidays	No Class
Jan. 2-8, 2006	Intersession	No Class
Jan. 9, 2006	Classes Begin – Spring Semester	
Jan. 16, 2006	M.L. King Day	No Class
Feb. 3, 2006	Founder's Day	No Class
Feb. 20, 2006	Presidents Day	No Class
Mar. 19-26, 2006	Spring Break	No Class
Apr. 24-28, 2006	Final Exams	
Apr. 28, 2006	Winter Semester Ends	
Apr. 30, 2006	Commencement	
May 1-May 5, 2006	Intersession	No Class
May 8, 2006	Classes Begin – Summer Session	
May 29, 2006	Memorial Day	No Class
Jul. 4, 2006	Independence Day	No Class
Jul. 24-28, 2006	Summer Session Final Exams	
Jul. 28, 2006	Summer Session Ends	

### Deadlines

April 20, 2005	Tuition deposit for Fall Semester due
June 20, 2005	Tuition balance for Fall Semester due
Sept. 12, 2005	Last day to add classes for Fall Semester; Withdrawal deadline for 90% refund
Sept. 16, 2005	Automatic withdrawal date from classes missing pre-requisites Final day to drop class without academic penalty
Sept. 20, 2005	Tuition deposit for Winter Semester due;
Oct. 2, 2005	Withdrawal deadline for 75% refund
Oct. 27, 2005	Final day to withdraw from classes for Fall Semester; 50% refund and a "W" will appear on transcript
Nov. 20, 2005	Balance of tuition for Winter Semester due
Jan. 16, 2006	Last day to add classes for Winter Semester; Withdrawal deadline for 90% refund
Jan. 20, 2006	Final day to drop class without academic penalty
Feb. 4, 2006	Withdrawal deadline for 75% refund

Feb. 15, 2006	Tuition deposit for Summer Session due
March 1, 2006	Final day to Withdraw from classes for Winter Semester; 50% refund and a "W" will appear on transcript
March 20, 2006	Balance of tuition for Summer Session due

## Tuition and Fees

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

### Enrollment Application Fee

A \$75.00 application fee must accompany the application form. \$50.00 of the fee is refundable if the applicant is not accepted to the Institution or if the applicant requests a refund within 7 calendar days after making the payment.

### Registration Fee

Upon acceptance into a degree program, a \$150.00 non-refundable registration fee must be paid to confirm enrollment. The registration fee is non-refundable; however, if an applicant requests a cancellation within seven calendar days after signing the enrollment agreement, the \$150.00 will be refunded.

### Tuition

	Undergraduate U.S. Citizen & Resident	Undergraduate Non-U.S. Citizen or Resident	Graduate U.S. Citizen & Resident	Graduate Non-U.S. Citizen or Resident
Cost/Credit	\$345.00*	\$450.00*	\$500.00*	\$650.00*
Total Cost B.S. in R.T.I.S. & B.S. in C.E.	\$53,130.00* (154 credits)	\$69,300.00* (154 credits)	N/A	N/A
Total Cost B.F.A.	\$49,680.00* (144 credits)	\$64,800.00* (144 credits)	N/A	N/A
Total Cost A.S. in R.T.I.S.	\$28,290.00* (82 credits)	\$36,900.00* (82 credits)	N/A	N/A
Total Cost A.A.A.	\$27,600.00* (80 credits)	\$36,000.00* (80 credits)	N/A	N/A
Total Cost M.S. in C.S.	N/A	N/A	\$15,000* (30 Credits)	\$19,500* (30 Credits)

\*Tuition is subject to change with 6 months notice.

Students re-registering for a failed course must pay the regular course fees.

### Tuition Fee Payment

Please see the payment schedule in your 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.

### Late Registration Fee

Students are responsible for registering for classes each semester by the posted date. All late class registrations will cost \$100.00 to cover administrative costs due to late registrations.

## **Books**

Text and reference books are estimated to be approximately \$700.00 per year. This cost is not included as a part of the tuition.

## **Parking**

On-campus parking is available for \$320.00 per academic year. Please see the Administration Office for details regarding parking applications.

## **Administrative Fee**

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

## **Technology Fee**

This fee covers paper and toner for the student-use printers and maintenance costs associated with the upkeep of the computer labs. This fee is \$40.00 per semester for all students.

## **Graduation Fee**

This \$60.00 fee covers the cost of the graduation gown, graduation application, degree audit, and graduation ceremony. This fee must accompany the graduation application.

## **Transfer and Waiver Fees**

Course transfers and waivers are processed at \$25.00 per credit. Waiver exams, when required, have an associated \$100.00 fee.

## **Course Fees**

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

# Cancellation and Refund Policies 2005-2006

## **Tuition Refund Schedule**

### Cancellation Policies

- a. 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.
- b. All monies paid by an applicant must be refunded if requested within three days after signing an enrollment agreement and making an initial payment. An applicant requesting cancellation more than three days after signing an enrollment agreement and making an initial payment, but prior to entering the school, is entitled to a refund of all monies paid minus a registration fee of 15% of the contract price of the program, but in no event will the school retain more than \$150.

Students who submit an official withdrawal in writing or who are determined by the Administration to have withdrawn from the Institute:

- Before the beginning of classes are entitled to a tuition refund of all money paid towards tuition for the upcoming semester.
- Before the close of the seventh calendar day after the beginning of classes must pay 10% of the semester's tuition. Any portion of tuition paid above this percentage will be refunded.
- Before the close of the 27<sup>th</sup> calendar day of the semester must pay 25% of the semester's tuition. Any portion of tuition paid above this percentage will be refunded.
- Before the close of the 52<sup>nd</sup> calendar day of the semester must pay 50% of the semester's tuition. Any portion of tuition paid above this percentage will be refunded.

- After the 52<sup>nd</sup> calendar day of the semester must pay 100% of the semester's tuition.

All other assessed fees are refunded on the same schedule as tuition payments.

### **Termination Date**

The termination date for refund purposes for institutional withdrawal is the last date of actual attendance by the student. The termination date for refund purposes 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 is 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, the Institute shall make a settlement that is reasonable and fair to both parties. These will be judged on a case-by-case basis.

### **Application of Policy**

Any monies due the student shall be refunded within 60 days from the last date of student 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 issue of the student's transcripts.

## **Financial Assistance**

### **The Role of the Financial Aid Office**

The goal of the Financial Aid Office is to deliver student assistance in a timely manner and to ensure availability of financial aid for students who, without such assistance, would be unable to pursue their educational goals at DigiPen.

The primary objective of the Financial Aid Office is to provide adequate financial assistance to the maximum number of eligible students through coordination with and full utilization of all governmental, community, and on-campus resources, and to deliver that assistance within the framework of federal, state, and institutional regulations and policies.

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

The school is designated as an eligible institution by the U.S. Department of Education for participation in the following programs:

## **Federal Pell Grant Program**

Federal Pell Grants are the largest source of free money for college from the government. These need-based grants, which recently ranged between \$400-\$4050, are awarded to every undergraduate student who qualifies and hasn't already earned a bachelor's, master's, or professional degree. Grants can be used for tuition, fees, and living expenses. The amount a student may receive depends on the student's family financial situation, and the student's full-or part-time enrollment status.

## **Federal Family Educational Loan Programs (FFELP)**

The following loan programs fall under the umbrella of the FFEL Programs: The Federal Subsidized Stafford Loan Program, The Federal Unsubsidized Stafford Loan Program, and the Federal Parent Loan for Undergraduate Students.

## **Federal Stafford Loans**

Federal Stafford loans are the most common loans. These loans are for undergraduate students. There are two types: subsidized loans, for which the government pays the interest while you're in college; and unsubsidized loans, for which you're responsible for paying all the interest on the loans, during college and after. You may receive both types of loans at the same time. The U.S. Department of Education and the loan guarantor charges an origination fee of 3%. To receive loan funds, you must be enrolled at least half time.

## **Subsidized Federal Stafford Program**

Subsidized Stafford loans are awarded based on demonstrated financial need. The federal government pays the interest while you're in college and during the six month grace period after you graduated, leave school or enroll less than half time. The government also pays your interest costs during deferment. A student will be obligated for a 3% origination fee on each unsubsidized Federal Stafford Loan he or she receives. To qualify, you must meet all the requirements for federal student financial aid and have your eligibility for a Pell Grant determined. Repayment terms may vary from lender to lender.

## **Unsubsidized Federal Stafford Program**

Unsubsidized Stafford loans are for all eligible students, regardless of their income and assets. You must meet the same requirements as those for the subsidized Stafford loan, except for demonstrating financial need. You're responsible for paying all the interest on the loan, but you can allow it to accumulate while you're in college and during the grace period. If you do, the interest will be added to the amount you borrowed when repayment begins and future interest will be based on the higher loan amount. The maximum interest rate on an unsubsidized Federal Stafford Loan is 8.25%, as the date this catalog was published. A student will be obligated for a 3% origination fee on each unsubsidized Federal Stafford Loan he or she receives.

## **Federal PLUS Loan Program**

Federal PLUS Loans enable parents or stepparents to borrow up to the total cost of their dependent child's education, minus any other aid he or she may receive. PLUS Loans are for undergraduate study only and are not based on your family's income or assets. These loans are always unsubsidized. The maximum interest rate for Federal PLUS Loans is 9%, as the date this catalog was published. The interest rates charged on these loans may change, so the student must check with a lender or the school for the current rate. Parents will be obligated for a 3% origination fee on each Federal PLUS Loan they receive. Federal PLUS Loan borrowing is limited to parents with a favorable credit history.

## **Other Loans and Scholarships**

Other financial aid options include private bank loans and private scholarships.

Private, also known as alternative, loans can help you pay for college if you're still short after exhausting all your resources, federal loans and other college financial aid. Private loans usually carry higher interest rates and fees than federal loans and typically are based on creditworthiness. A number of commercial lenders and colleges offer private loans.



DigiPen does not currently offer any in-house scholarships. It is a good idea to check with employers and local civic groups to see if scholarship opportunities exist. Additionally, many community organizations, foundations, religious organizations offer scholarships. Start your research with local organizations in your community, then browse the scholarship directories on the Web or in the libraries, use the free search engines online. In addition, many professional and trade associations offer scholarships. Leads may also be listed in magazines or on Websites devoted to your interest or skills. Also contact the personnel offices of companies in your area or your parts' employers or labor unions to see if they offer scholarships. You may need to write letters and essays or be interviewed as part of the application process, so start your research early.

Private organizations will notify you directly of an award, its requirements and how you'll receive the funds. Keep in mind that colleges must apply any outside scholarship toward your unmet need or reduce other aid—scholarships dollars usually will not replace your estimated family contribution (EFC), DigiPen will reduce loan aid rather grant aid. Be sure to let your college know about any outside awards as soon as you receive them. You can apply for private scholarships and grants throughout your college years.

### **Veterans Administration Benefits**

Selected programs of study at DigiPen Institute of Technology are approved by a Washington State Approving Agency for enrollment of those eligible for benefits under Title 38 and Title 10, U.S. Code The Veterans Affairs Coordinator is available to serve the needs of individuals eligible for Veterans Administration educational benefits, and assist veterans, veterans' dependents and others eligible for educational benefits with problems or questions regarding benefits, certification or other matters relating to VA benefits.

The following VA educational assistance benefits are available at DigiPen Institute of Technology.

Chapter 30 - Montgomery GI Bill for Active Duty and Veterans

Chapter 32 - Veterans Educational Assistance Program

Chapter 35 - Dependents of Disabled/Deceased Veterans

Chapter 1606 - Montgomery GI Bill for National Guard & Selected Reserves

If you are a prospective student and believe you might be eligible for educational benefits, call or visit the DigiPen Institute of Technology Veterans Affairs Coordinator or the Financial Aid for more information and to begin the application process. The Coordinator may assist veterans in seeking other sources of financial aid in addition to their VA Educational Assistance benefits. [Veterans Affairs Coordinator: (425) 895-4430 ([rpage@digipen.edu](mailto:rpage@digipen.edu)) and Office of Financial Aid: (425) 895-4446 ([financialaid@digipen.edu](mailto:financialaid@digipen.edu))]

To be eligible for VA educational benefits you must be a degree-seeking student with a declared major at DigiPen Institute of Technology. Eligibility for the various VA Educational Benefits programs is determined, in part, by your date of enlistment. In all cases the Department of Veteran Affairs makes the final determination of eligibility. Application forms for your VA benefits are available at <http://www.vba.va.gov/pubs/educationforms.htm>.

The Veterans Affairs Coordinator is responsible for certifying veteran enrollment to the Regional Veteran Administration Office each semester. Therefore, you must ensure your registration is completed on time and that you indicate that you are a VA student. You will receive your first VA Educational Benefit check approximately six to eight weeks after submission of the VA certification. The amount of money you will receive for education benefits differs for each program, so it is best to call the VA Regional Office (888-442-4551) with a specific question about pay.

A veteran who is enrolling for the first time or who has not been enrolled for at least 30 days at any educational institution may be eligible for advance pay. The school generally receives this payment no later than 10 days after classes begin. The first check will cover the first partial month plus the first full month of school attendance. This check may be picked up at the Business Office upon payment of any balance owed DigiPen. The veteran will receive the next check at the end of the second full month of

classes. If you are interested and eligible for advance pay, please contact the Veteran Services Office at least 45 days before the first day of the class you plan to attend.

It is advisable for new or reentering students who are or may be eligible for VA benefits to contact the Veterans Affairs Coordinator prior to registration to insure that all necessary VA paperwork is properly initiated. Please remember that the Veterans Administration determines eligibility for VA educational benefits and that eligibility for VA educational benefits bears no relationship to an individual's indebtedness to DigiPen Institute of Technology.

- Veterans who have not used any of their Montgomery GI Bill-Active Duty Educational Assistance (Chapter 30) benefits will need an original or certified copy of their Member 4 of their DD Form 214 to send to the VA.
- Dependents who have not received Dependents' Educational Assistance (Chapter 35) benefits will need to apply using VA Form 22-5490 or provide a Certificate of Eligibility.
- Reservists who have not used any of their Montgomery GI Bill-Selected Reserve Educational Assistance (Chapter 1606) benefits, will need the original DD Form 2384, or Notice of Basic Eligibility, from their Reserve Unit. New Chapter 30 & 1606 recipients will need to complete a VA Form 22-1990.
- Transfer students who have received VA educational assistance benefits at other institutions of higher education will need to complete a Change in Place of Training form.

If you need additional assistance, please contact the Veterans Affairs Coordinator at DigiPen, or call the toll-free number 1-888-GI-BILL-1 (1-888-442-4551), or visit <http://www.gbill.va.gov/education/benefits.asp>

You may also contact the Department of Veterans Affairs at the following:

Education information	(888) 442-4551
Other VA information	(800) 827-1000
VA monthly certification	(827) 823-2378
Website	<a href="http://www.gbill.va.gov">www.gbill.va.gov</a>

## Enrollment Requirements

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

## Satisfactory Academic Progress (SAP) for Financial Aid

Federal regulations governing Federal Financial Aid programs stipulate that in order for a student to continue receiving Financial Aid funds, he/she must maintain satisfactory academic progress, as defined by the institution. Therefore, each semester a student receives Financial Aid, he/she will be required to (a) successfully complete at least 12 credits per semester. If you're a considered half-time (6-11 credits), the SAP policy will be prorated. (b) Earn a grade point average (GPA) of at least 2.0 each semester financial aid is received.

At the end of Fall Semester, if a student fails to maintain Satisfactory Academic Progress due to remediation, failing grades, withdrawals or incompletes, and/or who has exceeded the Maximum Time Frame condition (undergraduate program must not exceed 150% of the program in credit hours) will be placed on Financial Aid *warning* for one semester by the Director of Financial Aid. He/she will be notified in writing after an evaluation has been completed. While on *Financial Aid warning* the student will receive funds for Spring Semester. [At the end of any specific semester, a student is within reach of the 150% mark of their program, the student will be placed on *Financial Aid warning* for one semester by the Director of Financial aid. Again, he/she will be notified in writing after an evaluation has been completed.

While on *Financial Aid warning* the student will receive funds for that particular semester.] At the end of Spring Semester (once a year), the Financial Aid Office will check for Satisfactory Academic Progress. If the student remains below a 2.0 GPA, or exceeds 150% of their program, or does not successfully complete coursework he/she will be placed on financial aid disqualification/suspension and withdrawn from all Title IV programs (this includes loans), until satisfactory academic progress is attained. He/she will be notified in writing after an evaluation has been completed. (See Academic Progress Policy)

If you fail to complete the average credits required by the end of Spring Semester, you may re-establish your eligibility for aid during Summer or Fall Semester by completing 12 credits with a minimum 2.0 GPA, in one semester without Financial Aid.

You may attend DigiPen Institute Of Technology or another school to make up credits. These credits must apply to your degree and outside credits must be transferable to DigiPen. If you attend another school, please have them forward your academic transcripts to our office at the conclusion of your attendance there.

### **SAP Appeals**

A student on disqualification/suspension may appeal by indicating in writing to the Financial Aid Office (a) reasons why he/she did not achieve academic standards and (b) reasons why his/her aid eligibility should not be terminated or should be reinstated. Please include appropriate documentation (letters from physicians or instructors, etc.) to support the statements in your appeal. Each appeal will be considered on a case-by-case basis. Individual cases will not be considered as precedent.

Financial aid cannot be reinstated for a prior semester. Your appeal should be submitted within 21 days of the beginning of the semester you want aid reinstated. The Financial Aid Director will review the appeal within two weeks of its receipt and determine whether the Financial Aid disqualification/suspension is justified. The student will be advised in writing of the decision. The decision is final without additional documentation and you cannot re-appeal at a higher level. If your appeal is approved, reinstatement of aid is dependent on availability of funds.

### **Leave of Absence/Withdrawal from DigiPen Institute of Technology**

If at any time, a student decides to leave DigiPen Institute Of Technology, it is absolutely necessary for him/her to see the Financial Aid Office or make an appointment with the Director of Financial Aid for an exit interview prior to leaving the campus. This applies to students who are taking a leave of absence, withdrawing, and/or transferring to another institution. Failure to meet for an exit interview may increase the risk of defaulting on student loans as well as incurring a potential liability to DigiPen for not maintaining compliance with a federal requirement. Students who withdraw or take a leave of absence may be subject to Return of Title IV Funds.

### **Financial Aid Refund and Repayment Policy**

#### **Return of Title IV Funds**

DigiPen Institute Of Technology *institutional refund policy* operates independently from the Return of Title IV Funds policy required for all financial aid recipients. The Return of Title IV Funds policy applies to the completion of credit hours in a financial aid "payment period". **The return of federal financial aid funds policy is applied to all financial aid recipients who withdraw, drop out or otherwise fail to complete 60% of the payment period for which they have received federal funds.** Unearned Title IV funds (grants and loans) must be returned to the appropriate federal program by both the college and the student. The percent of funds "earned" is based upon the number of credit hours attended in the payment period divided by the number of hours in the payment period for which the student received federal funds. The percentage of assistance "earned" is equal to the percentage of the payment period completed. The percentage of Title IV funds "unearned" equals 100 percent minus the percent of Title IV aid "earned". The student and the college may retain the earned portion of aid, but are required to return a portion of the unearned aid to the appropriate federal grant and/or loan.

