



**SCHOOL OF COMPUTER SCIENCE, TELECOMMUNICATIONS
AND INFORMATION SYSTEMS**

ADMINISTRATION

DAVID MILLER, Ph.D.
Senior Associate Dean
GREGORY BREWSTER, Ph.D.
Associate Dean
MARTIN KALIN, Ph.D.
Associate Dean
LINDA V. KNIGHT, Ph.D.
Associate Dean
ANNE B. MORLEY
Assistant Dean

FACILITIES

FACULTY

ADMISSION

ACADEMIC PROGRAMS

BACHELOR OF SCIENCE IN COMPUTER GAMES DEVELOPMENT

BACHELOR OF SCIENCE IN COMPUTER GRAPHICS AND ANIMATION

- I. Developer
- II. Technical Designer

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

BACHELOR OF ARTS IN DIGITAL CINEMA

- I. Standard
- II. Animation
- III. Screenwriting

BACHELOR OF SCIENCE IN DIGITAL CINEMA

BACHELOR OF SCIENCE IN E-COMMERCE TECHNOLOGY

BACHELOR OF SCIENCE IN HUMAN-COMPUTER INTERACTION

BACHELOR OF SCIENCE IN INFORMATION ASSURANCE ENGINEERING

BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BACHELOR OF SCIENCE IN MATHEMATIC AND COMPUTER SCIENCE

- I. Theory
- II. Computational Methods
- III. Graphics
- IV. Artificial Intelligence
- V. Data Analysis

BACHELOR OF SCIENCE IN NETWORK TECHNOLOGY

- I. Standard
- II. Network Security

COMBINED BACHELOR OF SCIENCE AND MASTER OF SCIENCE DEGREES

BACHELOR OF ARTS IN COMPUTING (JOINT DEGREE WITH SCHOOL OF NEW LEARNING)

SPECIAL PROGRAM: TEACHER OF COMPUTER SCIENCE: SECONDARY LEVEL

MINORS

COURSES

GENERAL INFORMATION

The School of Computer Science, Telecommunications and Information Systems offers a course of studies leading to the degrees of Bachelor of Science in Computer Graphics and Animation, Bachelor of Science in Computer Science, Bachelor of Science in E-Commerce Technology, Bachelor of Science in Information Systems, Bachelor of Science in Human-Computer Interaction, Bachelor of Science in Math and Computer Science, Bachelor of Science in Network Technology and Bachelor of Arts in Computing. The purpose of each curriculum is to prepare the student with the requisite theoretical, technical, and practical knowledge for a professional career in various computer or computer-related fields. Each degree program develops an informed view of the relationship between computer science and its allied fields while equipping the student with the technical expertise necessary to enter a computer-related career.

FACILITIES

DePaul's Information System Division (ISD) houses a large network of computers and allows students, access to a rich computing environment. The configuration includes several Sun SPARCcenters for student use. In addition, students have access to IBM PC laboratories and Macintosh laboratories at the Loop and Lincoln Park campuses. There are numerous dial-up phone numbers available for off-campus work. DePaul's suburban campuses, in the Naperville, O'Hare and South areas also offer excellent student laboratory facilities. Permanent student Internet access accounts are available along with dial-in SLIP connections.

The School itself operates specialized laboratories in the following:

- Requirements Engineering Lab
- Mobile E-Commerce Lab
- Solid Objects Lab
- Software Research Lab
- Multimedia Networking Lab
- Artificial Intelligence Lab
- American Sign Language Lab
- E-Commerce Technology Lab
- Information Systems Lab

FACULTY

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Assistant Professor
University of Victoria

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Professor
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Purdue University

LU ZHANG, Ph.D.,
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Iowa State University

JOANNE ZIELINSKI, M.F.A.,
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Rutgers University

ADMISSION

Candidates interested in admission to the school should direct all inquiries to the Office of admission, DePaul University, 1 E. Jackson Boulevard, Chicago, Illinois 60604. Telephone (312) 362-8300; e-mail: admitdpu@depaul.edu. The Office of Admission will provide each candidate with the required forms and instructions for filing the application or visit the web site at www.depaul.edu to apply on-line. A non-refundable application fee of \$25.00 is required of each applicant. For further information on the regulations and procedures governing admission, consult page 441 of the Bulletin.

ACADEMIC ADVISEMENT

The school believes that academic advisement is necessary for the vitality and success of the student's undergraduate education. The purposes of liberal education require that the education of the student form a coherent whole. Therefore, the requirements of the Liberal Studies Program and to a degree the major field of study are determined by the individual student's intellectual interests, needs and abilities.