**This new federal law means that the federal government expects that student must "earn" the aid they receive. Once a student receives federal aid such as a Federal Pell Grant, or Federal Stafford Loan, she/he is expected to "earn" those funds by attending school and completing the number of credit-hours for which she/he was paid.**

If a student shows eligibility for funds not disbursed, a late disbursement of aid can be made even though the student has stopped attending. DigiPen Institute Of Technology allocates unearned Title IV funds to the following financial aid programs, in the order shown:

- Unsubsidized Stafford Loan
- Subsidized Stafford Loan
- Federal Plus Loan
- Federal Pell Grant

The official [Return of Title IV Funds Policy](#) is available in the Financial Aid Office.

## Applying to DigiPen

### **Part-Time Studies**

Part-time study may be available for the upcoming school year. Please inquire with the Registrar's Office to determine course availability.

### **Admission to the Programs of Study**

The Institute determines eligibility for acceptance into a program. In general, admission is competitive; those who exceed the minimum admission requirements are more likely to be accepted into the program.

### **Undergraduate Application Process**

All undergraduate applicants must submit the following:

1. DigiPen Institute of Technology Application for Admission.
2. \$75.00 application fee (U.S. funds only).
3. Official high school transcripts or official GED/equivalency scores.
4. Official transcripts from ALL post-secondary institutes attended (if applicable). This includes transcripts for high school concurrent enrollment programs.
5. Official SAT or ACT exam scores.
6. Two letters of recommendation from professors, employers, or other supervisory individuals. Letters from family members will not be considered.
7. Personal statement. Guidelines for the personal statement will be included on the application.
8. Other official documentation. This includes, but is not limited to: TOEFL scores, copy of Permanent Resident card, a financial responsibility form for international students, etc.
9. Portfolio (3D Computer Animation and Production Animation applicants only).

### **Real-Time Interactive Simulation (B.S.) and Computer Engineering (B.S.)**

Minimum Admission Requirements:

1. Proficiency in the English language. Non-native English speakers must provide a minimum TOEFL score of 550 (paper exam) or 213 (computer exam).
2. Completed grade 12 or the equivalent with a minimum 2.5 cumulative GPA.
3. B average or 3.0 GPA in mathematics courses including Algebra, Geometry, Algebra II/Trigonometry, Pre-Calculus, plus Calculus/AP Calculus if possible. Other courses that will be considered include Physics, Chemistry, and Computer Science.

### **3D Computer Animation (A.A.A.) and Production Animation (B.F.A.)**

Minimum Admission Requirements:

1. Proficiency in the English language. Non-native English speakers must provide a minimum TOEFL score of 550 (paper exam) or 213 (computer exam).

2. Completed Grade 12 or high school equivalence with a minimum of a 2.5 overall GPA.
3. Supply 10 to 20 samples from their art portfolio for competitive review. Fifty percent of the student's portfolio should demonstrate his or her artistic range and skill. Samples of animation, figure/animal studies, character designs, architectural renderings, landscape studies, sculpture, and painting are preferred. The second half of the portfolio must be drawings from direct observation. This work may not be from photos or other 2D reference or from the student's imagination. If necessary, DigiPen may request more samples for review. Submissions will not be returned.

## **Graduate Application Process**

All graduate applicants must submit the following:

1. DigiPen Institute of Technology Application for Admission.
2. \$75.00 non-refundable application fee (U.S. funds only).
3. Official Graduate Record Examination (GRE) scores for the General Test **and** the Subject Test in Computer Science. GRE code: 4193.
4. Official transcripts from ALL colleges and universities attended.
5. Two letters of recommendation from professors, employers, or other supervisory individuals. Letters from family members will not be considered.
6. Statement of Purpose. Guidelines for the Statement of Purpose will be included on the application.
7. Other official documentation. This includes but is not limited to: TOEFL scores, copy of Permanent Resident card, etc.

## **Computer Science (M.S.)**

Minimum Admission Requirements:

1. Proficiency in the English language. Non-native English speakers must provide a minimum TOEFL score of 550 (paper exam) or 213 (computer exam).
2. Have completed a Bachelor's degree in Computer Science or a related field with a minimum of a 2.5 cumulative GPA.

## **Admission/Denial to the Program**

Accepted undergraduate applicants will receive an enrollment packet via standard mail. This packet will include an enrollment agreement, information on financial aid, student services information, and, if applicable, a request to furnish proof of high school graduation before the start of classes in the fall. By returning the signed enrollment agreement, proof of high school graduation, and the enrollment fee, an applicant has confirmed enrollment.

Applicants who are not accepted to the Institute will receive a letter of denial by mail. If an applicant is denied admission to an undergraduate program, \$50.00 of the application evaluation fee will be refunded to them.

## **Readmission Information**

Any student who wishes to return to DigiPen Institute of Technology after an absence, may apply to do so by completing a Readmission Application and submitting the following:

1. Completed Readmission Application
2. Non-refundable \$25 application fee
3. Official transcripts from all institutions attended since last attending DigiPen Institute of Technology
4. Other official documentation for specific circumstances as requested on the application (e.g. physician's statement for medical withdrawals)

### **Medical Withdrawals**

If you withdrew from DigiPen for medical reasons, a physician's statement indicating that you are ready to resume your studies and describing any special needs you may require upon your return to campus must be sent to the Office of Admissions. Your application cannot be processed without this statement.

### **Readmission After Academic Dismissal**

If you are applying for readmission after academic dismissal, your explanation of what you have been doing since you last attended the Institute, why you would like to return, and how you plan to be successful in returning will be carefully considered during the review of your application for readmission.

### **Readmission After Disciplinary Action**

If you were suspended from DigiPen for disciplinary reasons or left with disciplinary charges pending, you must receive clearance from the Disciplinary Committee to return. Please include a formal appeal for the Committee to review along with your application.

### **Readmission for Personal Reasons**

If you were in good academic and financial standing when you withdrew, there usually are no impediments to returning other than space availability. However, an academic plan may need to be developed with your advisor. Students requesting readmission after an extended period of time must meet with an academic advisor to determine the viability of completing a degree program.

### **Readmission After Non-Payment of Account**

If you are withdrawn by the Institute for non-payment of your account, you must settle your account before applying. Once you have settled your account, then the readmission policy follows the same guidelines as for personal reasons.

### **Transcripts of Non-DigiPen Coursework**

If you have taken courses from another college after leaving DigiPen, you must have an official transcript forwarded to the Office of Admissions from the registrar of each institution attended. The transcripts should show all academic work through the last semester you completed. If you are approved for readmission with coursework in progress, your admission status will be provisional pending receipt of your final transcript.

## **Waiver, Credit, AP Examinations, CLEP, and Other Credit**

Students who can demonstrate that their knowledge and skills are equivalent to those gained by courses offered at DigiPen Institute of Technology – whether they were gained by formal education, exam, work experience, or life experience – may apply for academic credit or course waivers. Credit may be granted through other means: Advanced Placement (AP) Exam scores, International Baccalaureate courses, College-Level Examination Program (CLEP) subject exam scores, or transfer credits from other post-secondary institutions. A maximum of 9 credits per semester may be earned by these means. In all cases, no less than 75% of a student's total program must be taken at DigiPen. Course transfers and waivers are processed at \$25.00 per credit. Waiver exams, when required, have an associated \$100.00 fee.

### **Course Waiver Examinations**

A student 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 but does not result in credit earned. Rather than reducing the total number of semester hours required for a degree, it will increase the available number of elective

hours. The department in which the course is offered considers waiver requests at its discretion. Waiver examinations must be taken prior to the final semester of residence and 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 to waive a core course, the student must complete a waiver request form for each course, attach a transcript or photocopy of transcript with relevant coursework highlighted, to each waiver request, and submit the requests to the Registrar. Copies of the waiver request form are available from the Registrar. Each department will designate the courses for which a waiver exam or credit exam may be offered.

For waiver requests received by July 1, students will receive notification by August 1. Waiver requests arriving in the Registrar's Office after July 1 will be handled on a rolling basis, at faculty convenience. Because of faculty schedules, 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 baccalaureate degree and a maximum of 9 semester hours may be waived toward an associate degree.
4. Examinations may not be repeated.
5. Repeat course work and F grades are not open to waiver requests.
6. Students may not take waiver examinations on courses they have audited.

**Advanced Placement Examination**

Waiver hours or credit may be earned by successful completion of an Advanced Placement examination in the last ten years. These tests are graded on a scale of one to five.

Course waivers or credit may be granted for satisfactory attainment on Advanced Placement Exams of the College Entrance Examination Board. An exam score of four or above earns from three to six course waiver hours or credit. 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 for analysis before course waivers or transfers are granted.

A maximum of two courses may be waived or transferred through AP examinations, which 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. Waiver/credit granted for a specific course count toward the satisfaction of any requirement toward which the listed course counts.

AP Exam	Score
Art – History of Art	4
English – Composition	4
English – Creative Writing	4
English – Literature	4
Mathematics – Calculus AB	4
Mathematics – Calculus BC	4
Physics – Physics	4

### **International Baccalaureate (IB)**

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

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

Course & Level	Score
Computer Science – HL	5, 6, 7
English (A1 & A2) – HL	5, 6, 7
Mathematics – HL	5, 6, 7
Philosophy – HL	5, 6, 7
Psychology – HL	5, 6, 7
Social Anthropology – HL	5, 6, 7
Theatre Arts – HL	5, 6, 7

### **College-Level Examination Program (CLEP)**

There are two types of CLEP examinations, General and Subject. DigiPen grants credit for Subject Examinations only. These tests may not be repeated. Examination must be taken prior to the student's completion of a total of 40 hours of college credit.

CLEP offers a number of subject-matter examinations. Students obtaining the percentiles established by the mathematics, computer science, and general education departments will receive credit toward that basic requirement. Students wishing credit in courses other than those listed above should consult the appropriate departmental chair.

Credit or course waivers may be granted for satisfactory attainment on Subject Examinations of the College-Level Examination Program (CLEP) of the College Entrance Examination Board. These tests may be taken at any of a number of test sites, and the responsibility for scheduling such examinations is the student's. Credit will be given only in those areas in which comparable courses are offered at DigiPen. For further details and information concerning test centers and dates, students should check with the College Board at [www.collegeboard.org](http://www.collegeboard.org). Hours granted or courses waived are entered on students' transcripts, but no grades or quality points are awarded. Official results must be sent to the Registrar for analysis before credit or course waivers are granted.

DigiPen Institute of Technology 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.

### **Transfer Credit**

Credit earned by examination at other colleges or universities in the last ten years may be transferred provided such credit meets the guidelines used by DigiPen Institute of Technology.



The Registrar will evaluate college credits earned elsewhere with respect to curricular requirements at DigiPen. Transfer credit is granted for academic classes appearing on official transcripts of post-secondary institutions in which students earn a grade of B or better. Transfer credit is not granted for developmental classes, orientation classes, or for classes in which a student receives a Pass. Current DigiPen students are advised to confer with the Registrar prior to enrolling in course work at other institutions if they intend that the credit be applied toward graduation from DigiPen. Class standing of transfer students will be based on the number of credits accepted for transfer. Hours earned and courses waived are entered on transcripts, but no grades or quality points are awarded. Students who wish to have transfer credit applied to their major at DigiPen may be required to take a challenge exam for that course.

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.
2. The course(s) must be comparable in academic quality to DigiPen courses; transfer credit will be denied for courses not meeting this standard. Accordingly, current students are strongly urged to seek transfer approval from their advisor and the Registrar using the form provided for this purpose prior to enrollment in any course for which transfer approval might be sought.
3. Transfer credit will be considered for courses in which the grade of B or better is recorded.
4. Courses transferred to a student's major may also require a validation examination in order to be accepted.
5. Credit or Pass grades will not be accepted for transfer.

If a course is accepted for credit, it will be counted as a transfer credit. No grade points from such transfer courses will be calculated in the DigiPen grade point average. However, grades transferred for courses taken in residence at institutions for which DigiPen has direct, formal institutional exchange agreements are exempt from this policy and will be recorded. Courses transferred in may not be used to substitute improved grades for passing grades earned at DigiPen.

### **Credit Evaluation Forms**

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

### **Transferability of Credits to Other Institutions**

DigiPen will furnish transcripts and other documents necessary for a receiving institution to judge the quality and quantity of a student's work. The Institute advises all prospective students that the work reflected on their transcript may or may not be accepted by a receiving institution. Students should inquire with the specific receiving institution about transferability of Institute credits.

### **Granting Credits for Experience**

At this point the Institute does not grant credits for experience.

## **Standards of Progress**

### **Semester Credit Hour**

The semester credit hour is the basic unit of credit awarded at this institution. The academic value of each course is stated in semester hour credits. As a rule, one semester credit hour of academic credit is given for at least 15 hours of classroom contact hours, or at least 30 hours of supervised laboratory time or at least 30 hours of documented independent study activities, or at least 45 hours of internship or work related experience. In addition, undergraduate students typically will be expected to spend two hours in preparation outside of class for each hour of lecture. Additional outside work may be required for laboratory or studio classes. During the summer session, the student earns semester credit hours for class contact hours that are equivalent to those provided in the fall and spring semesters. Whenever

semester hour is used in this Catalog, it is synonymous with semester credit hour (sch). A classroom contact Hour is 53 minutes in length.

## **Grading System**

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

- A Excellent = 4.0 quality points
- A- Excellent = 3.7 quality points
- B+ Good = 3.3 quality points
- B Good = 3.0 quality points
- B- Good = 2.7 quality points
- C+ Fair = 2.3 quality points
- C Fair = 2.0 quality points
- C- Fair = 1.7 quality points
- D Poor = 1.0 quality points lowest passing grade, failing grade for major
- F Failure = 0 quality points
- FN Failure for Never Attending = 0 quality points
- FS Failure for Stopping Attendance = 0 quality points

### **Grade A**

A distinguished grade for superior work:

1. You mastered the content and objectives of the course, can apply what you learned to new situations, and can relate it to other knowledge.
2. You consistently distinguish yourself in examinations, reports, projects, class participation, and laboratory or training situations.
3. You show independent thinking in assignments and class discussion.
4. Your work is consistently in proper form, shows satisfactory evidence of careful research (where required), and is submitted punctually.
5. Where achievement in the course involves development of analytical skills, you consistently demonstrate superior skills, ability, and performance.
6. You complied with the instructor's attendance requirements.

### **Grade B**

A better-than-acceptable grade:

1. You consistently show mastery of the course content and objectives and usually apply what you learned to new situations or related it to other knowledge.
2. Your work is in proper form, shows satisfactory evidence of research (where required), and is submitted punctually.
3. Where achievement in the course involves development of analytical skills, you consistently demonstrate above average skills, ability, and performance.
4. You complied with the instructor's attendance requirements.

### **Grade C**

An acceptable grade permitting progress forward in course sequence:

1. You show evidence of a reasonable comprehension of the subject matter of the course and have an average mastery of the content sufficient to indicate success in the next course in the same field.
2. You consistently make average scores in examinations, reports, projects, class participation, and laboratory or training situations.
3. You complete your assignments in good form and on time.
4. Where achievement in the course involves development of analytical skills, you consistently demonstrate average skills, ability, and performance.
5. You complied with the instructor's attendance requirements.

### **Grade D**

A less-than-acceptable, passing grade; failing grade for core courses in your major:

1. You fall below the average in examinations, projects, reports, class participation, and laboratory or training situations, but show some competence in the assigned subject matter of the course.
2. The competence demonstrated is insufficient to indicate success in the next course in the subject field.
3. Assignments are completed in imperfect form, are sometimes late, or of inconsistent quality.
4. Where achievement in the course involves development of analytical skills, you consistently demonstrate below-average skills, ability, and performance.
5. You complied with the instructor's attendance requirements.

### **Grade F**

A failing grade:

1. With respect to examinations, projects, reports, class participation, and laboratory or training situations, you fail to perform at the D grade level.
2. You show little or no competence in the assigned subject matter of the course.
3. Where achievement in the course involves development of analytical skill, you fail to perform at the D or above grade level.
4. You did not comply with the instructor's attendance requirements.

### **Grade FN – Failure for Never Attending**

Given when a student has officially registered but never attended and never dropped.

### **FS – Failure for Stopping Attendance**

Given when a student stops attending but never officially drops a course.

The following grades do not affect the GPA:

### **AU – Audit**

Indicates course was attended without expectation of credit or grade.

### **I – Incomplete**

The Incomplete is intended for use when circumstances **beyond a student's control** prohibit taking the final exam or completing course work. The Incomplete is not intended as a mechanism for allowing a student to retake a course. A student who has fallen substantially behind and needs to repeat a course can drop the course prior to the end of the eighth week of classes. Otherwise, the instructor should assign the appropriate final grade (D or F, for example).

An Incomplete may not be used simply to allow a bit more time for an undergraduate student who has fallen behind for no good reason. An I may be granted only to students who have a legitimate excuse. Examples of unacceptable reasons for approving an Incomplete include 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, and the like.

The I indicates one of the following two circumstances:

1. Some work remains to be completed to gain academic credit for the course. An I is assigned in the first instance at the discretion of the instructor. This assignment shall not be automatic but shall be based upon an evaluation of the student's work completed up to that point and an assessment of the student's ability to complete course requirements within the allowed time limit. Work to remove an I must be performed within the 12 months following the last day of the semester in which the I is incurred or earlier if the instructor so requires. When such work is completed, the instructor will assign a final grade for the course. Should the work not be completed within the agreed-upon time frame, the instructor will assign a final grade of "F".
2. When work is not completed because of documented illness or other "emergency" occurring after the eighth week of the semester.

**Registrar's Note:** An "emergency" is formally defined as a situation or event which could not be foreseen and which is beyond the student's control, preventing the student from taking the final examination or completing other work during the final examination period. Also note that as previously defined, a student may not request an I before the end of the eighth week; the rationale is that the student still has the option to drop the course until the end of the eighth week. The grade I exists so there is some remedy for illness or emergencies that occur **after** the drop deadline.

Arrangements for the grade of I and its completion must be initiated by the student and agreed to by the instructor prior to the final examination. 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 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 deadline for completing the course.

When the student completes the course, the instructor will submit a change of grade to the Registrar's Office. These procedures cannot be used to repeat a course for a different grade. An I grade should 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.

#### **S – Satisfactory**

Given only in non-credit courses.

#### **U – Unsatisfactory**

Given only in non-credit courses.

#### **P – Pass**

Given for internship courses and to students who successfully challenge classes for credit or waiver.

### **Grade Reports**

Reports of the final grade in each subject will be mailed to the student soon after the close of each semester. However, grade reports are withheld from students who have delinquent accounts with the Administration Office, 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 student's grade.

The quality point value for each grade earned during a semester is multiplied by the number of credit hours assigned to that course as listed elsewhere in this catalog. The sum of these points is the total number of quality points earned during the semester. This sum is divided by the number of credit hours attempted (hours from courses with grades of A through FS) to obtain the GPA.

The cumulative GPA is obtained by calculating the GPA for all courses attempted at DigiPen. Course grades of AU, I, W, S, U, and P are non-punitive grades. 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)
MAT100	4	A-	14.8 (4 x 3.7)
CS 105	3	B	9.0 (3 x 3.0)
ENG110	3	D	3.0 (3 x 1.0)
CS 120	3	B+	9.9 (3 x 3.3)
TOTALS	16		48.7

Total grade points divided by total credits equals the cumulative grade point average. Therefore, the grade point average for the above example is 48.7 divided by 16 for a 3.04 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 FS) 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 the major 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" outline. The Registrar makes decisions on student status.

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

### Undergraduate Students

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

Milestone	Minimum GPA Requirement
<b>At the end of the first semester</b>	1.0 or better cumulative GPA
<b>25% of program</b> (38.5 attempted credits for B.S., 20 attempted credits for A.S. and A.A.A., 36 attempted credits for B.F.A.)	1.5 or better cumulative GPA
<b>50% of program</b> (77 attempted credits B.S., 40 attempted credits for A.S. and A.A.A., 72 attempted credits for B.F.A.)	2.0 or better cumulative GPA
<b>100% of program</b> (154 attempted credits B.S., 80 attempted credits for A.S. and A.A.A., 144 attempted credits for B.F.A.)	2.0 or better cumulative GPA

\*An attempted credit is defined as any credit that is awarded a final letter grade (A to FS). Credits earning a W or I are not considered attempted credits.

Appeals involving extenuating circumstances may be addressed to the Dean of Faculty for resolution by an appropriate faculty committee.

### Passing Classes and Graduation

In addition to the pre-requisites set forth in the Catalog, Associate of Arts students must successfully complete all 100 level PRJ courses in order to proceed to any 200 level courses. All students must have a cumulative GPA of at least 2.0 to graduate.

## **Graduate Students**

During the course of study, graduate students may not receive more than three C grades and must have an overall 3.0 GPA to graduate.

## **Academic Probation**

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

### ***Failing to Meet Minimum GPA Requirement***

Students who fail to maintain the required minimum cumulative GPA will be placed on Academic Probation the semester following the one where their cumulative GPA falls below the minimum required. A student is removed from Academic Probation as soon as their cumulative GPA is above the minimum required grade point average.

While on Academic Probation, a student will be restricted to a maximum course load of 15 credits of which 50% must be core courses as defined in the course catalog. Probationary students must achieve a GPA of 2.0 or higher during their probationary semester. Failure to satisfy these requirements will result in academic expulsion and the student must wait 12 months before they can reapply for admission.

Students who earn a 2.0 during their probationary semester but do not raise their cumulative GPA above the minimum requirement will continue Academic Probation until their cumulative average meets the minimum requirement.

Students with a cumulative GPA of 0.5 or lower are not eligible for Academic Probation 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 re-apply for admission after they have served one year on suspension.

### ***Failing to Complete Program Within the Maximum Timeframe***

Students who fail to complete their degree program within the maximum time frame, as defined under the satisfactory progress policy, will be placed on academic probation to direct them towards completion. Working with their academic advisor, these students will develop a program completion plan that outlines the quickest path to completion. These students will be held to the same conditions of probation as outlined above, with the exception that the maximum credit load per semester is waived.

## **Grade Changes**

The faculty person who administered the grade makes 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 go to the department chair responsible for the course then to the Dean of Faculty.

## **Repeating Courses**

A student may repeat any course in which he or she has not received a passing grade (an A to C- in a core course, an A to D in a non-core course), as long as the student is in good standing with the school and eligible to continue his or her studies.

All grades and attempted classes remain on the student's transcript and are calculated in the student's GPA. Courses in which a student has earned a passing grade may be repeated as audit courses only.

## **Withdrawing from School and the W Grade**

To formally withdraw from classes, the student should submit a written withdrawal notice to the attention of the Admissions office. Withdrawal notice forms may be obtained at the Administration Office. Students below the legal age must have a parent or guardian submit the withdrawal notice.

A student may withdraw from the Institute before the end of the eighth week of instruction of a semester:

1. If a student withdraws before the end of the third week of instruction, no course entries will appear on the student's transcript for that quarter.
2. If a student withdraws after the end of the third week of instruction and before the end of the eighth week of instruction, the registrar will assign a final grade of W to the student for each course in which the student was enrolled at the beginning of the fourth week of instruction.
3. Each student will receive a final grade for each course in which the student was enrolled at the end of the eighth week of instruction of the semester.

## Dean's Honor List Requirements

The Dean's Honor List, prepared at the end of the fall and spring semester, officially recognizes and commends students whose grades for the semester 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.
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 Required:
  - a. 12 credits – 3.65 or higher
  - b. 15 or 16 credits – 3.55 or higher
  - c. 17 or more credits – 3.45 or higher
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 relative.

If you believe you fulfilled the criteria indicated above, please stop in at the Registrar's Office to fill out a special form requesting a review of your semester grades. No action can be taken without this form. Assuming you qualify, you will receive a confirming letter. If you did not qualify, you will be informed of this fact with the reason(s) indicated.

## Grievance and Appeal Process

### *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, the student may file an appeal with the Head of the Department. If the resultant solution is still unsatisfactory, then the student may file an appeal with the Dean of the Institute.

Students may appeal grades and review exams no later than two weeks after transcripts are issued.

The Administration reserves the right to destroy any examination papers after the two-week appeal period. However, academic records will be kept indefinitely.

### *Appeal for Refund of Tuition*

Students who would like to file an appeal against a decision regarding their tuition refund shall file a **written request** to the Registrar. If dissatisfied with the decision of the Registrar, the student may file a

second appeal with the Chief Operating Officer. If still unsatisfied with the decision, he or she may appeal to the Executive Director of the Higher Education Coordinating Board of the State of Washington at:

**Higher Education Coordinating Board of the State of Washington  
P.O. Box 43430  
Olympia, WA 98504-3430**

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

**Accrediting Commission of Career Schools and Colleges of Technology  
2101 Wilson Blvd./Suite 302  
Arlington, VA 22201  
(703) 247-4212**

A copy of the Commission's Complaint Form is available at the school and may be obtained by contacting Meighan Shoesmith, Sr. Vice President, Administration.

### **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 without explanation for a period of two weeks or more are considered to have withdrawn as of their last date of attendance.

### **Exams**

All students are required to be in attendance at the times scheduled by DigiPen for final exams. Instructors are not required to make arrangements for individuals to write 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 failure 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 medical reasons accompanied by a doctor's note will be considered acceptable reasons for missing exams. Exam retakes shall be allowed at the sole discretion of the Registrar and Department Chair.

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 instructors. In all cases, the retakes shall be administered no later than one week after the original, missed exam.

### **Leaves**

The Registrar must approve leaves or absences between one week and 180 days. A leave of absence may not exceed 180 days within any 12-month period. A leave of absence must be requested in writing four weeks prior to the start date of the leave. In the case of catastrophic situations, the Institute must be notified as soon as possible. Leaves without approval may result in the termination of student status.



In all cases, it is the student's responsibility to make up missed work. Extensive leaves may result in repeating an entire semester, for which the student will be charged full tuition.

## Student Internship Guidelines

The student internship at DigiPen Institute of Technology is a carefully monitored work or service experience in which the student establishes intentional learning goals and reflects actively on what he or she learns throughout the experience. 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.

The goals for the internship may include:

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

As a rule, one semester credit hour of academic credit is awarded for 45 hours of internship/work experience. Typically, a five (5) credit internship taken over during the Fall, Spring or Summer semester means 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. RTIS students may not register for more than ten (10) Internship credits). Internships can be part-time or full-time, paid or unpaid, and because they are part of the student's educational program, they are monitored and evaluated for academic credit. The important element that distinguishes an internship from a short-term job or community service are the intentional learning objectives that the intern brings to the experience.

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

## Change of Major and Graduation

### Graduation Requirements

Degrees and certificates will be granted during the semester in which the final requirements are completed. For example, if you receive an I in a course required for graduation in your final semester, you will not graduate until the semester in which the I is replaced by a letter grade. During that semester, you must reapply for graduation.

A program of study must be completed within a reasonable period of time to be eligible for graduation; the credit hours attempted cannot exceed 1.5 times the credit hours required to complete the program. Full-time students who do not complete their studies during this maximum time frame will be placed on academic probation and will have to complete their program requirements under the conditions of their academic probation.

A student may apply to change their major by completing the appropriate Change of Major forms. Students applying to change majors are subject to the admission requirements of the new program. The Office of the Registrar reserves the right to review each request on a case-by-case basis.

### Applying for Graduation

The Institute sets minimum requirements for all students seeking undergraduate degrees. **The Institute reserves the right to change graduation requirements at any time. Every degree candidate is**

**expected to comply with changes in requirements as they relate to the uncompleted portion of coursework.**

Most students will follow the graduation requirements published in the catalog for the year they enter 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 the bachelor's 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 questions resolved prior to registration for their final term at DigiPen.

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.

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.

### **Graduation Application Process**

1. The student completes **the Graduation Application** and submits the \$75.00 graduation fee by the following deadlines:

<b>Graduation Date</b>	<b>Graduation Application Due Date</b>
April	December 1 <sup>st</sup>
July	April 1 <sup>st</sup>
December	April 1 <sup>st</sup>

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** s/he 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 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 Services**

### **Open House**

DigiPen offers a weekly open house to the general public free of charge. Any person interested in finding out more about the offered programs is welcome to attend an information session held at the Institute.

Currently, the information session is held every Friday at 4:00 P.M., excluding holidays. Students who are accepted are required to attend an official orientation session prior to the start of the program.

## **Student Advising**

DigiPen uses a faculty-advisor model where each full-time faculty member is assigned a number of students. Advising is part of each full-time faculty member's job description. Students meet with their advisor during new student orientation and are encouraged to meet with their advisors at any time during their education. Advisors are instructed to follow-up with advisees once a semester especially during class registration time. Students are required to seek advisor approval for academic status changes such as changing majors or applying for graduation.

## **Placement Assistance**

Student services, faculty in the Game Production and Design and Art departments work together to establish relationships with various prospective employers on an on-going basis. Student services offers resume and job-hunting workshops to supplement career education found in the curriculum. The school has a career bulletin board and uses an e-mail mailing list to post job postings. Advice on career options is available for enrolled students. 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. Employment upon graduation is not guaranteed.

The Institute also hosts an annual career day that attracts employers from around the country to our campus to review student portfolios and conduct interviews. DigiPen also attends industry events such as the Game Developer's conference to promote our program and its students. Placement assistance continues beyond graduation as these services are extended to alumni.

## **Special Needs**

DigiPen Institute of Technology strives to ensure that all students are provided with an equal opportunity to participate in the college's programs, courses and activities. Students requiring special assistance must self-identify to the Student Services Director and provide current documentation supporting their disability. Students must assist in identifying the proper accommodations and negotiate these accommodations at the beginning of each semester. As outlined by the American with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, DigiPen will provide reasonable accommodations and academic adjustments as long as provisions do not fundamentally alter the nature of the program or the academic requirements that are considered essential to the program of study.

## **Housing**

DigiPen does not offer student housing but we do maintain a housing referral and a roommate referral program for students. The Students Services Director administers these programs with help from the Admissions department. The roommate referral program is an online program for students, giving them an opportunity to 'meet' one another online and find a compatible roommate before the beginning of the classes in the Fall. Many students reside in apartment units that are within walking distance to DigiPen.

## **Meal Plan**

DigiPen contracts with a local catering company that operates the 3D Café, offering students the choice of a prepaid meal plan or a-la-carte cafeteria-style service. The 3D Café offers lunch and dinner during the Fall and Winter semesters and offers lunch during the summer semester, depending on demand.

## **Lockers**

The Institute provides lockers free of charge for voluntary student use. A deposit of \$5.00 is required when a locker is requested. The Institute will provide combination locks to be used with the lockers, and a copy of the combination code will be kept with the Administration. The \$5.00 deposit will be returned when the student returns the combination lock in good and working condition.

The Institute is not responsible for any loss or damage to the contents placed in the lockers, and the Institute reserves the right to search the contents of the lockers at any time, without prior notification to the student, to ensure that no illegal substances are being brought to the premises and for other reasons deemed appropriate by the Institute.

### **Student Association**

There is a student association elected by the student body. This council consists of two class representatives from each cohort, with an internally elected President, Vice President, Secretary and Treasurer. This association is the formal student voice to the staff and faculty at DigiPen.

### **Counseling Services**

Currently, DigiPen contracts with a licensed counselor to provide brief counseling sessions for students (maximum 3-4 sessions) on school related issues, crisis intervention and interpersonal relationships with other students and staff. Referral to outside community resources for on-going services will also be provided. The counselor also provides workshops and/or courses on Stress Management, Interpersonal Communication, Conflict Resolution, and other human service topics as needed. The counselor also provides individual consultation for faculty/staff on emotional disorders in young adults.

### **Graduate Follow-Up**

A database of all graduates is maintained and 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.

## **Family Educational Rights and Privacy Act (FERPA)**

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

1. The right to inspect and review the student's education records within 45 days of the day the Institute receives a request for access. Students should submit to the Registrar, Dean, or head of the academic department (or appropriate official) written requests that identify the record(s) they wish to inspect. The Institute official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the Institute official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.
2. The right to request the amendment of the student's education records that the student believes is inaccurate. Students may ask the Institute to amend a record that they believe is inaccurate. They should write 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, except to the extent that FERPA authorizes disclosure without consent. 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 in which a student seeks or intends to enroll.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the Institute in compliance with the requirements of FERPA. The name and address of the Office that administers FERPA is:

**Family Policy Compliance Office  
U.S. Department of Education  
400 Maryland Avenue, S.W.  
Washington, DC 20202-4605**

### **Release of Student Directory Information**

The Family Educational Rights and Privacy Act (FERPA) of 1974 protects the privacy of your education records. However, the following information is considered public or directory information and may be released to anyone unless you inform the Office of the Registrar that you do not wish any information released:

1. Name
2. Local telephone number
3. Institute e-mail address
4. Major field of studies
5. Dates of attendance
6. Degrees and awards received
7. Full or part-time enrollment status
8. Educational institutions attended

### **NO to Release of Information**

If you do not wish to authorize directory release and do not want your directory information to appear in any published or electronic Student Directory, you 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 you restricted release of directory information and now wish to change your authorization and allow release, you 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**

The Institute has the right to take whatever disciplinary action deemed to be warranted by a student's misconduct. The specific provisions as to offenses, penalties, and disciplinary procedures, which are set out below, should not be construed as limiting the general authority of the Institute.

### **Offenses**

Misconduct subject to penalty includes, but is not limited to, the following offenses:

1. Bringing in or out of the premises any magnetic media or optical media, diskettes, prints, slides, videos, etc. other than for academic or approved usage. Additionally, it is forbidden to bring in any personal computers or software, as well as any video or audio recording equipment.
2. Possessing food and/or drink that could damage equipment and/or facilities anywhere within the training areas of the premises.
3. Smoking anywhere within the premises, including washrooms, elevators, or stairwells.
4. Students are responsible for keeping their work area clear. All personal belongings brought to the premises must be left in the indicated storage areas. The Institute does not assume any responsibility for any personal belongings brought to the premises.

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. There is a \$25 replacement fee for lost ID tags.
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 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 references to any of the following material/subjects:
  - Religious content
  - Religious symbols
  - Pornographic material
  - Excessive violence
  - Sexual and nude content
  - Promotion of illegal substances
  - Promotion of racism or hate
  - Demeaning to any group or society
7. Plagiarism is a serious form of academic misconduct in which an individual submits or presents the work of another person as his or her own. Possession of source code, artwork, concept, or other material without the explicit permission from the owner is also construed to be plagiarism. When excerpts are used in paragraphs or essays, the author must be acknowledged through footnotes or other accepted practices. Two forms of plagiarism are defined below:
  - Substantial plagiarism exists when the student gives no recognition to the author for phrases, sentences, and ideas incorporated in an essay or other academic presentation submitted for evaluation.
  - Complete plagiarism exists when the student copies and presents as original work an entire essay or other academic presentation composed by another person.Students who are unsure as to what constitutes a case of plagiarism should consult their instructor.
8. Submitting the same essay, presentation, or assignment more than once whether the earlier submission was at this or another Institute, unless prior approval has been obtained.
9. Cheating on an examination or falsifying material subject to academic evaluation. Cheating includes having any materials other than those authorized by the examiners during an exam.
10. Impersonating a candidate at an examination or availing oneself of the results of such impersonation.
11. Submitting false records or information, in writing or orally, or failing to provide relevant information when requested.
12. Falsifying or submitting false documents, transcripts, or any other academic credentials.
13. Disrupting instructional activities, including making it difficult to proceed with scheduled lectures, seminars, examinations, and tests, for example.
14. Evidencing symptoms of alcohol or drug use while on school property, or the procurement or possession of illegal substances on school property.
15. Damaging, removing, or making 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.
16. Using 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.
17. Tampering, moving, defacing, or otherwise altering the premises, equipment, or building property.
18. Defacing, such as graffiti or other forms of mural art, or the posting of signs anywhere in the premises and the building without permission of the Administration.
19. Using office equipment, such as photocopier, fax, or office phone, for student's personal use.
20. Assaulting individuals, 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.
21. Attempting to engage in, or aiding and abetting others to engage in, conduct which would be considered an offense.

22. Downloading or installing software on school equipment without express permission from school authorities.
23. Tampering with the emergency exit doors, any safety devices, or alarm systems. Students are responsible for becoming familiar with the emergency exits on the premises and should not use the elevator in case of fire.
24. Failing to comply with any penalty imposed for misconduct.
25. All students must abide by DigiPen's Computer and Network Usage Policy, which may be amended from time to time.

## **Penalties**

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

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

## **Warning**

1. The penalty for plagiarism or for cheating is normally suspension from the Institute.
2. Charges filed under federal or state legislation or the commencement of civil proceedings do not preclude disciplinary measures taken by the Institute.

## **Procedures**

An alleged instance of student misconduct deemed serious enough for action by the Institute shall be referred to the Student Appeals/Discipline Committee. After an investigation and hearing at which the student is invited to appear, the committee makes its recommendation to the Dean of Faculty. The student then has the opportunity to meet with the Dean of Faculty, if he or she wishes, before a final decision is rendered.

A student suspected or apprehended in the commission of an offense shall be notified, within a reasonable period of time, of intention to report the alleged offense to a department head, Student Services Director, or other appropriate person. The student shall also be given the opportunity to explain the incident and, if he or she requests, to meet with the Student Appeals/Discipline Committee before the alleged offense. The Committee will then make its recommendation to the Dean of Faculty.

## **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 all materials in his or her possession to the Institute relating to the program, whether created by the student, other students, or provided by the Institute.

## **Appeals**

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

Appeal hearings take place before a committee called together by the Chief Operating Officer. A student is entitled to be represented or assisted throughout the appeal process by an advocate who may be a

friend, relative, or legal counsel. The student is entitled to explain the reasons for appealing either orally or in writing, and he or she may call witnesses. The Dean of Faculty is also present and puts forth the reasons for the original decision.

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





# Degree Programs for the Academic Year 2005 / 2006



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# Bachelor of Science in Real-Time Interactive Simulation

## Program Overview

Like the associate's degree, the bachelor's degree in R.T.I.S. focuses on the subject of computer simulation with an emphasis on real-time interactive simulation technologies. It offers extensive training in mathematics and physics as a foundation for the various topics presented in general computer science and computer graphics. The various lectures offered each semester converge towards the creation of a practical project. Each project embodies the theoretical knowledge gained from the courses offered in the previous and current semesters. These projects are game-oriented productions since games are a perfect media to present complicated subjects in a format agreeable to students. The advantages of game-oriented productions are:

- Games are graphics-oriented simulations, including two and three-dimensional based simulations.
- Games can realistically reproduce or simulate natural phenomena and real-life events. Flight simulators are excellent examples of such simulations.
- Games 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.
- Games react in real time. The implementation of such simulations requires a thorough knowledge of computer hardware and computer languages.
- Games 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.
- Games could be designed for either a single or multiple-player environment. The development of a multiple-player game requires the understanding of subjects such as computer networks, TCP/IP, and Internet programming.
- Games 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. These collaborative efforts reinforce student ability to work competently within a group while completing projects.