Students will be assigned a faculty advisor upon admission to the school. Academic approval of a course of study is required of all students in the school. All students are encouraged to meet with their faculty advisor at least once each year to plan their course of study.

PROFESSIONAL DEVELOPMENT

The School of Computer Science, Telecommunications and Information Systems established the Institute for Professional Development in 1985 to offer certificate programs designed to meet the needs of both individuals and businesses in the Chicagoland area. These non-degree offerings provide intensive training in a wide variety of areas, with each standalone certificate program addressing a different set of theoretical concepts and practical skills. Emphasis is placed on gaining practical experience through a combination of lectures and demonstrations complemented by laboratory exercises and homework assignments. Certificate programs are typically taught by a team of instructors, that includes full-time faculty with consulting experience and part-time instructors from industry. The programs require a substantial commitment of time, as most meet two nights per week and in the morning on approximately half of the Saturdays during the program.

For application and registration information pertaining to the certificate programs offered by the Institute for Professional Development, please call the Institute office at (312) 362-6282.

Current certificate program offerings include:

IPD 370 Advanced SQL Program

A 2-week program covering advanced SQL features

IPD 371 Advanced Oracle PL/SQL Program

A 3-week program covering advanced PL/SQL concepts and programming constructs

IPD 381 Best Practices in Web Design Program

A 7-week comprehensive program covering best practices in web design based on current mark-up, presentation, and accessibility standards

IPD 395 Database Technologies Program

A 12-week comprehensive program covering database applications development and administration using Oracle

IPD 380 Information Systems Project Management Program

A 10-week comprehensive program covering best practices in information systems project management

IPD 390 Information Systems Security Management Program

A 10-week comprehensive program covering best practices in designing, implementing and maintaining an organizational information security plan

IPD 394 J2EE Developer Program

A 10-week in-depth program covering enterprise-wide applications development using J2EE

IPD 382 Java Developer Program

A 10-week comprehensive program covering object-oriented applications development using Java

IPD 366 Java Web Services Program

A 7-week concentrated program covering service-oriented architecture and the development of Web services using Java

IPD 393 Local Area Networks Program

A 12-week intensive program in the fundamentals of wired and wireless local area networks, wide area networks, and network-based services

IPD 389 .NET Developer Program

A 10-week comprehensive program covering .NET technologies

IPD 368/468 .NET Mobile Applications Development Program

A 10-week focused program covering the basic skills and techniques for successfully building mobile applications using the .NET platform

IPD 398 .NET Web Services Program

An 8-week concentrated program covering service-oriented architecture and the development of Web services using the .NET platform

IPD 396 Network Security Program

An 11-week intensive program in the fundamentals of network security, hosts security, and Information Assurance

IPD 376 Oracle Database Availability, Scalability, and Recoverability Program

A 3-week program covering Oracle database availability, scalability, and recoverability

IPD 372 Oracle Database Programming Using Open Architecture Program

A 3-week program covering open architecture database application development

IPD 367 Understanding Wireless Mobility & Security Program

A 10-week rapidly-paced overview and exploration of the major concepts and key issues driving the wireless mobility revolution in business, industry, law, government, healthcare, transportation and education

IPD 392 Voice-over-IP Program

A 12-week integrated program focusing on designing and implementing fully converged and integrated Voice-over-IP (VoIP) networks and systems

TRANSFER CREDIT

Prospective students may transfer credit from an accredited college to DePaul University. All transfer credit will be initially evaluated by an Admission counselor; final course placement will be made by an academic advisor in the School of Computer Science, Telecommunications and Information Systems (CTI). For specific information governing transfer admission and evaluation of credit, please consult page 442 of this Bulletin. Current CTI students may take courses at another accredited college either in the summer or during the regular school year and transfer the credit back to DePaul University only with prior approval from the student's academic advisor.

GRADES

Students must earn grades of 'C' or above in all courses taken for credit in the major field. Grades of 'C-' may be accepted for major field credit provided the overall grade point average within the major is 2.0 or above. All other courses require grades of 'D' or better. In addition, all students must fulfill the graduation requirements as noted on page 469 of this Bulletin.

MODERN LANGUAGE OPTION

Students in the School of Computer Science, Telecommunications and Information Systems (CTI) may choose to study a modern language and use the credit earned from the language courses to satisfy Liberal Studies domain requirements. Students reduce their Liberal Studies domain requirements by two courses if they complete a three-course language sequence. From the following combinations of learning domains, students can select their two course reduction:

Philosophical Inquiry or Religious Dimensions; Understanding the Past or Self, Society and the Modern World; Arts and Literature (at most one course from each combination).The third course in the three-course language sequence may apply as open elective credit only.