Graduates of this program will gain the skills required to successfully pursue entry-level careers in the rapidly growing world of computer technologies in general, and computer graphics and simulations in particular. Some of the job titles that graduates of this program may aspire to are Solutions Architect, Compatibility/Playability Tester, Game Analyst, Quality Assurance Engineer, Quality Assurance Supervisor, Computer or Software Programmer, Software Engineer, Game Programmer, Engine and Tools Programmer, Game Graphics Programmer, Artificial Intelligence Programmer, Audio Programmer, Web Programmer, or Software/Lead Tester.

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

## Length

The Bachelor of Science in Real-Time Interactive Simulation consists of 154 credits offered over 8 semesters of 15 weeks each. This program usually takes four academic years to complete.

## **Math Minor**

Students who fulfill a total of 27 credits in MAT courses numbered above (and not equal to) 100 or PHY 300, with a C- or better, will earn a math minor. Of those 27 credits, 6 credits must be completed from MAT courses numbered 300 or higher, and at least 9 credits must be taken at DigiPen Institute of Technology.

## **Recommended Course Sequence**

Listed on the following page is the recommended course sequence for the Bachelor of Science in Real-Time Interactive Simulation. Please note the following:

**Note:** Students must achieve a grade of C- or higher in the Core courses to earn credit toward this degree.

**\*\***Students must receive special permission from the Dean to take more than 18 credits first semester and 22 credits second semester

## Bachelor of Science in Real-Time Interactive Simulation Recommended Sequence of Required Classes (154 credits)

Semester	Course	Course Title	Core	Credits
Semester 1	MAT 100 or 140	Precalc. w/ Linear Algebra & Geometry or Linear Algebra & Geometry	X	4
	CS 100	Computer Environment I	X	3
	CS 120	High Level Programming I – The C Programming Language	X	3
	GAM 100	Project Introduction	X	3
	ENG 110	Composition		3
	ART 210	Art Appreciation		2
			Semester Total	18**
Semester 2	MAT 150	Calculus and Analytic Geometry I	X	4
	CS 105	Computer Environment II	X	3
	CS 170	High Level Programming II – The C++ Programming Language	X	3
	CS 230	Game Implementation Techniques	X	3
	GAM 150	Project I	X	3
	ENG 150	Mythology for Game Designers		3
	SOS 150	Society and Technology		3
			Semester Total	22**
Semester 3	MAT 200	Calculus and Analytic Geometry II	X	4
	CS 200	Computer Graphics I	X	3
	CS 225	Advanced C/C++	X	3
	CS 180	Operating System I, Man-Machine Interface	X	3
	GAM 200	Project II	X	4
	PHY 200	Motion Dynamics	X	3
			Semester Total	20
Semester 4	CS 250	Computer Graphics II	X	3
	CS 260	Computer Networks I	X	3
	MAT 258/358	Discrete Math	X	3
	CS 280	Data Structures	X	3
	GAM 250	Project II	X	4
	MAT 250	Linear Algebra	X	3
	PHY 250	Waves, Optics and Aerodynamics		3
			Semester Total	22
Semester 5	CS 300	Advanced Computer Graphics I	X	3
	CS 315	Low-Level Programming	X	3
	CS 330	Design and Analysis of Algorithms	X	3
	MAT 300	Curves and Surfaces	X	3
	GAT 300	3D Computer Animation Production I		3
	GAM 300	Project III	X	5
			Semester Total	20
Semester 6	One of: MAT 350-359, 361	One Math Elective chosen between MAT 350 – MAT 359, 361 See course descriptions section for titles of individual courses.		3
	CS 350	Advanced Computer Graphics II	X	3
	CS 365	Software Engineering	X	3
	Elective	One CS Elective chosen from CS 245, 370, 380, 381, 400, 460, or PHY 350. See course descriptions section for titles of individual courses.	X	3
	GAM 350	Project III	X	5
	Elective	An elective of your choice in CS, MAT, GENED, or ART		3
			Semester Total	20
Semester 7	Elective	Select one: ANI125, ART400, FLM115, FLM151, FLM275, or ART410		2-3
	ENG Elective	Select one: ENG 240, 241, or 450		2-3
	Elective	One CS Elective chosen from CS 370, 380, 381, 400, 460, or PHY 350 See course descriptions section for titles of individual courses.	X	3
	GAM 400	Project IV	X	5
	Elective	An elective of your choice in CS, MAT, GENED, or ART		3
			Semester Total	15-17
Semester 8	ENG Elective	Select one: ENG 240, 241, or 450		2-3
	Elective	One CS Elective chosen from CS 370, 380, 381, 400, 460, or PHY 350 See course descriptions section for titles of individual courses.	X	3
	CS 420	Graphics File Format	X	3
	GAM 450	Project IV	X	5
	Elective	An elective of your choice in CS, MAT, GENED, or ART		3
			Semester Total	16-17
			<b>Total</b>	<b>154 min.</b>

\*Note: Please see the explanation of Core Courses and the [\*] on the preceding page.

# Bachelor of Science in Computer Engineering

## Program Overview

Millions of desktop and portable computers are produced every year. Less obvious but more widespread are "embedded systems," a term that refers to any device that uses a microprocessor or microcontroller. Examples of embedded systems include TV receivers, TV remote controls, GPS receivers, bar code readers, digital cameras, talking dolls, aircraft flight recorders, entertainment robots, and countless others. Design teams that include mechanical engineers, electrical engineers, and computer engineers produce these devices. The job of the computer engineer is typically to develop the software that produces the functionality, and sometimes even to architect the hardware/software system. The software ranges from fairly simple in the case of a watch or toaster to highly complex in the case of an aircraft autopilot system.

Applications of computer engineering include:

<b>Technology Areas:</b> <ul style="list-style-type: none"><li>• Telecommunications</li><li>• Robotics &amp; Automation</li><li>• Artificial Intelligence</li><li>• Operating Systems</li><li>• Information Systems</li><li>• Signal Processing</li><li>• Control Systems</li><li>• Instrumentation</li><li>• Multimedia</li></ul>	<b>Application Domains:</b> <ul style="list-style-type: none"><li>• Aerospace and Avionics</li><li>• Automotive</li><li>• Consumer Electronics</li><li>• Medical Sciences</li><li>• Internet</li><li>• Entertainment</li><li>• Military</li></ul>
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The U.S. Department of Labor ranks computer software engineering as the fastest growing occupation through 2010 (<http://www.bls.gov/oco/ocos267.htm>). However, Washington State's institutions of higher education do not appear capable of producing sufficient computer engineering graduates to satisfy this demand.

The DigiPen Institute of Technology's Bachelor of Science in Computer Engineering seeks to address the needs of this demanding industry. The R.T.I.S. program has been highly successful due to its emphasis on projects that mirror real-world working conditions. Many of the graduates from the R.T.I.S. program have been placed into companies such as Nintendo Software Technology, Electronic Arts, DreamWorks Interactive, Sony Entertainment, Microsoft, etc. We plan to continue the mix of solid academic fundamentals with hands-on projects for the Bachelor of Science in Computer Engineering. Students who successfully complete the Computer Engineering curriculum will possess the following skills and appropriate samples of professional work:

- A broad foundation in mathematics, physics and computer science. This base allows the student to remain current in the profession as tools and techniques evolve.
- A foundation in electrical engineering that includes the basic principles of circuits with an emphasis on digital electronics, microprocessors, microcontrollers and embedded systems.
- The ability to work in small teams to design, build and test prototype systems typical of those current in the industry. The development of significant projects each year will allow students to translate theoretical concepts into practical applications.
- Strong foundation skills in system design, software engineering, coding and system integration.
- Strong foundational skills in applied technology using industry standard hardware and software. Students will be thoroughly familiar with a range of software and hardware tools typical of those used in industry. 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. They will be able to identify and create work that meets professional quality standards. They will understand production flow and be able to generate and maintain appropriate schedules and production goals for their work. They will understand the stresses of production and methods for positively managing this stress.
- Social perspective and civic accountability relative to the roles that technology plays in our society. Students will explore the long-term ramifications of this industry and be able to intelligently discuss their responsibilities to the betterment of society as a whole.

Computer technology pervades modern society. Those who thoroughly understand it have a wide range of rewarding career options. At DigiPen, the Bachelor of Science in Real-Time Interactive Simulation, the Associate of Applied Arts in 3D Computer Animation, the Bachelor of Fine Arts in Production Animation and the Master of Science in Computer Science are intended for students planning to work in the entertainment industry. The Bachelor of Science in Computer Engineering prepares students for a much wider range of career options, as can be seen in the lists above. Graduates of this program are qualified for entry-level positions as Project Engineers, System Architects, System Analysts, Design Engineers, Software Engineers, and Hardware/software Engineers.

### **Length**

The Bachelor of Science in Computer Engineering consists of 154 credits offered over 8 semesters of 15 weeks each. This program usually takes 4 academic years to complete.

### **Math Minor**

Students who fulfill a total of 27 credits in MAT courses numbered above (and not equal to) 100 or PHY 300, with a C- or better, will earn a math minor. Of those 27 credits, 6 credits must be completed from MAT courses numbered 300 or higher, and at least 9 credits must be taken at DigiPen Institute of Technology.

## Bachelor of Science in Computer Engineering Recommended Sequence of Required Classes (154 credits)

Semester	Course	Course Title	Core	Credits
Semester 1	MAT 100 or MAT 140	Pre-calculus with Linear Algebra and Geometry or Linear Algebra and Geometry	X	4
	CS 100	Computer Environment I	X	3
	CS 120	High Level Programming I – The C Programming Language	X	3
	GAM 100	Project Introduction		3
	ENG 110	Composition		3
	ART 210	Art Appreciation		2
			Semester Total	18
Semester 2	MAT 150	Calculus and Analytic Geometry I	X	4
	CS 105	Computer Environment II	X	3
	CS 170	High Level Programming II – The C++ Programming Language	X	3
	CS 180	Operating System I, Man-Machine Interface	X	3
	GAM 150	Project I		3
	MAT 258/358	Discrete Math	X	3
			Semester Total	19
Semester 3	MAT 200	Calculus and Analytic Geometry II	X	4
	CS 225	Advanced C/C++	X	3
	CS 315	Low Level Programming	X	3
	EE 210	Digital Electronics I	X	4
	EEL 220	Introduction to Robotics	X	3
	PHY 200	Motion Dynamics	X	3
			Semester Total	20
Semester 4	MAT 256	Differential Equations I	X	3
	CS 280	Data Structures	X	3
	EE 200	Electric Circuits	X	3
	EE 260	Digital Electronics II	X	4
	EEL 270	Real-time Operating Systems	X	3
	PHY 270	Electricity and Magnetism	X	3
			Semester Total	19
Semester 5	MAT 225	Calculus and Analytic Geometry III	X	3
	CS 260	Computer Networks I, Interprocess Communication	X	3
	EE 300	Embedded Microcontroller Systems	X	3
	CS 380	Robotic Intelligence	X	3
	Elective	GENED Elective		3
	EEL 310	Project III Hand Held Gaming Device	X	5
			Semester Total	20
Semester 6	MAT 340	Probability and Statistics	X	3
	CS 365	Software Engineering	X	3
	CS 370	Image Processing	X	3
	EE 350	Linear Control Systems	X	3
	ECN 350	Engineering Economics		3
	EEL 360	Project III Hand Held Gaming Device	X	5
			Semester Total	20
Semester 7	EE 400	Motors and Sensors	X	3
	ART 410	Mechanical Drawing		3
	ENG 400	Creative Writing and Game Design		3
	EEL 410	Project IV Robots	X	5
	Elective	GENED Elective		3
			Semester Total	17
Semester 8	ENG 450	Elements of Media and Game Development		2
	EEL 460	Project IV Robots	X	5
	SOS 150	Social and Cultural Perspectives on Technology		3
	Electives	GENED Electives to total at least 5 credits		5
	Elective	An elective of your choice in CS, MAT, or PHY	X	3
			Semester Total	18
			<b>Total</b>	<b>154</b>

**Note:** Students must achieve a grade of C- or higher in the Core courses to earn credit toward this degree. \*\*Students must receive special permission from the Dean to take more than 18 credits first semester and 22 credits second semester

# Associate of Applied Arts in 3D Computer Animation

## Program Overview

As the 3D computer animation industry matures, companies increasingly seek employees with skills beyond simply a working knowledge of a specific commercial 3D software package. More than ever, employers need computer animators who have strong content creation skills. Studios like to see strong traditional art skills in addition to an understanding of fundamental animation principles. If they wish to be successful, animators must also have a good grasp of story development, character design, storyboarding, lighting, camera composition, and sound design. Graduates receiving the associate degree can anticipate eligibility for entry-level jobs as 3D artists in various industries, including game development, electronic media, and graphic design. Some of the job titles that graduates of this program can aspire to are beginning Storyboard Artist, Texture Artist, Character Animator, 3D Lighting and Camera Designer, Props and Environment Modeler, 3D Broadcast Graphics Modeler and Animator, Level Designer, Effects Animator, or Character Rigger.

DigiPen's Associate of Applied Arts Degree in 3D Computer Animation seeks to achieve the following:

- To provide students with the necessary practical skills using industry-standard, computer hardware and software.
- To educate students about creative content issues to ensure they have the ability to maximize the fullest potential of this digital medium.
- To help students develop a strong work ethic needed by successful production artists including the ability to work with others and to complete the work by the deadline.
- To allow students to express themselves artistically while ensuring that student portfolio work is marketable to industry companies.
- To implement a production oriented environment that will allow students to produce a high quality portfolio.

The intensive theory courses will be reinforced through multiple production cycles whereby students will be expected to complete several animation productions.

## Length

The Associate of Applied Arts in 3D Computer Animation consists of 80 credits offered over 4 semesters of 15 weeks each. This course usually takes two academic years to complete.

**Associate of Applied Arts in 3D Computer Animation  
Recommended Sequence of Required Classes (80 Credits)**

Semester	Course	Course Title	Core	Credits
Semester 1	ANI 101	Introduction to Animation – Theories and Techniques	X	3
	ART 101	The Language of Drawing	X	3
	ART 115	Art and Technology	X	4
	CG 105	Introduction to 3D Graphics	X	3
	ENG 116	Storytelling	X	3
	PRJ 105	Introduction to 3D Production	X	4
		<b>Semester Total</b>		<b>20</b>
Semester 2	ANI 151	Advanced Animation – Theories and Techniques II	X	3
	ART 155	Basic Life Drawing and Anatomy	X	3
	CG 275	3D Character Animation	X	3
	FLM 151	Visual Language and Film Analysis	X	3
	FLM 275	Sound Design and Foley	X	3
	PRJ 155	Personal 3D Production	X	5
		<b>Semester Total</b>		<b>20</b>
Semester 3	ART 205	Character and Environment Design	X	3
	ART 225	Dimensional Design and Sculpture	X	3
	CG 300	3D Environment and Level Design	X	3
	ENG 316	Story Through Dialogue	X	3
	FLM 201	Cinematography	X	3
	PRJ 205	Team Projects	X	5
		<b>Semester Total</b>		<b>20</b>
Semester 4	ANI 125	Acting for Animation	X	3
	ART 125	Tone, Color, and Composition	X	3
	ART 255	A.A.A. Portfolio	X	3
	CG 350	3D Graphics for Gaming	X	3
	FLM 250	Post-Production	X	3
	PRJ 255	Final Projects	X	5
		<b>Semester Total</b>		<b>20</b>
			<b>Total</b>	<b>80</b>

**Note:** Students must achieve a grade of C- or higher in the Core courses to earn credit toward this degree.

# Bachelor of Fine Arts in Production Animation

## Program Overview

As the animation industry matures, 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 animation skills. Industry-quality standards continue to rise, and competition for entry-level positions demands that animators possess sophisticated skill sets before they can even begin their careers. Studios seek animators 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. Simply possessing credentials is irrelevant.

For all of these restrictions, animation remains a very viable career opportunity. 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 animation education.

The broad scope of these demands presents a series of significant academic challenges. Most current animation 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 they are able to provide. Consequently aspiring animators must acquire this foundation while they are also trying to establish their professional focus. The complexity of the individual components of this field demand highly structured curricula and programmed sequencing simply to enable most students to be successful. Some students are capable of the rapid assimilation of the integrated knowledge the studios now require, but most are better served by a deeper and more sequential approach to the material.

DigiPen Institute of Technology's B.F.A. in Production Animation seeks to address these needs. Students who successfully complete this curriculum will possess the following skills and appropriate samples of professional work:

- A broad foundation of production experiences in both 2D and 3D animation. This base allows the student to gain an overview of the profession and provides long-term adaptability.
- An area of production specialization and focus. This enables the student to target a specific sector of the industry upon graduation. A thesis portfolio will support this focus.
- Strong foundational skills and a thorough grounding in applied drawing. This will include an understanding of how to maintain and continually enhance the student's drawing skill throughout his or her career, in addition to building the habits to sustain this growth.
- Strong foundational skills in storytelling. This includes visual storytelling, literary traditions, story through dialogue, 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. Finally, they will understand the stresses of production and methods for positively managing this stress.
- Social perspective and civic accountability relative to the roles that animation plays in our 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.

Some of the careers for which graduates of the B.F.A. in Production Animation are trained include Props and Environment Modelers, Texture Artists, Level Designers, Character Modelers, Character Riggers, Character Animators, 3D Lighting and Camera Design, Effects Animator, Conceptual Illustration and Character Design, or Storyboard Artists.

### **Length**

The Bachelor of Fine Arts in Production Animation consists of 144 credits offered over 8 semesters of 15 weeks each. This course usually takes four academic years to complete.

**Bachelor of Fine Arts in Production Animation**  
**Recommended Sequence of Required Classes (144 credits)**

Semester	Course	Course Title	Core	Credits
Semester 1	ANI 101	Introduction to Animation – Theories and Techniques	X	3
	ART 101	The Language of Drawing	X	3
	ART 115	Art and Technology		4
	BIO 100	Visual Perception	X	3
	ENG 116	Storytelling	X	4
	FLM 115	History of Film and Animation		3
		Semester Total		20
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		18
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 Sprite Animation Production	X	5
		Semester Total		17
Semester 4	ART 225	3D Design and Sculpture	X	3
	ART 251	Character Design	X	3
	CG 251	2D Vector Graphics and Animation	X	3
	CG 275	3D Character Animation	X	3
	PRJ 251	2D Vector Animation Production	X	5
		Semester Total		17
Semester 5	ANI 300	Acting Through an Interface	X	3
	ART 300	Perspective, Backgrounds, and Layouts	X	3
	CG 300	3D Environment and Level Design	X	3
	FLM 201	Cinematography	X	3
	PHY 115	Introduction to Applied Math and Physics		3
	PRJ 300	Limited Scope 3D Animation Production	X	5
		Semester Total		20
Semester 6	ANI 350	Voice Acting for Animation	X	3
	ART 350	Storyboards	X	3
	CG 350	3D Graphics for Gaming		3
	ENG 315	Story Through Dialogue	X	4
	PRJ 350/INT 500	Applied 3D Animation Production Problems/Internship	X	5
		Semester Total		18
Semester 7	ART 401	Conceptual Illustration and Visual Development		3
	FLM 250	Digital Post-Production	X	3
	FLM 275	Sound Design and Foley		3
	SOS 115	Media and Ethics: A Social Science Perspective	X	3
	PRJ 400/ INT 501	Team Projects/Internship	X	5
		Semester Total		17
Semester 8	ANI 400	Cinematic Animation	X	3
	ART 450	Portfolio	X	3
	CS 115	Introduction To Scripting and Programming	X	3
	LAW 115	Introduction to Intellectual Property and Contracts		3
	PRJ 450/ INT 502	Final Projects/Internship	X	5
		Semester Total		17
		<b>Total</b>		<b>144</b>

**Note:** Students must achieve a grade of C- or higher in the Core courses to earn credit toward this degree.

## Which DigiPen Animation Degree Is Right for Me

DigiPen Institute of Technology currently offers two degrees in the field of animation: an **Associate of Applied Arts (A.A.A.) in 3D Computer Animation** and a **Bachelor of Fine Arts (B.F.A.) in Production Animation**. The two degrees do share some coursework, faculty, and facilities. The degrees also have identical application packet requirements. However, the degrees have very different educational scopes and admission evaluation criteria. Unlike DigiPen's real-time interactive simulation (RTIS) degrees, the A.A.A. degree is not the first two years of the B.F.A. curriculum.

The **A.A.A. in 3D Computer Animation** is an extremely intensive, accelerated two-year study. The curriculum specifically addresses the unique needs of 3D computer animation for today's commercial production environments. Entrance into this program is highly competitive and highly restricted – only serious amateur artists with significant traditional skills should consider applying for this program. Typical applicants for this program have often already completed college level training in art, and many already have college degrees in art and/or professional experience. Previous degrees in art, however, are not a guarantee that an applicant's skill level is sufficient for admission into this program. This A.A.A. degree is best suited for a trained artist looking to supplement his or her existing foundations with animation-specific training. A typical student workload in the A.A.A. program is a minimum of 72-80 hours/week between homework and classroom instruction.

The **B.F.A. in Production Animation** is an intensive four-year study into the aspects of modern production animation. It covers a broader and deeper cross-section of the animation industry than the A.A.A. degree, including education in 2D computer animation and animation pre-production art in addition to 3D computer animation. It also allows for a sequential acquisition of skills and knowledge that will benefit many students. Entrance into this program is competitive and restricted, but does not have the same minimum standards as the A.A.A. degree. Applicants for the B.F.A. in production animation should have a strong foundation in art and a sincere willingness to work. Recent graduates from high school are strongly encouraged to consider the B.F.A. program if they are considering DigiPen Institute of Technology. This degree is best suited for any serious amateur artist wishing to prepare for a lifelong career as a commercial animator or animation artist. A typical student workload in the B.F.A. program is a minimum of 55-60 hours/week between homework and classroom instruction.

Please note that due to the intensity and integrated scope of the Institute's animation curricula, college transfer credits are highly restricted. No transfer credits are accepted for DigiPen drawing or projects classes from any student regardless of his or her educational or professional background.



# Master of Science in Computer Science

## Program Overview

The interactive real-time simulation software and video game industry is currently worth about 35 billion US dollars worldwide, according to [www.idsa.com](http://www.idsa.com). The number of people involved in different game activities (game console, personal computer, hand-held, on-line, wireless devices, etc.) is expected to thrive. The trend is conservatively estimated to be growing at the rate of 10% per year. The 3D computer graphics technology continues to drive innovations and new game titles as well. It is an exciting and dynamic industry and an active research field that is still young, offering tremendous opportunities to talented people.

Gaming companies increasingly demand programmers or leading engineers with an in-depth comprehension and a solid background in mathematics, physics, and 3D computer graphics. On the other hand, many developers currently working in the field have been seeking postgraduate education to update their knowledge, sharpen their professional skills, or advance in the industry. The curriculum taught in many colleges and universities, however, lacks a focus on implementation of these exclusive objectives. Both companies and individuals consequently feel that a four-year program with a bachelor degree is evidently inadequate and often limits them from advancing professionally. More extensive training at a postgraduate level is needed.

DigiPen Institute of Technology has awarded the Bachelor of Science in R.T.I.S. since 2000. This degree provides both academic and practical training for programming computer games. It has been highly successful, and DigiPen was named the top school in the world for game-degree programs by *Electronic Gaming Monthly Magazine* (Dec. 2002). The Institute is now pleased to award a Master of Science Degree in Computer Science. The new program will specialize in real-time interactive simulation and is designed to attract talented students who have recently graduated from a bachelor degree program in computer science or have game industry experience. The program offers extended education in areas of 3D computer graphics, animation and modeling techniques, artificial intelligence algorithms, image processing, and real-time rendering, combined with related training in computer science, mathematics, and physics.

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

- In-depth foundation in mathematics and physics, such as implicit curves and surfaces, theory and applications of quaternions, differential geometry, computational geometry, wavelets, graph theory, advanced numerical analysis, and finite elements.
- Advanced knowledge in 3D computer graphics, including advanced animation and modeling algorithms (interpolation, rigid body, deformable object, inverse kinematics, natural phenomena facial, motion blending and capture, etc.), advanced rendering techniques (level of details, implicit surfaces, pipeline optimization, advanced intersection and collision detection, etc.), artificial intelligence, game engine design, physically-based modeling algorithms, ray tracing, and radiosity.
- Solid hands-on experience on game projects, including advanced game (single or multi-player) design, documentation, project management, marketing, networking, distributed systems, streaming media testing, and working with external contractors.
- Strong capability of academic research in the area of 3D computer graphics, including virtual reality, illumination and shading algorithms, animation techniques, surface representation and rendering, volume visualization and morphing algorithms, geometry, and modeling.

Computer technology pervades modern society. Those who thoroughly comprehend it have a wide range of rewarding career options. This graduate degree program prepares students specifically for advanced career choices.

## Length

The Master of Science in Computer Science consists of 30 credits offered over 2 semesters of 15 weeks each. This program usually takes one academic year to complete but must be completed within three years.

### Master of Science in Computer Science Course Requirements (30 credits)

Course Distribution	Course	Course Title	Credits
Computer Science	CS 510	Advanced Rendering Techniques	
	CS 560	Advanced Animation Algorithms I	
		Total	6
Mathematics (Select One)	MAT 351/551	Quaternions, Interpolation and Animation	
	MAT 354/554	Computational Geometry	
	MAT 357/557	Numerical Analysis	
		Total	3
Project	GAM 550	Game Project I	
	GAM 551	Game Project II	
		Total	6
Electives (Select Three; at least two must be in CS)	CS 500	Ray Tracing	
	CS 520	Reasoning Under Uncertainty	
	CS 530	Advanced Game Engine Design	
	CS 561	Advanced Animation and Modeling II	
	CS 599	Special Topics	
	PHY 350/500	Advanced Physically-based Modeling	
	MAT 350/550	Curves and Surfaces II	
	MAT 351/551	Quaternions, Interpolation and Animation	
	MAT 352/552	Wavelets	
	MAT 353/553	Differential Geometry	
	MAT 354/554	Discrete and Computational Geometry	
	MAT 355/555	Graph Theory	
	MAT 357/557	Numerical Analysis	
		Total	9
Thesis	CS 600	Thesis	
		Total	6
		<b>Total Credit Hours</b>	<b>30</b>

**Note:** During the course of study, graduate students may not receive more than three C grades and must have an overall 3.0 GPA to graduate.



Course Descriptions for the  
Academic Year  
2005 / 2006



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# Department of Art

## Animation

### **ANI 101 Introduction to Animation – Theories and Techniques (3 Cr.)**

**Prerequisites:** None

**Description:** This course introduces students to the principles of animation through classical animation techniques. Students will explore the art of creating convincing movement through good timing, spacing, and drawing. Works of master animators will be 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.)**

**Prerequisites:** None

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

### **ANI 151 Advanced Animation – Theories and Techniques II (3 Cr.)**

**Prerequisite:** ANI 101

**Description:** In ANI 151 students will continue to explore and exercise the concepts and techniques of classical animation through a series of assignments. The exercises in this course will be considerably more demanding than those completed in ANI 101 as they will be longer and will require more refinement, subtlety, and creativity. There will also be a greater emphasis on character development – the expression of personality, mood, thought, and attitude through motion and posing.

### **ANI 200 Acting Through a Surrogate (3 Cr.)**

**Prerequisites:** ANI 125, ANI 151, ART 225, CG 275

**Description:** An animator’s ability to express attitude, thought, and emotion through a surrogate is a fundamental skill of animation. This course builds upon the earlier acting curriculum and introduces the traditions of puppetry and marionettes. Stop motion animation techniques are explored next. Finally, students will extrapolate their knowledge to 3D biped animation and 2D character animation problems.

### **ANI 250 Voice Acting for Animation (3 Cr.)**

**Prerequisite:** ANI 200

**Concurrent Course:** ENG 215

**Description:** This course explores the nature of acting through the medium of the human voice. Narration, expressive reading, diction, and vocal refinement will all be considered. Students will be introduced 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 300 Cinematic Animation (3 Cr.)**

**Prerequisites:** ANI 250, ART 401, FLM 275

**Description:** This course is a culmination of the student’s ability to use animation as a storytelling medium. It is also an opportunity for the student to demonstrate his or her personal artistic

growth. Each student will work to complete a short piece of cinematic animation. Working either independently or in small groups with the instructor's approval, students may use either 2D or 3D tools.

## Art

### **ART 101 The Language of Drawing (3 Cr.)**

**Prerequisites:** None

**Description:** 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 will be given special consideration. Students will be introduced to basic professional habits in drawing practice, drill, and play. Design principles, basic research, and the design process will be 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 115 Art and Technology (4 Cr.)**

**Prerequisites:** None

**Description:** 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 will be examined and students will 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:** ART 101

**Description:** This course continues to build upon students' abilities to draw by exploring the nature and use of tone, color, and composition in drawing. Methods of creating tone, using luminance as an organizational element, and critical thinking will be emphasized. Students will be introduced 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 will then explore the artistic use of color. Systems and traditions of organizing hue and saturation will be covered, and methods of building from tonal preliminary studies will be examined. Classical forms of compositional organization such as symmetry, asymmetry, golden mean, and figure-ground relationships will also be explored.

### **ART 151 Basic Life Drawing (3 Cr.)**

**Prerequisite:** ART 101

**Description:** This course introduces students to the challenges of drawing the human form for animation. Life drawing for animation will be examined in addition to methods for attaining these goals. Special emphasis will be given to capturing skeletal structure, muscle form, emotion, and gesture. Using clothed and nude models of both genders, students will learn to apply lessons in anatomy to the figure, significantly expanding their understanding of human kinetics and structure. Students will also be shown how to extrapolate basic human life drawing strategies to other animals.

### **ART 155 Basic Life Drawing and Anatomy (3 Cr.)**

**Prerequisite:** ART 101

**Description:** This course introduces students to the challenges of drawing the human form for animation. The goals of life drawing for animation will be examined, and then methods for attaining these goals will be demonstrated. Students will study human skeletal and muscular anatomy and learn to apply this knowledge to drawing. Special emphasis will be given to capturing skeletal structure, muscle form, emotion, and gesture. Using clothed and nude models of both genders, the students will learn to apply lessons in anatomy to the figure and will significantly expand their understanding of human kinetics and structure. Students will also be shown how to extrapolate basic human life drawing strategies to other animals.



**ART 201 Advanced Life Drawing (3 Cr.)****Prerequisites:** ART 125, ART 151

**Description:** This course builds upon the anatomy and drawing courses the students have already taken. Students will 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 will build the foundation of drawing accurate figures from their imagination. They will also explore putting the figure into an environment, figurative composition, and introductory sequential figurative composition.

**ART 205 Character and Environment Design (3 Cr.)****Prerequisite:** ART 155

**Description:** Students will apply their drawing and anatomy knowledge to the creation of animation characters. The traditions of character design and the basic structural strategies for creating animation characters will be introduced. Students will explore simplification gradients relative to human, animal, and inanimate object-based characters. Issues of costume, personality, and story interaction will also be explored. Students will then learn to place these characters into appropriately designed environments. Professional applications, techniques, and standards of quality will be emphasized.

**ART 210 Art Appreciation (2 Cr.)****Prerequisites:** None

**Description:** This introduction to art will provide students with a better understanding of the artistic influences of our modern culture. Along with the history of art, students will 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 should provide the groundwork for further personal study in the arts. This in turn will influence the development of their creativity.

**ART 225 3D Design and Sculpture (3 Cr.)****Prerequisite:** ART 201 or ART 155

**Description:** This course introduces students to the principles of 3D design using both traditional and digital tools. Students will be acquainted with additive, subtractive, and cast sculpture. The basic concepts of architectural space, interior design, landscape design, surface interplay with light, lofted forms, and skinning systems are considered. Special emphasis will be given to using modern polymer clays and building an animation maquette.

**ART 251 Character Design (3 Cr.)****Prerequisite:** ART 201

**Description:** Students will 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 will explore simplification gradients relative to human, animal, and inanimate object-based characters. Issues of costume, personality, and story interaction will be explored. Professional applications, techniques, and standards of quality will be emphasized. The work completed in this course will serve as pre-production design for PRJ 300, PRJ 350, or ANI 300.

**ART 255 A.A.A. Portfolio (3 Cr.)****Prerequisites:** ART 205, PRJ 205

**Description:** Students will use this course to compile the elements of their professional portfolio. They will be introduced 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 will then use this knowledge to assemble their own portfolios. The course also covers related information regarding job interviews, trade shows, professional standards, and contract negotiation.

**ART 300 Perspective, Backgrounds, and Layouts (3 Cr.)****Prerequisites:** ART 225, ART 251

**Description:** This course explores the animation pre-production skills of background and layout art. Students will review classical depth cue and perspective systems, applying this knowledge to the creation of animation backgrounds and layouts. Additionally, students will explore means of using drawing to create camera lens illusions, architectural space, theatrical sets, level design, matte painting, and surface texture. Professional applications, techniques, and standards of quality will be emphasized. The work completed in this course will serve as pre-production design for PRJ 300, PRJ 350, or ANI 300.

**ART 350 Storyboards (3 Cr.)****Prerequisites:** ART 300, ENG 115, FLM 200

**Description:** This course explores the animation pre-production skills of storyboard art. Students will leverage their knowledge of drawing, storytelling, and cinematography to create both production and presentation storyboards. They will also explore means of using drawing to create story flow, character development, mood, time, and place. Professional applications, techniques, and standards of quality will be emphasized. The work completed in this course will serve as pre-production design for PRJ 300, PRJ 350, or ANI 300.

**ART 400 Drawing Fundamentals (2 Cr.)****Prerequisites:** None

**Description:** The development of strong drawing skills is of extreme importance as they are essential tools for expressing ideas, particularly during the pre-production stages of an animation project. Therefore, the objective of this course is to present the basic elements of drawing and graphic design in order to improve the student's practical ability to draw with skill and imagination. Methods of observing, describing, and organizing form will be covered using various mediums such as pencil, charcoal, and color pencils.

**ART 401 Conceptual Illustration and Visual Development (3 Cr.)****Prerequisite:** ART 350

**Description:** This course explores the animation pre-production skills of conceptual illustration and visual development. Students will apply their knowledge of drawing, storytelling, and composition to create speculative drawings for animation. Compositional systems, design process, and illustration techniques will be reviewed. Students will also explore means of using drawing to visually explore story and character ideas from both existing and original story materials. Adaptation, stylization, and visual variety will all be considered. Professional applications, techniques, and standards of quality will be emphasized. The work completed in this course will serve as pre-production design for PRJ 300, PRJ 350, or ANI 300.

**ART 410 Mechanical Drawing (3 Cr.)****Prerequisites:** None

**Description:** The development of strong drawing skills is of extreme importance as they are essential tools for expressing ideas. The emphasis in this course will be on drawing mechanical objects and the utilization of CAD systems.

**ART 450 Portfolio (3 Cr.)****Prerequisites:** ART 401, PRJ 400, FLM 250**Concurrent Courses:** ANI 400, PRJ 450

**Description:** Students will use this course to compile the elements of their professional portfolio, which will serve as their B.F.A. thesis. Additionally, students will be introduced 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 will then use this knowledge to assemble their own portfolios. The course will also cover related information regarding job interviews, trade shows, professional standards, and contract negotiation.

## Computer Graphics

### **CG 105 Introduction to 3D Graphics (3 Cr.)**

**Prerequisites:** None

**Description:** This course covers all of the general principles of computer graphics, introducing students to the primary 3D computer animation software used to create the various productions. In addition, students will be taught how to use a 2D paint package for the creation of maps.

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

**Prerequisites:** ANI 151, ART 101, ART 125

**Description:** 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 then explores techniques and critical thinking for digital painting, scanning, still compositing, and texture creation. It also looks at basic interface customization options and strategies in 2D raster graphics, culminating with a series of sprite animation problems.

### **CG 225 Introduction to 3D Animation (3 Cr.)**

**Prerequisites:** ANI 151, ART 101, ART 125

**Description:** This course introduces students to the 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 then introduces techniques and critical thinking for texture mapping, modeling, rigging, lighting, cameras, and animation. It also 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:** CG 201

**Description:** This course examines the principles and practices of 2D vector graphics and animation. Students will be introduced to industry standard software, output options, and production strategies for using vector graphics in both graphic design and animation. Special consideration will be given to critical thinking and refinement strategies when modifying vector images. Methods of using vector-based tools for creating web and broadcast animation will be examined, and the course concludes with a series of applied problems in 2D vector animation.

### **CG 275 3D Character Animation (3 Cr.)**

**Prerequisite:** CG 105 or CG 225

**Description:** Students will continue to explore and exercise the concepts and techniques of 3D animation through a series of assignments applied to characters. Exercises in this course will be considerably more demanding than those completed in CG125 as they will be longer, requiring more refinement, subtlety, and creativity. Emphasis will be on character development – the expression of personality, mood, thought, and attitude through motion and posing. Special consideration will be given to proper model rigging.

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

**Prerequisite:** CG 275

**Description:** This course introduces students to the principles of 3D environment design. Theatrical sets, architectural simulations, and level design will all be considered. In order to provide students with a broader skill set, this course also presents the “mechanics” of how to use another 3D animation program, with an emphasis on the unique strengths of the package.

### **CG 350 3D Graphics for Gaming (3 Cr.)**

**Prerequisite:** CG 300

**Description:** The tremendous growth of the video game industry has resulted in a high demand for specialized 3D animation skills. Limited color palettes, file size, file formats, surface

restrictions, real-time implementation, cyclical animation, and levels of detail are some of the issues that need to be handled properly for inclusion into a game. This course examines the unique problems of creating 3D graphics for games and teaches effective production techniques for addressing these issues.

## Film

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

**Prerequisites:** None

**Description:** 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, every major movement and genre will be explored as well as their impact on society. Special consideration will be given to examining all of the various professional outlets for this technology.

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

**Prerequisites:** None

**Description:** Animation is ultimately “film making,” and animators should learn from the many “classics” 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 will also examine the fundamental theories underlying visual storytelling. Understanding the creative processes utilized by these influential filmmakers will provide insight into how students may improve their own animations.

### **FLM 201 Cinematography (3 Cr.)**

**Prerequisite:** FLM 151

**Description:** Like a director of photography, computer animators must have a good understanding of appropriate camera composition and lighting 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. Students will analyze examples of effective cinematic techniques from a variety of different animations and films. Assignments in camera composition, movement, and lighting will help students solidify their understanding of the concepts presented.

### **FLM 250 Post-Production (3 Cr.)**

**Prerequisite:** FLM 201 or FLM 150

**Description:** 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 seen in today’s movies are added. This course teaches the fundamental skills that are used in post-production. Effective editing skills are the primary outcome of the course. Students will also cover the planning, execution, and addition of special effects to animation.