BACHELOR OF SCIENCE LIBERAL STUDIES PROGRAM

The student's course of study in the Liberal Studies Program is part of the undergraduate program devoted exclusively to liberal education. The program seeks to balance and, when necessary, augment the student's course in the major field. In addition to the 24 quarter hours required in the liberal studies core, all students in the School are required to complete 52 quarter hours distributed through 6 learning domains as part of one degree program. The number and distribution of courses in each of the areas are as follows:

Liberal Studies Core: 6 courses/24 quarter hours required

First Year Program: (16 quarter hours required) Discover Chicago or Explore Chicago, Focal Point Seminar, and Composition and Rhetoric I and II.

Sophomore Seminar: (4 quarter hours required) Sophomore Seminar on Multiculturalism in the United States

Junior Year Experiential Learning: (4 quarter hours required) If your junior year experiential learning requirement also fulfills a major field requirement, you may substitute a liberal studies domain elective (from outside your major field area) or the third course in the modern language option for this requirement.

Senior capstone: All CTI majors require that students complete the senior capstone in their major field.

Liberal Studies Learning Domains: 13 courses/52 quarter hours required

Arts and Literature: 12 quarter hours required. At most 2 courses from the same department or program. (ART 102 is required for the Bachelor of Science in Computer Graphics and Animation technical designer concentration.)

Philosophical Inquiry: 8 quarter hours required.

Religious Dimensions: 8 quarter hours required; 4 quarter hours in "Patterns and Problems," and 4 quarter hours in "Traditions in Context." Note: One course from either Philosophical Inquiry or Religious Dimensions must be a course in ethics. CSC 208 strongly recommended, MGT/PHIL/REL 228 recommended.

Scientific Inquiry: 4 quarter hours required. The course must be designated as a lab course. Courses in mathematics or CTI are not acceptable.

Self, Society and the Modern World: 12 quarter hours required. At most 2 courses from the same department or program. (Psychology 105 is required for the Human-Computer Interaction degree).

Understanding the Past: 8 quarter hours required; 4 quarter hours of history pre-1800 and 4 quarter hours of history 1800-1945. In addition, courses must be from two different categories:

1) Asia, 2) Latin America, 3) Africa, 4) North America or 5) Europe; 6) intercontinental or comparative.

Although study in CTI courses contributes to a student's liberal education, courses offered through CTI may not be applied towards liberal studies requirements.

ACADEMIC PROGRAMS

BACHELOR OF SCIENCE IN COMPUTER GAMES DEVELOPMENT

The B.S. degree in Computer Games Development reflects the fact that the field of computer games development is tremendously multidimensional and requires expertise from such areas as: game play, game design, art, 3D modeling, animation, procedural art development, physics, programming languages, artificial intelligence to name only a few. The program emphasizes the fact that a game developer needs inspiration from such areas as art, architecture and engineering. Students graduating from this program will be prepared for design, modeling and programming jobs in the gaming industry.

ANI 101 Animation or ANI 201 Animation I
ANI 105 Motion Design
ANI 200 3D Modeling for Animation and Gaming
ANI 210 3D Animation for Cinema and Gaming
ANI 310 Motion Capture Workshop
CSC 261 Programming Languages I: C/C++
CSC 262 Programming Languages II: C/C++
GAM 224 Strategies in Game Design
GAM 244 Game Development I
GAM 245 Game Development II
GAM 341 Artifact, Level and Terrain Design
GAM 350 Physics for Game Developers
GAM 374 Action Games Programming
GAM 376 Artificial Intelligence for Computer Games
GAM 378 Strategy Games Programming
GAM 394 Game Development Project I
GAM 395 Game Development Project II
IT 228 Ethics in Computer Games and Cinema
MAT 150 Calculus I

- Gaming Electives (5)
- DC 201 is required as a liberal studies course
- Open Electives (4)

Gaming Electives

Any 200-level DC or GPH Course
Any 300-level CTI Course

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN COMPUTER GRAPHICS AND ANIMATION

I. DEVELOPER CONCENTRATION

The developer concentration in the B.S. in Computer Graphics and Animation degree emphasizes software development for such areas as computer animation, video gaming, multimedia, and special effects. It prepares students for such careers as games development, visualization, and modeling.