### **FLM 275 Sound Design and Foley (3 Cr.)**

**Prerequisites:** None

**Description:** Every good animation relies on a well-designed soundtrack to enhance the production. While most animators do not produce the soundtrack themselves, they need to understand the effect of music, voice, and sound effects on an audience. Animators must be able to communicate their ideas to a musician and understand the technological possibilities of modern sound design. Initially students will survey a broad range of music from different cultures. Emphasis will be on developing basic listening skills in hearing rhythm, melody, harmony, color, texture, and form. The students will then learn how this understanding is applied to the production needs of animation. Special attention will be given to how sound is generated, how it is used to advance a story and how it can create mood, a sense of place, and emphasis. There may be course fees associated with this class. Please see the course registration packet for details.

**Projects Note:** Generally, students decide the subject of the projects class animations, but the instructor must consider the undertaking within the scope of a student's skill set, commercial marketability, academic soundness, and appropriateness in nature. DigiPen reserves the right to refuse any student production proposal that it deems inappropriate. Students are also expected to maintain an exceptional level of professionalism within these production environments, striving to produce quality work. Failure to meet this standard may result in academic discipline.

## Projects

### **PRJ 105 Introduction to 3D Production (4 Cr.)**

**Prerequisites:** None

**Concurrent Courses:** ANI 101, ART 101, ART 115, CG 105, ENG 115

**Description:** If one hopes to be a successful professional, it is insufficient for an animator to only understand the theory of animation and art. He or she must also understand the rigors and demands of commercial animation production. The projects classes create academic production environments where students learn the principles, practices, and habits that will help them adapt readily to the demands of the commercial animation industry. Each projects class focuses upon a series of related production problems and culminates in the students generating professional quality work on a rigid deadline. This work will serve as the foundation for their graduation portfolios. Weekly production meetings with an instructor ensure that the production stays on schedule and that a professional quality standard is maintained.

PRJ 105 introduces students to the basic concepts of the production process utilizing small-scale applied problems in 3D animation. Students will also be introduced to the professional animation production pipeline, which they must successfully navigate in order to achieve professional results and hone their professional critical thinking skills. The course culminates in students creating the pre-production work for their PRJ 155 project.

### **PRJ 155 Personal 3D Production (5 Cr.)**

**Prerequisite:** PRJ 105

**Concurrent Courses:** ANI 151, ART 155, CG 275, FLM 151, FLM 275

**Description:** PRJ 155 addresses two of the more serious emotional challenges facing commercial animators: professional focus and realistic expectations. Animation is a team sport, and it requires a significant commitment of time and resources to accomplish even the most mundane tasks. During this course students will face a series of choices. Each student will use the pre-production work they created in PRJ 105 to generate a single piece of limited animation. They must limit themselves to a production scale that allows for extensive professional refinement and meets the stringent specification criteria established by the faculty. Students will be introduced to realities of commercial art direction and quality control in conjunction with production deadlines. They should be prepared to repetitively revisit the same material with a relentless attention to subtle detail.

### **PRJ 201 2D Sprite Animation Production (5 Cr.)**

**Prerequisites:** ANI 151, ART 125

**Concurrent Courses:** ART 201, BIO 200, CG 201, CG 225

**Description:** It is insufficient for an animator to understand the theory of animation and art if they hope to be successful professionals. Similarly, they must also understand the rigors and demands of commercial animation production. The projects classes create academic production environments where students learn the principles, practices, and habits helping them to adapt readily to the demands of the commercial animation industry. Each class focuses upon a series of related production problems, culminating in students generating professional quality work on a rigid deadline. This work will serve as the foundation for their graduation portfolios. Weekly production meetings with an instructor ensure that production stays on schedule and that a professional quality standard is maintained.

PRJ 201 introduces students to the basic concepts of the production process utilizing small-scale applied problems in 2D Sprite animation. Sprite animations are heavily employed in handheld devices such as watches, cell phones, PDA's, and handheld game platforms. They are also a cornerstone of Internet graphics and fundamental to animated texture maps. Their restrictive nature makes them excellent teaching platforms because they cannot be readily solved through brute force. Each pixel must be accounted for, and issues such as color management and movement must be thoroughly planned. Students must successfully navigate the production pipeline in order to achieve professional results and hone their professional critical thinking skills.

**PRJ 205 Team Projects (5 Cr.)**

**Prerequisite:** PRJ 155

**Concurrent Courses:** ART 205, ART 225, CG 300, ENG 315, FLM 201

**Description:** This course introduces students to the realities of team-based production environments. Each student will pitch a proposed team project to the faculty and the class for consideration. (Select RTIS program junior and senior level projects may also be presented by academic approval.) The animation faculty will then decide which team projects will be produced and will assign students to specific teams based upon their artistic strengths and career goals. Each team will be assigned a primary and secondary faculty advisor.

Each student's individual effort will be measured as well as the overall success of each team. Student teams will not be allowed to jettison individual members due to production conflicts or performance, and all members will be evaluated for the overall teamwork and professional success of the group. Only the faculty will possess the ability to remove a team member for failure to perform.

**PRJ 251 2D Vector Animation Production (5 Cr.)**

**Prerequisites:** PRJ 201

**Concurrent Courses:** ART 225, ART 251, CG 251, CG 275

**Description:** Students will build upon the foundations of their first two years by exploring a 2D vector-based animation production. (2D vector animations are found throughout the Internet, video game, educational software, and broadcast entertainment industries.) Students will now apply the production pipeline to a sustained project spanning an entire semester. Concepts in research, project development, workflow projection, scheduling, time management, administrative documentation, and quality control will all be given special consideration. Appropriate work habits will also be emphasized.

**PRJ 255 Final Projects (5 Cr.)**

**Prerequisite:** PRJ 205

**Concurrent Courses:** ANI 125, ART 125, ART 255, CG 350, FLM 250

**Description:** Students will use this course to complete an independent or team project. This project will be geared toward rounding out the student's portfolio and will demonstrate an appropriate level of professional challenge.

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

**Prerequisites:** CG 275, PRJ 251

**Concurrent Courses:** ANI 300, ART 300, CG 300, FLM 201, PHY 115

**Description:** PRJ 300 addresses two of the more serious emotional challenges facing commercial animators: professional focus and realistic expectations. Animation is a team effort, and it requires a significant commitment of time and resources to accomplish even the most mundane tasks. During this course the students will face a series of choices. First, they must choose one area of focus within 3D animation and spend the entire semester working on a project within this narrow scope. Second, they must limit themselves to a production scale allowing for extensive professional refinement. Students will be introduced to realities of commercial art direction and quality control in conjunction with production deadlines. Students

should be prepared to repetitively revisit the same material with a relentless attention to subtle detail.

**PRJ 350 Applied 3D Animation Production Problems (5 Cr.)**

**Prerequisites:** ART 300, CG 300, PRJ 300

**Concurrent Courses:** ANI 350, ART 350, CG 350, ENG 315

**Description:** This course challenges students to apply their knowledge of 3D animation and general art theory to a series of problems in 3D production. Historically memory and bandwidth limitations have forced commercial animators to restrict themselves when producing 3D animations. Often the power of the 3D software has outstripped the technical and storage capabilities of the delivery media. Using a series of game and simulation problems, students will face a series of real world production restrictions they must overcome while maintaining highly professional aesthetic standards. Problems will include polygonal face limitations, frame limitations, levels of detail, texture map scale, limited color palettes, simulated lighting illusions, compositing, and cyclical motion.

**PRJ 400 Team Projects (5 Cr.)**

**Prerequisites:** ART 350, ENG 215, PRJ 350, Senior Class Standing

**Concurrent Courses:** ART 401, FLM 250, FLM 275, SOC 115

**Description:** This course introduces students to the realities of team-based production environments. Each student must first declare an area of specialization in either 2D or 3D animation. This area of specialization will apply to PRJ 300, PRJ 350, and ANI 300. Each student will then present their pre-production work from ART 250, ART 300, ART 350, and ENG 215 to the faculty and the senior class for consideration. (Select RTIS program junior and senior level projects may also be presented by academic approval.) The animation faculty will then decide which team projects will be produced and will assign students to specific teams based upon their artistic strengths and career goals. Each team will be assigned a primary and secondary faculty advisor.

Each student's individual effort will be measured as well as the overall success of each team. Student teams will not be allowed to jettison individual members due to production conflicts or performance, and all members will be evaluated for the overall teamwork and professional success of the group. Only the faculty will possess the ability to remove a team member for failure to perform.

**PRJ 450 Final Projects (5 Cr.)**

**Prerequisites:** ART 401, PRJ 400, Senior Class Standing

**Concurrent Courses:** ANI 400, ART 400, CS 115, LAW 115

**Description:** Students will use this course to complete an independent or team project in their area of specialization as chosen in PRJ 300. This project will be geared toward rounding out the student's portfolio, demonstrating an appropriate level of professional challenge.

**PRJ 475 Summer Animation Team Production (3 Cr.)**

**Prerequisites:** Two full-time semesters, interview by permission of Department Chair, and a portfolio evaluation.

**Description:** This advanced projects class will allow students to gain invaluable experience and knowledge on a short animated film (approx. 1-2 minutes) in a professional production setting. The film will be directed and supervised by the instructor and students will carry out staff roles as designers, layout/lighting artists, animators, riggers, modelers, and texture artists. This is an opportunity for students to work in a professional setting, which fosters responsibility, teamwork and artistic excellence.

# Department of Computer Science

## Computer Science

### **CS 100 Computer Environment I (3 Cr.)**

**Prerequisites:** None

**Description:** The objective of this course is to provide a good understanding of the fundamental elements on which computers are based. Topics include digital systems, logic circuits and algebra, and data representations. This knowledge eliminates mysteries about hardware and provides a well-rounded understanding of computers.

### **CS 105 Computer Environment II (3 Cr.)**

**Prerequisites:** CS 100, CS 120

**Description:** This course builds on the fundamentals learned in CS 100 and introduces microprocessors, micro-controllers, computer architecture, low-level programming, and microprocessor development systems. Students will apply the acquired knowledge towards building a micro-controller-based machine such as a simple robotic car. There may be course fees associated with this class. Please see the course registration packet for details.

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

**Prerequisite:** CG 350

**Description:** This class introduces programming environments to students who are not experienced programmers. Simple logic, programming flow, and the use of variables will be discussed. Students will be introduced 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. Special topics in programming and scripting may be covered at the instructor's discretion.

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

**Prerequisites:** None

**Description:** The objective of this course is to present the C programming language. It serves as a foundation for all high level programming courses and projects. The course provides the fundamentals in programming control-flows (such as statement grouping, decision making, case selection, procedure iteration and termination test, etc.) and basic data types (such as arrays, structures, pointers, etc.) The lexical convention, syntax notation, and semantics are discussed intensively.

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

**Prerequisite:** CS 120

**Description:** This course is a continuation of High Level Programming I [CS 120]. The course starts where CS 120 left off, that is, with the study of Object-Oriented Programming. OOP is discussed in detail and will be used extensively throughout the course. Students will be introduced to more advanced concepts of higher-level programming constructs using the C++ language.

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

**Prerequisites:** CS 100, CS 120

**Description:** This course presents an overview of the various components of modern operating systems, including the kernel, process and thread creation and management, networking, interprocess communication and synchronization, memory management in demand-paged virtual memory systems, and file systems.



**CS 200 Computer Graphics I (3 Cr.)****Prerequisite:** MAT 150, CS 120**Description:** The objective of this course is to provide a rigorous presentation of the mathematical elements and algorithms involved in the generation and viewing of two-dimensional graphic primitives.**CS 220 Advanced C (3 Cr.)****Pre-requisite:** CS 170**Description:** This course focuses on advanced topics of the C programming language. Such topics include advanced pointer manipulation techniques, pointer applications and using standard library functions more efficiently. The course also presents many methods designed to avoid common C programming errors and pitfalls. Mastering the various topics presented in this course would enable the student to become a more productive programmer.**CS 225 Advanced C/C++ (3 Cr.)****Prerequisite:** CS 170**Description:** This course builds on the foundation created in the first two High Level Programming courses [CS 120/170]. Advanced topics of the C/C++ programming language are presented in greater detail. Such topics include advanced pointer manipulation, utilizing multi-dimensional arrays, complex declarations, and standard library functions. Among the advanced C++ topics are 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:** CS 170, CS 180**Description:** This course introduces students to GDI+, the latest version of Win32 Graphics Device Interface. The implementations of bitmap operations using GDI+ are then discussed in detail along with bitmap data format, loading, saving, scaling and compositing. Win32 API and the creation of dialog boxes are also covered to facilitate the interactive controls for games and tools.**CS 241 Fundamental Computer Graphics (3 Cr.)****Prerequisites:** MAT 140 and MAT 200**Description:** The Algorithms and Mathematics used in rendering graphics primitives are discussed. Specifically, the class covers the following subjects: graphics pipeline organization, graphical object representations, 2D and 3D coordinate systems and transformations, scan-conversion algorithms, color models and basic culling, clipping and intersection techniques.**CS 245 Introduction to Interactive Sound Synthesis (3 Cr.)****Prerequisites:** CS170, CS180, MAT140, PHY200**Description:** The course explores dynamic sound synthesis, 3D-directional auditory effects and sonic ambience to real-time simulation and video games. The subjects include mixing audio, modulating dry recorded sounds using wave table synthesis, creating 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). Algorithms and techniques for real-time multi-threaded programming and synthesized sound integration for the game engine are also studied.**CS 250 Computer Graphics II (3 Cr.)****Prerequisite:** CS 200**Description:** This course is the continuation of the Computer Graphics I [CS200] course taken in the previous semester. Particular emphasis is placed on studying the mathematical elements and algorithms used in the generation and viewing of three-dimensional graphic primitives.

**CS 260 Computer Networks I, Interprocess Communication (3 Cr.)****Prerequisite:** CS 170**Description:** This course introduces the hierarchical network communication in a distributed computing environment. Course topics cover network technologies, architecture, and protocols. Hence, it prepares students for programming multi-player games in later semesters.**CS 261 Computer Networks II (3 Cr.)****Prerequisite:** CS 260**Description:** 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. Additional topics will be covered based on the state of the industry.**CS 270 Advanced C++, Designing Classes (3 Cr.)****Prerequisite:** CS 220**Description:** This course presents the Object-Oriented Methodologies used in the development of large software projects. Combined with the knowledge acquired in the C++ Programming Language courses [CS 120/170/220], students will be able to better manage their Game Software Design and Production and produce reusable code and libraries.**CS 280 Data Structures (3 Cr.)****Prerequisite:** CS 220 or CS 225**Description:** The objective of this course is to introduce 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:** CS 250**Description:** This course deals with the advanced topics of computer graphics that are involved in viewing three-dimensional environments. Particularly, the course topics cover algorithms used for detecting the visible lines and surfaces of three-dimensional objects.**CS 315 Low-Level Programming (3 Cr.)****Prerequisite:** CS 105, CS 120, CS 180**Description:** This course provides the students with an introduction to microprocessor architecture, as well as the knowledge required to directly address and program the microprocessor and the various hardware devices connected to it. The resulting code is usually faster than similar code written in a high-level language such as C or C++. Hence, it has great importance in improving the response speed of real-time interactive programs.**CS 330 Design and Analysis of Algorithms (3 Cr.)****Prerequisites:** CS 270 or CS 225, CS 280**Description:** The objective of this course is to design and analyze algorithms on the ADT such as table, queue, binary tree, and linked list. Particular emphasis is placed on studying the correctness and efficiency of these algorithms.

**CS 340 Image Synthesis (3 Cr.)****Prerequisites:** CS 170, MAT 150**Note:** Students may not receive credit for both CS 250 and CS 340**Description:** This course addresses the generation of 2D and 3D computer graphic images. Topics include scene transformations and perspectives, the representation of 3D objects by polygons and curved surfaces, lighting, shading, and texture mapping.**CS 341 Advanced Computer Graphics (3 Cr.)****Prerequisites:** MAT 200, CS 200**Description:** This course studies algorithms and techniques that are designed to improve the efficiency and increase the realism of 3D graphics. Two subjects are discussed: (1) algorithms that eliminate invisible objects from being further processed by graphics pipeline, including BSPTree, Octree, occlusion, portal, etc., and (2) techniques that add details on objects' surface, including lighting and shading models, texture mapping, bump mapping, environmental mapping and shadow algorithms.**CS 350 Advanced Computer Graphics II (3 Cr.)****Prerequisite:** CS 300**Description:** This course deals with the advanced topics of computer graphics that are involved in rendering a three-dimensional environment. Particular emphasis is placed on adding realism to the rendered surface of three-dimensional objects as a result of lighting, shading, and texture mapping.**CS 365 Software Engineering (3 Cr.)****Prerequisite:** CS 225 or CS 270**Description:** 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 methodologies and notation, object oriented analysis and design, requirements analysis, implementation, verification, validation, maintenance, and software engineering standards. Acquired knowledge will be applied by student teams to a substantial project.**CS 370 Image Processing (3 Cr.)****Prerequisites:** CS 180, CS 280**Description:** This course introduces some of the popular image processing techniques. Course material covers methods students can apply in creating special effects with digital images and preparing graphics information for either human or computer interpretation.**CS 380 Robotic Intelligence (3 Cr.)****Prerequisite:** CS 280**Description:** The techniques developed for real-time adaptive control of mobile robots are among the AI methods most suitable for game characters. Robots and game characters must both navigate unknown terrain and avoid or overcome obstacles. All planning must be subject to instant revision. This class treats game characters as virtual robots. Robotic AI methods will be used without building any physical robots. The class covers the hierarchical control paradigm and expert systems based on LISP or related scripting languages. It then focuses on reactive agents using subsumption architecture or potential fields. The class then examines the hybrid paradigm and navigation. It concludes with implementation examples in games.**CS 381 Machine Learning (3 Cr.)****Prerequisite:** CS 280**Description:** This course deals with the question of how to construct 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.

Other techniques examined include Bayesian learning, artificial neural networks, and genetic algorithms.

**CS 400 Ray Tracing (3 Cr.)**

**Prerequisite:** CS 350 or equivalent

**Description:** This course introduces the ray tracing technique in computer graphics. It places particular emphasis on studying the mathematical elements of light illumination models, light intersection calculations, and data structure organization.

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

**Prerequisites:** CS 250 and CS 280, or CS 340

**Description:** This course covers data compression techniques for still images and multimedia. These include run length encoding, entropy coding, dictionary compression, transforms, and motion compensation. The techniques are illustrated by examining various popular graphic file formats such as BMP, TIFF, GIF, JPEG, DXF, MPEG, etc.

**CS 460 Advanced Animation and Modeling I (3 Cr.)**

**Prerequisites:** CS 300, MAT 300, GAT 300

**Description:** 3D animation and modeling play significant roles in computer simulation and video game software. 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.

**CS 498 Special Topics (3 Cr.)**

**Prerequisites:** Permission of instructor

**Description:** Topics and content vary according to instructor.

**CS 499 Independent Study (3 Cr.)**

**Prerequisites:** Permission of instructor

**Description:** Topics and content vary according to student-instructor collaboration.

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

**Prerequisite:** Entrance into the Master of Science in Computer Science program.

**Description:** This course introduces the ray tracing technique in computer graphics. It places particular emphasis on studying the mathematical elements of light illumination models, light intersection calculations, and data structure organization.

**CS 510 Real-Time Rendering Techniques (3 Cr.)**

**Prerequisites:** CS 341 or CS 350

**Description:** This course introduces data structures, algorithms and techniques concerned with rendering image more accurately and efficiently in interactive computer simulation and video game software. The topics include patch and surface algorithms, terrain rendering techniques, anti-aliasing theory and practice, lighting and shadowing methods, and real-time shader programming essentials.

**CS 520 Reasoning Under Uncertainty (3 Cr.)**

**Prerequisites:** CS 380, CS 381, or equivalent

**Description:** This class covers advanced search and path finding techniques. It explores decision making in uncertain environments, using techniques from blackboard architectures, fuzzy inference systems, and knowledge engineering.

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

**Prerequisites:** CS 341 or CS 350

**Description:** Design and construction of a real-time graphics engine is a complex engineering process. This course provides rigorous explanations and derivations of all essential concepts and

state-of-the-art techniques related to the accuracy and efficiency issues of the 3D video game engine. The topics include game engine architecture, graphics hardware, pipeline stages and optimization, hierarchical scene organization and traversal, advanced collision detection algorithms and level of detail approaches.

**CS 560 Advanced Animation Algorithms I (3 Cr.)**

**Prerequisite:** CS 341 and CS 460

**Description:** 3D animation and modeling play significant roles in computer simulation and video game software. 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.

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

**Prerequisite:** CS 560 or CS 460

**Description:** This class discusses special topics on the advanced animation and modeling algorithm and techniques in 3D simulation. The topics include natural phenomena modeling, facial animation, deformable objects, motion blending, and motion capture.

**CS 599 Special Topics (3 Cr.)**

**Prerequisites:** None

**Description:** This class covers topics related to the theoretical study of 3D computer graphics.

**CS 600 Thesis (6 Cr.)**

**Prerequisites:** All course requirements for the first semester (M.S. Program) and a GPA of 3.0 or higher

**Description:** This class is taken simultaneously with the second semester courses, allowing students to investigate a current topic in Computer Science that is proposed and then determined between the student and advisor.

## Electrical Engineering

**EE 200 Electric Circuits (3 Cr.)**

**Prerequisite:** CS 105

**Description:** Topics in this course include: passive components, series and parallel circuits, two-terminal networks, two-port networks, circuit reduction techniques, impedance analysis, measurement of waveforms, power, and filters.

**EE 210 Digital Electronics I (4 Cr.)**

**Prerequisites:** CS 105, EE 200

**Concurrent Courses:** LAB 210, EE 200

**Description:** Topics in this course include: digital logic, programmable logic devices, FPGA, arithmetic circuits, multiplexors and demultiplexors, logic families, memory devices, and flip-flops.

**EE 260 Digital Electronics II (4 Cr.)**

**Prerequisite:** EE 210

**Concurrent Course:** LAB 260

**Description:** This course covers counter circuits, shift registers, timers, digital/analog conversion, microprocessor architecture, ports, and interrupt handling. The course also examines the use of logic analyzers and in-circuit emulation (ICE) with particular emphasis on small-scale systems for embedded devices.

**EE 300 Embedded Microcontroller Systems (3 Cr.)****Prerequisites:** CS 315, EE 260**Concurrent Course:** LAB 310**Description:** This class provides the remaining concepts needed to build the hardware and software for a handheld gaming device. Topics include Harvard architecture, microprocessor systems, analog/digital conversions, timing control, serial ports, peripheral access, and digital signal processor (DSP) applications to real-time audio processing.**EE 350 Linear Control Systems (3 Cr.)****Prerequisite:** MAT 256**Description:** Topics in this course include: signals and systems, state-space description, convolution, frequency analysis of signals, feedback, Bode, Nyquist, root locus analysis, stability, phase margin, observability, errors in tracking and steady-state, motor control, PID control, and Kalman filters.**EE 400 Motors and Sensors (3 Cr.)****Prerequisite:** PHY 270**Concurrent Course:** LAB 410**Description:** Topics in this course include: three phase circuits, transformers, power transmission, motors and generators, stepper motors and encoders, motor controllers, limit switches, and sensors – optical, acoustic, eddy current, and triangulation.

## Laboratory

**EEL 220 Introduction to Robotics (3 Cr.)****Prerequisites:** CS 105, GAM 150**Concurrent Course:** EE 210**Description:** Continuing the concepts learned in CS 105, students will build a robot that uses an embedded microprocessor system. It may be entered in a competition. The class introduces concepts of software engineering and process documentation. Students will additionally document the design, production, and service of their device.**EEL 270 Real-Time Operating Systems (3 Cr.)****Prerequisites:** GAM 150, CS 315**Description:** Students will build a prototype consumer or industrial device that uses an embedded microprocessor system and a commercial real-time operating system (RTOS). The class covers multitasking, interrupt handling, threads, synchronization, preemption, resources, and messaging.**EEL 310/360 Project III Handheld Gaming Device (5 Cr. Each)****Prerequisites:** LAB 260, CS 315**Concurrent Course:** EE 300**Description:** Students will work in small teams to design, build, program, and test a device similar to the Color Game Boy studied previously. Students will assemble a microprocessor with storage, input, and display devices into a handheld game platform. The project will include programming a game to run on the system.**EEL 410/460 Project IV Robots (5 Cr. Each)****Prerequisites:** LAB 360**Concurrent Course:** EE 400**Description:** Students will build mobile or entertainment robots. The project includes specification and construction of mechanical and electrical subsystems. A CAD system will be used to design mechanical parts. The team will interact with an artist or designer from the Fine Arts Program.

# Department of Game Software Design and Production

## Game

### **GAM 100 Project Introduction** (3 Cr.)

**Co-requisites:** CS 100 and CS 120

**Description:** This class presents an overview of the way the game development industry works, a history of game development, and exposure to the positions and job responsibilities that each member of a game development team has along with the industry requirements for the creation of a game design document (GDD) and a technical design document (TDD). Over the remainder of the semester, students will be broken into teams responsible for designing and developing text-based games, complete with a functional GDD and TDD, schedule and milestones. Additionally, each student will be required to create individual games using the ProjectFUN game development environment created by DigiPen. Games created via ProjectFUN will be graphical in nature, serving to enhance the student's retention of C/C++ coding techniques and math functions taught in the first semester CS and MAT classes.

### **GAM 150 Project I** (3 Cr.)

**Prerequisite:** GAM 100, CS 100, CS 120, MAT 100/140

**Co-requisites:** CS 170 and MAT 150

**Description:** Continuing with the teams they were assigned to in GAM 100, each team will be responsible for preparing a GDD and TDD for one team-based project. Teams complete the approved game design according to the schedule they establish in their technical design. Each team will present these completed games to the Institute at large during the final week of the semester. Additionally, each student will be designing and developing smaller projects using a variety of tools. These projects reinforce the game design and implementation curriculum.

### **GAM 200/GAM 250 Project II** (4 Cr. Each)

**Prerequisites:** **GAM 200:** GAM 150, CS 170, CS 180, MAT 150; **GAM 250:** GAM 200, MAT 200, CS 200, CS 225, CS 230

**Concurrent Courses:** **GAM 200:** MAT 200, CS 200, CS 225, CS 230; **GAM 250:** CS 250, CS 280

**Description:** This project is divided into two semesters where students are tasked with designing and implementing a scrolling game engine. Similar to Project I, they start by writing a GDD and TDD. Along with creating a scrolling engine, students will also explore networking within conventional games, sound, and music as it affects game design during this full year project as well as an introduction to designing games for a multiplayer environment.

Since the project is intended to be a multiplayer game, in GAM 200 students create multiplayer games on one system that migrate to being networked onto multiple machines in GAM 250.

### **GAM 240 Intermediary Game Project I** (5 Cr.)

**Prerequisite:** BS in Computer Science with knowledge of C++, permission of instructor

**Description:** This course focuses on the game production cycle in theory and in practice. Course lectures will cover the entire production cycle of a game – from pre-production documentation, to tool creation and coding, to marketing the finished project. In addition, students will form into 3-4 member teams to create a 2D or 3D simulation game on the PC. Topics include game design theory, project management, Windows gaming environment, and user interface implementation. During the course each team will be required to complete a pitch presentation (to be presented to the faculty), Game Design Document, a Technical Design Document, and a first-playable prototype. The project and marketing campaign will be completed in GAM 340.

**GAM 340 Intermediary Game Project II (5 Cr.)**

**Prerequisite:** GAM 240, permission of instructor

**Description:** Completion of the GAM240 project as a fully functional game/simulation including manual and marketing material. Topics will cover the business side of the game industry and how games are marketed. Teams will present their projects in pre-beta version to focus groups and present analyses of their responses. Successful completion of the project will require a comprehensive marketing plan and game packaging materials (box, manual, sell sheet). At the completion of the project, the team will be required to generate a postmortem suitable for submission to an online game development site.

**GAM 300/350 Project III (5 Cr. Each)**

**Prerequisites:** **GAM 300:** GAM 250, CS 250, CS 260, CS 280, PHY 200; **GAM 350:** GAM 300, CS 300, 330.

**Concurrent Courses:** **GAM 300:** CS 300, GAT 300. **GAM 350:** MAT 250, CS 350

**Description:** This project is divided into two semesters whose focus is on low-level programming of a simulation type game, complete with artificial intelligence. Given the complexities and nuances of a simulation, ideally the teams will remain together for the entire year to work on a specific form of simulation (sport, vehicle, or city management).

A large component of this class will be focused on AI-related research and the requirements for AI in games from a simulation perspective. Also, since real-game and real-life physics will be required to be modeled in the projects, an understanding of what this entails will be covered in class. Additionally, students will also learn about networking up to eight players on a LAN.

Similar to Project II, students present their ideas through a concept proposal and in the form of a written GDD and TDD. These components demonstrate an understanding of low-level programming and the ability to define a memory map for their applications. After their presentation, students go through an extensive code review using professional tools.

**GAM 400/450 Project IV (5 Cr. Each)**

**Prerequisites:** **GAM 400:** GAM 350, CS 350, CS 365, MAT 250, PHY 250; **GAM 450:** GAM 400, MAT 300

**Concurrent Courses:** **GAM 400:** MAT 300, CS 400; **GAM 450:** MAT 350

**Description:** This is a two-semester project, with a focus on PC-based 3D games. The requirements of modeling in a 3D (as opposed to sprite-based) game will be covered as well.

3D games offer all of the challenges of the first three projects plus the added nuance of management of polygonal (vector-based) characters as opposed to sprite-based graphics. Furthermore, analog and digital controllers and other forms of tertiary input are covered. 3D games also push the student to manage their memory effectively in order to sustain a high frame rate for polygonal animation. Advanced techniques such as pixel shading may be covered.

Similar to Project III, the students present their ideas in the form of a written GDD and TDD. The written components must include all the sections described earlier in Project III as well as marketing materials, user manuals, packaging, sell sheets, focus group responses, extensive examples of beta testing, and creation of a final version deliverable for commercial release.

**GAM 390/490 Internship I/II (5 Cr.)**

**Prerequisites:** GAM 200, GAM 250, GAM 300

**Description:** 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.



**GAM 550 Game Project I (3 Cr.)**

**Prerequisite:** B.S. in Computer Science or related field of study, permission of instructor

**Description:** This course challenges the student to research the latest techniques in game design and technology and then apply their findings in a 3D game/simulation. Students will investigate issues in 3D techniques, artificial intelligence, and “next generation” game console architecture as well as such advanced game design issues as massively multi-player “persistent worlds”, input/GUI theory and design, and advanced simulation theory and applications. Students will report their results to the class and then present a “pitch paper” for a product that incorporates their findings both to the class and a faculty review board. Students will then create a Game Design Document and Technical Design Document for the approved project. Depending on the scope of their projects, students will work individually or on teams. By the end of the semester, students should complete a prototype of their game/simulation.

**GAM 551 Game Project II (3 Cr.)**

**Prerequisite:** GAM 550

**Description:** Completion of the GAM550 project as a fully functional game/simulation including manual and marketing material. Topics will cover advanced team leadership skills, short-term project budgeting and long-term financial planning, and legal issues related to the game industry. Teams will present their projects in pre-beta version to focus groups and present analyses of their responses. Successful completion of the project will require a FLASH/XML/multimedia presentation of the finished title and marketing plan to a Creative Board. At the completion of the project, the team will be required to generate a postmortem suitable for submission to an online game development site.

## Game Application Techniques

**GAT 300 3D Computer Animation Production I (3 Cr.)**

**Prerequisites:** None

**Description:** (Formerly GEN 300) This course deals with all the basic theories and techniques utilized in the production of computer animations. Students will be introduced to a computer-based 3D animation package, which they will use throughout the course.

**GAT 350 3D Computer Animation Production II (3 Cr.)**

**Prerequisite:** GAT 300

**Description:** (Formerly GEN 350) This course builds on the fundamentals taught during GAT 300. Students will learn about key framing, special effects, final rendering, and recording.

**GAT 400 Multimedia Aspects of Game Making I (3 Cr.)**

**Prerequisites:** None

**Description:** (Formerly GEN 400) With the introduction into the market of high-level tools allowing the assembly of video games from a set of pre-programmed components, game programmers can very quickly assemble games. More often than not, these games lack optimization and are more suitable for prototyping or creating interactive, multimedia presentations. Some of these tools include high-level programming languages in addition to the click and point Graphic User Interface.

**GAT 450 Multimedia Aspects of Game Making II (3 Cr.)**

**Prerequisite:** None

**Description:** (Formerly GEN 450) In this second section of the course, students take the knowledge gained in GAT 400 and apply it in the creation of a game or an interactive portfolio.

# Department of General Education

## Biology

### **BIO 100 Visual Perception (3 Cr.)**

**Prerequisites:** None

**Description:** This course explores the nature of human visual perception. Beginning with the physics of light and the anatomy of the human eye, the course examines how human beings process light information and use this data to survive. Neuro-physiology, perceptual psychology, and artistic traditions will all be examined. Special consideration will be given to the modern technological and professional uses of this knowledge.

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

**Prerequisite:** None

**Description:** This course explores the skeletal and muscular structures of the human body. Students will learn to identify skeletal and muscular forms from both live models and anatomical reference. Vocabulary, structural arrangement, and kinetic function will all be considered. Special emphasis will be given to adapting this knowledge to the needs of artists and animators.

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

**Prerequisite:** BIO 150

**Description:** This course introduces the major skeletal and muscular structures of animals. Students will extrapolate their knowledge of the human form to the structure and form of a variety of animal types. Special emphasis will be placed upon the impact of locomotion and feeding strategies upon form. Vocabulary, structural arrangement, and kinetic function will all be considered. The course also considers standard locomotion cycles and the relationship between humans and various animals. Special emphasis will be given to adapting this knowledge to the needs of artists and animators.

## Economics

### **ECN 350 Engineering Economics (3 Cr.)**

**Prerequisites:** None

**Description:** Topics in this course include: present worth; future amounts; cash flows; salvage value; depreciation; income tax; basic cost accounting; venture capital, SBIR and other funding sources; and patents, copyright and intellectual property.

## English

### **ENG 110 Composition (3 Cr.)**

**Prerequisites:** None

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

**ENG 115/116 Storytelling** (3 Cr. for 115 or 4 Cr. for 116)

**Prerequisites:** None

**Description:** Students will explore the nature of storytelling. Beginning with the psychosocial drive to tell stories, students will be exposed to the historical traditions of storytelling in all forms. The course covers the classical elements of story structure, traditional story goals, and critical thinking strategies for matching story form to a specific goal. Through a series of oral and written exercises, students will hone their storytelling skills. Special emphasis will be given to telling stories with time restrictions and the modern commercial applications of both linear and non-linear storytelling.

**ENG 150 Mythology for Game Designers** (3 Cr.)

**Prerequisite:** ENG 110

**Description:** The power of myth resides in its ability to touch the essence of our humanity and put meaning into our lives. Artists, filmmakers, game designers, and writers have appropriated elemental mythological premises and 'updated' them to create modern myths accessible to contemporary audiences. Whether we are playing a role-playing game wherein the task is to rescue the princess and save the planet, reading the latest cyberpunk novel, or watching an animated Disney classic, the power of mythology touches our psyches.

This course is an overview and analysis of cross-cultural mythology presented as prose, film, and game. The idea that myths have influenced cultures of the past and continue to inform and influence our culture of today will be discussed in depth throughout the course. The course will also examine the practical use of myth. Emphasis will be placed on the monomyth of the hero's journey and how a game developer may redefine the archetypal figures and adventures therein and incorporate them in a game design.

**ENG 240 Legends, Myths and the Art of the Tale** (3 Cr.)

**Prerequisites:** None

**Description:** Students will explore the nature of storytelling. Beginning with the cultural drive to tell stories, students will be exposed to the historical traditions of storytelling in selected forms. The course covers the culturally based elements of story structure, story goals, and critical thinking strategies for matching story form to a specific goal. Through a series of oral and written exercises, students will examine and enhance their knowledge of storytelling skills in a multicultural context.

**ENG 315/316 Story Through Dialogue** (4 or 3 Cr.)

**Prerequisite:** ENG 115

**Description:** Dialogue is a critical element of modern storytelling. This course explores the effective uses of dialogue in fiction, drama, and film. Students will discover how dialogue serves to move the action forward, build history, and develop character. They will continue to hone their storytelling skills through a series of written and oral dialogue exercises. Additionally, students will learn traditional dialogue and scripting formats and when these formats should be used. They will also consider the aural nature of dialogue by examining topics such as onomatopoeia, alliteration, and meter. The course culminates in pre-production script proposals for use in PRJ 300, PRJ 350, or ANI 300.

**ENG 320 Interpersonal and Work Communication** (3Cr.)

**Prerequisite:** ENG 110 or equivalent

This course will address culture, language, non-verbal communication, written communication, global issues (like social customs and business customs), and intercultural negotiation. The recommended text is [Intercultural Business Communication](#) by Chaney and Martin.

**ENG 352 Character Analysis and Development in Game Design** (3 Cr.)

**Prerequisite:** ENG 110

**Description:** Where do effective and engaging fictional characters come from? To say simply that they spring from the creator's imagination is not enough. This course examines memorable characters and explores techniques for devising and developing new ones. In this writing-intensive course, students will analyze, criticize, and create, ultimately acquiring a clear sense of the audience-driven creative style of inventing characters.

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

**Prerequisite:** ENG 110 or 150

**Description:** Creative Writing for Game design will focus on the narrative elements of creative writing. Exercises are designed to generate thinking and hone students' basic storytelling talents including characterization, exposition, plot, conflict, back-story, dialogue, and appropriate use of language. Students will learn how symbols are used to design a story, and how the symbols can be manipulated to create character, plot, message, and interactivity. Students will be encouraged to access their own genius, culture, and life experience in the development of their stories.

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

**Prerequisites:** None

**Description:** In this course, students will be introduced to the principles of film and other non-game media. Students will review technologically and artistically groundbreaking media. Emphasis will be placed on defining the term "media," analyzing film and TV, and examining how certain elements of historical and modern media can be adapted in games and interactive media. Students will discuss how the masters of 20th century media utilize such knowledge to surpass the current boundaries of interactive media products.

## Law

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

**Prerequisites:** None

**Description:** 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 will grapple with fundamental issues surrounding this field such as fair use, international relations, and economics. The course will also introduce students to a basic overview of contracts including structure, traditions, and vocabulary.

## Management

**MGT 450 Product Management (2 Cr.)**

**Prerequisite:** ECON 350

**Description:** This course provides an in-depth examination of theories and techniques in product management. Lectures will cover various aspects of product management: team leadership, interaction with management, marketing, budgeting, long-range project planning and contract negotiations. The course will include exercises giving students insight into dealing with team effectiveness and performance issues.

## Social Sciences

**SOS 115 Media and Ethics: A Social Science Perspective (3 Cr.)**

**Prerequisites:** None

**Description:** 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 will

acquire an understanding of the structure of social institutions and the process through which social choices are made. 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.)**

**Prerequisites:** None

**Description:** This survey course examines the impact of information and computer technology on society through techniques and perspectives drawn from social science and cultural studies. This course explores the impact of several technologies on urban places throughout the world. The course seeks to comprehend technology as a significant social and cultural reality. The course also considers how information and communications technologies affect societal values and ethics.

# Department of Mathematics and Physics

## Math

### **MAT 100 Precalculus with Linear Algebra and Geometry (4 Cr.)**

**Prerequisites:** None

**Description:** This course is intended for the student with a weak high school math background. (MAT 140 is recommended for RTIS freshmen.) MAT 100 gives a review of college algebra and trigonometry.

Topics include: functions and their graphs, especially polynomial, rational, trigonometric, exponential and logarithmic functions, and their inverses; conics, analytic trigonometry and identities; systems of equations.

Students may only earn credit for one of MAT 100 or MAT 140.

### **MAT 140 Linear Algebra and Geometry (4 Cr.)**

**Prerequisites:** None

**Description:** This course is recommended for RTIS freshmen. It begins with a review of relevant algebra and trigonometry, and then provides an introduction to vector geometry and linear transformations, which are subjects relevant to computer graphics.

Topics include: coordinate systems, trigonometry, vectors and vector operations, barycenters, representations of lines and planes, linear transformations, matrices, affine transformations.

Students may only earn credit for one of MAT 100 or MAT 140.

### **MAT 150 Calculus and Analytic Geometry I (4 Cr.)**

**Prerequisites:** MAT 100 or MAT 140

**Description:** This is the first semester of a three-semester course in the calculus of functions of a single real variable.

Topics include: limits, techniques of differentiation, applications to graphing, analytical geometry, physics, parametric functions, introduction to integration.

### **MAT 200 Calculus and Analytic Geometry II (4 Cr.)**

**Prerequisites:** MAT 150

**Description:** This is the second semester of the calculus sequence.

Topics include: applications of the integral in physics, techniques of integration, sequences, series and beginning vector calculus.

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

**Prerequisites:** MAT 200

**Description:** This is the third semester of the calculus sequence.

Topics include: vector-valued functions, curvature, torsion, partial derivatives, multiple integrals, vector fields, Green's Theorem, Divergence Theorem and Stokes' Theorem, beginning differential equations.

### **MAT 250 Linear Algebra (3 Cr.)**

**Prerequisites:** (MAT 140 and MAT 150) or MAT 200

**Description:** The course presents the mathematical foundations of linear algebra.

Topics include: systems of equations, Gauss-Jordan algorithm, matrices, vector spaces, determinants, subspaces, bases, linear transformations, eigenvalues. 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.)****Prerequisites:** MAT 200**Description:** This course introduces the basic theory and applications of first and second order linear differential equations. Applications include the harmonic oscillator, RLC circuits and elementary dynamical systems. Solution techniques include power series solutions, an introduction to special functions and the Laplace transform.**MAT 258/358 Discrete Mathematics (3 Cr.)****Prerequisites:** MAT 100 or MAT 140**Description:** This course gives an introduction to several mathematical topics of foundational importance in the mathematical and computer sciences.

Topics include: propositional and first order logic, basic number theory, enumeration, recurrence relations, mathematical induction, generating functions, basic probability and graph theory, asymptotic analysis.

**MAT 300 Curves and Surfaces (3 Cr.)****Prerequisites:** MAT 250, MAT 258**Description:** This course is an introduction to parametrized polynomial curves and surfaces.

Topics include: Bezier curves, control points, de Casteljau algorithm, splines, de Boor algorithm for polynomial curves, bipolynomial and total degree surfaces.

**MAT 340 Probability and Statistics (3 Cr.)****Prerequisites:** MAT 200, MAT 258**Description:** This course is an introduction to probability and statistics needed for computer science and artificial intelligence.

Topics include: sample spaces, continuous and discrete probability density functions, mean, conditional probability, Bayes' Theorem, expectation, variance, sums of random variables, statistical tests; binomial, Poisson, chi-square, normal distributions; confidence intervals, Central Limit Theorem, fuzzy sets and logic.

**MAT 350/550 Curves and Surfaces II (3 Cr.)****Prerequisites:** MAT 300**Description:** This course is a continuation of MAT 300.

Topics include: mathematical foundations for non-uniform rational B-spline (NURBS) curves and surfaces, de Casteljau and de Boor algorithms, knot insertion, and subdivision. Other topics may include subdivision surfaces, curvature of curves and surfaces, tensor products, and multivariate splines.

**MAT 351/551 Quaternions, Interpolation and Animation (3 Cr.)****Prerequisites:** MAT 300**Description:** This course covers topics in abstract algebra and geometry woven together by the thread of quaternions.

Topics include: rotation operators, finite groups, real algebras, the complex numbers as an algebra, unit complex numbers as rotations in the plane, division algebras, Hamilton's quaternion algebra, quaternions as 3D rotation operators, the unit quaternion sphere, interpolation of quaternions, continuity and differentiability of interpolation, applications to computer graphics.

**MAT 352/552 Wavelets (3 Cr.)****Prerequisites:** MAT 250, MAT 258**Description:** This course provides the foundations of wavelets as a method of representing and approximating functions.

Topics include: Fourier analysis, Haar transform, multiresolution analysis, subdivision curves and surfaces, B-spline wavelets. Applications to computer graphics include image editing,

compression, surface reconstruction from contours, and fast methods of solving 3D simulation problems.

**MAT 353/553 Differential Geometry (3 Cr.)**

**Prerequisites:** MAT 300

**Description:** Differential geometry studies curves and surfaces using the techniques of calculus.

Topics include: differentiability of multivariable functions, parametric curves in  $\mathbb{R}^3$ , surfaces in  $\mathbb{R}^3$  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, curvature tensor.

**MAT 354/554 Discrete and Computational Geometry (3 Cr.)**

**Prerequisites:** MAT 250, MAT 258

**Description:** This course gives an introduction to the basic theorems and algorithms of computational geometry, with particular attention paid to mathematical foundations.

Topics include: triangulation, Art Gallery Theorems, Voronoi diagrams, Delaunay graph, convex hulls, Minkowski sums, path finding, randomized algorithms. CS 330 is recommended background for this course.

**MAT 355/555 Graph Theory (3 Cr.)**

**Prerequisites:** MAT 250, MAT 258

**Description:** This course provides an introduction to the basic theorems and algorithms of graph theory.

Topics include: graph isomorphism, connectedness, Euler tours, Hamiltonian cycles, spanning trees, coloring algorithms, planarity algorithms, search algorithms.

**MAT 356/556 Advanced Differential Equations (3 Cr.)**

**Prerequisites:** MAT 250, MAT 256

**Description:** This course will cover the advanced theory and applications of ordinary differential equations.

Topics include: qualitative theory, dynamical systems, calculus of variations, applications to classical mechanics. Other topics may include chaotic systems and cellular automata.

**MAT 357/557 Numerical Analysis (3 Cr.)**

**Prerequisites:** MAT 250, MAT 258

**Description:** This course covers the numerical techniques necessary for obtaining approximate solutions to nonlinear equations arising from the construction of mathematical models of real-world phenomena.

Topics include: root finding, interpolation, approximation of functions, cubic splines, integration, differential equations, stability, iterative methods for solving systems of equations, eigenvalue approximation, Fast Fourier Transform.

**MAT 359/559 Computational Algebraic Geometry (3 Cr.)**

**Prerequisite:** MAT 300

**Description:** This course introduces computational algebra as a tool to study the geometry of curves and surfaces in affine and projective space.

Topics include: affine varieties, polynomial ideals, and the algebra-geometry dictionary; monomial orderings, Grobner bases, and the Buchberger algorithm; resultants, Zariski closure of algebraic sets, intersections of curves and surfaces, multivariate polynomial splines.



**MAT 361/561 An Introduction to Number Theory and Cryptography (3 Cr.)****Prerequisites:** MAT 250, MAT 258**Description:** This course will introduce topics from classical number theory.

Topics from number theory include: divisibility, Euclidean Algorithm, congruences, and quadratic reciprocity, factoring algorithms, finite fields, number fields, arithmetic of elliptic curves.

Topics from cryptography include: public key cryptosystems, discrete log problem, zero knowledge protocols, RSA algorithm, primality testing.

**MAT 400 Introductory Analysis I (3 Cr.)****Prerequisites:** MAT 250, MAT 258**Description:** This course introduces the mathematical foundations of real analysis.

Topics include: sets, real and complex numbers, series, continuity, differentiability, topology of metric spaces.

**MAT 410 Introductory Analysis II (3 Cr.)****Prerequisites:** MAT 400**Description:** This course is a continuation of Math 400.

Topics include: normed linear spaces, multivariable calculus and the theory of integration, Fourier Analysis.

**MAT 450 Abstract Algebra I (3 Cr.)****Prerequisites:** MAT 250, MAT 258**Description:** This course provides an introduction to the foundations of abstract algebra. The fundamental objects of study are groups, rings, and fields.

Topics may include: computation with finite groups, matrix groups, homomorphism theorems, group actions, symmetry, quotient spaces, polynomial rings, finite fields, basic theory of equations, Galois theory.

**MAT 460 Abstract Algebra II (3 Cr.)****Prerequisites:** MAT 400**Description:** This course builds on the foundations in MAT 450.

Topics may include: modules over rings, vector spaces, algebras, non-commutative rings and algebras, structure theorems, exact sequences, homology.

**MAT 390/590 Special Topics (3 Cr.)****Prerequisites:** Permission of instructor**Description:** Topics and content vary according to instructor.**MAT 399/599 Independent Study (3 Cr.)****Prerequisites:** Permission of instructor**Description:** Topics and content vary according to student-instructor collaboration.

## Physics

**PHY 115 Introduction to Applied Math and Physics (3 Cr.)****Prerequisites:** None**Description:** We live in a world governed by physical laws. As a result, we have grown accustomed to object's 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 will explore geometry, trigonometry for cyclical motions, and physical equations of motion for bodies moving under the influence of forces. With these tools, students will develop a broader understanding of the impact of knowledge in math and physics on their daily lives.

**PHY 200 Motion Dynamics (3 Cr.)****Concurrent Courses:** MAT 200**Description:** This course provides a fundamental understanding of the dynamics of various moving bodies by allowing students to implement the laws of physics in order to achieve realism.**PHY 250 Waves, Optics, and Aerodynamics (3 Cr.)****Prerequisite:** PHY 200**Description:** This course provides a fundamental understanding of the properties of light, periodic motions, and fluid dynamics. By understanding the physical laws governing these phenomena, students will be able to implement ray casting and ray tracing algorithms, create realistic flight simulators, and create various lens effects in two and three-dimensional environments.**PHY 270 Electricity and Magnetism (3 Cr.)****Prerequisite:** PHY 200**Concurrent Course:** MAT 225**Description:** The class studies the basic concepts underlying electrical and magnetic phenomena. It considers the following topics: atoms and free electrons; Coulomb's law; the electric field, Gauss's Law, and potential; capacitance, properties of dielectrics, current, resistance, and EMF; DC circuits and instruments, and Kirchhoff's rules; the magnetic field and magnetic forces on current-carrying conductors; magnetic field of a current; electromagnetic induction and magnetic properties of matter; alternating current; Maxwell's equations; electromagnetic waves; semiconductors and the PN junction; and photoelectric effect.**PHY 290 Modern Physics (3 Cr.)****Prerequisites:** PHY 200, PHY 250 or PHY 270, and MAT 200**Description:** 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 300 Advanced Mechanics (3 Cr.)****Prerequisites:** PHY 200, PHY 250, MAT 150, MAT 200, MAT 250, CS 200, CS 250, CS 300**Description:** 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 will provide the basis for the understanding of linear and rotational systems. The combination of theoretical physics and numerical methods will provide the student with the background for simulating physical systems with limited computational power. Topics covered include Lagrangian Dynamics, Hamilton's Equations, dynamics of rigid bodies, the use of the inertia tensor, collision resolution, and numerical techniques including methods of approximation.**PHY 350 Physics Simulation (3 Cr.)****Prerequisites:** PHY 300, MAT 300**Description:** Students will gather into teams of two to three and create a physics engine with minimal interface and graphics. Weekly lectures will go over the implementation of concepts covered in PHY300 as well as collision resolution, objects on surfaces, holonomic and nonholonomic constraints, numerical approximations, and special topics that address project-specific physics.

**PHY 500 Advanced Physically-based Modeling (3 Cr.)**

**Prerequisite:** Entrance into the Master's program in C.S.

**Description:** This class covers the topics in dynamics modeling techniques, including methods in the calculus of variations, Hamilton's principle, Lagrangian dynamics, Hamiltonian dynamics, motion in a non-inertial reference frame, dynamics of rigid bodies (moments of inertia, inertia tensor, and stability), collision resolution (impact parameters, scattering, and restitution), and physics of continuous bodies (elasticity, deformation, stress, and strain).

**PHY 550 Physics Simulation (3 Cr.)**

**Prerequisites:** Entrance into the Master's program in C.S.

**Description:** Students will gather into teams of two to three and create a physics engine with minimal interface and graphics. Weekly lectures will go over the implementation of concepts covered in PHY300 as well as collision resolution, objects on surfaces, holonomic and nonholonomic constraints, numerical approximations, and special topics that address project-specific physics.

## Faculty and Staff Roster

Computer Science		
Xin Li*	B.S. Computer Science M.S. Computer Science Ph.D. Computer Science	Northwest University (China) Academic Sinica (China) University of Central Florida
Jason Hanson	B.S. Mathematics/B.S. Physics M.S. Physics M.A. Mathematics Ph.D. Mathematics	University of Massachusetts University of Virginia Columbia University University of Hawaii
Tyler Folsom	B.S. Mathematics M.A. Mathematics M.S.E.E. Electrical Engineering Ph.D. Electrical Engineering	Villanova University University of Maryland University of Washington University of Washington
Matthew Mead	B.S. Computer Science M.S. Computer Science	Portland State University Portland State University
Prasanna Ghali	B.S. Electrical Engineering M.S. Electrical Engineering	Osmania University (India) University of Oklahoma
Scott Dee	B.S. Electrical Engineering	University of British Columbia
Nathan Ukrainetz	B.S. Electrical Engineering B.S. Computer Science	University of Saskatchewan (Canada) University of Saskatchewan (Canada)
Hao Wu	B.S. Electrical Engineering M.S. Electrical Engineering	Tsinghua University (China) University of Washington
Claude Comair	Le diplôme d'Ingenieur Archit. M.Eng. Environmental Eng.	L'Université du Saint Esprit (Lebanon) Osaka University (Japan)
Gary Herron	B.A. Mathematics Ph.D. Mathematics	Northern Michigan University University of Utah
Bruce Dawson	Professional Experience	
Rami Zaatari	M.S. Computer Science	University of North Carolina
Mathematics & Physics		
Michael Jahn*	B.S. Mathematics B.S. Electrical Engineering Ph.D. Mathematics	Southern Methodist University Southern Methodist University University of Wisconsin-Madison
Erik Mohrmann	B.S. Physics M.S. Physics	Rensselaer Polytechnic Institute University of Washington
Matt Klassen	B.S. Mathematics Ph.D. Mathematics	University of Arizona University of Arizona
Martin Weinless	B.S. Physics Ph.D. Mathematics	City College of New York Polytechnic University
Michael Aristidou	B.S. Mathematics M.S. Mathematics M.A. Philosophy Ph.D. Mathematics	Aristotle University of Thessaloniki, Greece Louisiana State University Louisiana State University Louisiana State University
Charles Duba	B.S. Physics M.S. Physics	University of California-San Diego University of Washington
Game Software Design & Production		
Jen Sward	B.S. Electrical & Computer Engineering	University of California
Ben Ellinger	B.S. Kinesiology	University of Texas
Michael Moore*	B.A. Communications B.A. English M.A. Communication	St. Mary's College St. Mary's College Southern Illinois University
Christopher Erhardt	B.S. Human Resources & Org. Behavior	University of San Francisco
Jay Gale	B.A. Broadcast Communication	University of Colorado

General Education		
Cedric Page*	B.A. Geography M.A. Geography Ph.D. Geography	Syracuse University Rutgers University Rutgers University
Stephen Schafer	B.A. Psychology M.A. English	University of Denver University of Denver
Janice Lovelace	B.A. Psychology and Biology M.A. in Clinical Psychology  Ph.D. Clinical Psychology	Mills College California School of Professional Psychology California School of Professional Psychology
Adam Rovner	B.A. English Literature M.A. Comparative Literature Ph.D. English	Washington University Hebrew Univeristy of Jerusalem Indiana University
Ryan Adams	B.A. Interdisciplinary Literature Studies M.A. English	University of Washington Western Washington University
Art		
Abbott Smith*	A.A.A. Computer Animation & Multimedia B.F.A. Studio Art B.A. Biology M.A. Illustration	The Art Institute of Seattle Augusta College Wabash College Syracuse University
Royal Winchester	A.A.A. 3-D Computer Animation B.S. Physics	DigiPen Institute of Technology Purdue University
Billy Jarcho	B.F.A Visual Design in Media Arts	Emerson College
Monte Michaelis	A.A.A. Computer Animation	The Art Institute of Seattle
Lawrence Schwedler	B.A. Music M.F.A. Music Performance	University of California at Los Angeles University of California at Los Angeles
Alecia Rossano	B.A. Studio Art M.F.A. Sculpture	Scripps College New York Academy of Art
Donald "BJ" Becker	B.A. 3-D Design M.A. Illustration	West Surrey College of Arts and Design Syracuse University
Jim Johnson	B.A. Theater Arts M.A. Cinematography	Humboldt State University Humboldt State University
Jazno Francoeur	B.F.A. Illustration	Kansas City Art Institute
Riley Prigg	A.A. Digital Imaging & Computer Animation	Bellevue Community College
Charles Wood	B.A. Biology B.S Medical Illustration Science M.S. Medical Illustration Ph.D. Physical Anthropology	Kalamazoo College The Medical College of Georgia The Medical College of Georgia University of Washington
Tony White	East Ham Technical College Extensive study of and professional experience in advanced animation techniques	London, England
Geraldine Kovats	B.F.A. Illustration Certificate of Completion-Painting, Animation	Academy of Art (San Francisco) Walt Disney Feature Animation

\*Department Chairperson

Staff	
Claude Comair	President
Jason Chu	Chief Operating Officer
John Bauer	Chief Financial Officer
Raymond Yan	Senior Vice President of Operations
Cedric Page	Dean of Faculty
Meighan Shoesmith	Sr. Vice President of Administration/Registrar
Melvin Gonsalvez	Senior Vice President of Production
Mayu Davis	Controller
Yuki Taber	Director of Administration/Bursar
Asuka Miyahara	Accounting Assistant
Gordon Dutrisac	Student Services Director/Librarian
Kim King	Financial Aid Director
Marti Jackson	Financial Aid Administrator
Angela Kugler	Admissions and Outreach Manager
Tony Keim	Assistant Admissions Coordinator
Katie McCully	Office Manager
Masayo Arakawa	Marketing and Outreach Support
Nadine Haining	Technical Project Coordinator
Emma Johansson	Receptionist
Ryan Fulcher	IT Support
Atom Powers	Tech Support
Brian Rosell	Facilities and Security