CMN 220 Public Speaking
CSC 261 Programming Languages I: C/C++
CSC 262 Programming Languages II: C/C++
CSC 321 Design and Analysis of Algorithms
CSC 393 Data Structures in C++
ENG 204 Technical Writing
GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
GPH 213 Perceptual Principles for Digital Environments III

GPH 325 Survey of Computer Graphics
 GPH 329 Computer Graphics Development
 GPH 339 Advanced Rendering Techniques
 GPH 372 Principles of Computer Animation
 GPH 375 Advanced Graphics Development
 GPH 395 Computer Graphics Senior Project
 HCI 315 Theory and Perception of Color
 MAT 140 Discrete Mathematics I
 MAT 150 Calculus I
 MAT 151 Calculus II
 MAT 220 Linear Algebra with Applications

- Graphics Electives (6) (See list below)
- Open Electives (2)

II. TECHNICAL DESIGNER CONCENTRATION

The technical designer concentration in the B.S. in Computer Graphics and Animation degree prepares students to support and engage in the visual aspects of the graphics and entertainment industry, including such careers as technical director for computer animation, games designer and new media consultant.

ART 106 Beginning Drawing
 ART 242 Survey of Asian Art
 ART 322 Contemporary Art
 CMN 220 Public Speaking
 CSC 211 Programming in Java I and CSC 212 Programming in Java II
 OR
 CSC 261 Programming Languages I: C/C++ and CSC 262 Programming Languages II: C/C++
 ENG 204 Technical Writing
 GPH 211 Perceptual Principles for Digital Environments I
 GPH 212 Perceptual Principles for Digital Environments II
 GPH 213 Perceptual Principles for Digital Environments III
 GPH 255 Hand Prototyping for Graphic Visualization
 GPH 250 Digital Modeling I
 GPH 325 Survey of Computer Graphics
 GPH 338 Survey of 3-D Animation
 GPH 339 Advanced Rendering Techniques
 GPH 395 Computer Graphics Senior Project
 HCI 210 Introduction to Human-Computer Interaction
 HCI 315 Theory and Perception of Color
 IT 130 The Internet and the Web
 IT 236 User Interface Development
 MAT 140 Discrete Mathematics I

- Graphics Elective (4) (See list below)
- Open Electives (3)
- ART 102 Principles of Art History is required as a liberal studies course

Graphics Electives List

Students may take any of the following courses as long as they were not previously used to satisfy the computer graphics and animation core:

ART 225 Beginning Photography
 ART 329 Digital Photography
 ART 360 Illustration
 ART 373 History of Design
 GPH 250 Digital Modeling I
 GPH 259 Design Geometry
 GPH 329 Computer Graphics Development
 GPH 336 Smooth Surface Modeling for Graphics and Animation
 GPH 340 Procedural Shading
 GPH 341 Advanced Lighting Techniques
 GPH 348 Rigging for Animation
 GPH 350 Digital Modeling II

GPH 360 Modeling Spaces
GPH 374 Computer Games
GPH 375 Advanced Graphics Development
GPH 376 Artificial Intelligence in Computer Games
GPH 380 Visualization
GPH 389 Real-Time Graphics Techniques
HCI 210 Introduction to Human-Computer Interaction
HCI 270 Formatting Digital Pages I
HCI 271 Formatting Digital Pages II
HCI 322 Multimedia
HCI 341 Usability Issues for Electronic Commerce
IT 223 Data Analysis
IT 236 User Interface Development
MAT 150 Calculus I
MAT 151 Calculus II
MAT 152 Calculus III

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Computer Science is the scientific discipline that studies the foundations of computing, data storage, and information processing, and then applies this knowledge to improving the performance of current computer applications, or to develop new applications for computer systems. The Bachelor of Science in Computer Science is the flagship program at CTI that provides the training for a student to become a professional in Computer Science. The key difference between Computer Scientists and graduates in other IT disciplines is that Computer Scientists obtain a comprehensive foundation that permits them to adapt to as well as create new technologies, new paradigms, and new ideas.

Computer science is a broad field that spans such diverse areas as security and cryptography, robotics and computer vision, data mining and databases, distributed and mobile systems, intelligent systems and gaming, computational biology, and other exciting areas. Computer Scientists are working on making better search engines, designing more realistic virtual reality computer games, making our appliances smarter, mining databases to create new insights, and harnessing the power of millions of desktop computers to help solve problems in computational biology and other sciences. They are also working on developing more efficient ways to encrypt information, send video and audio streams through the Web, search for patterns in texts, images or the web, and display complex images.

The coursework for the BS in CS consists of the DePaul University Liberal Studies Program (19 courses, not including the Senior Capstone), Major Field courses (24 courses or 96 credits, including the Senior Capstone), and Open Elective courses (5 courses or 20 credits).

Note: CSC 208 The Computer and Social Responsibility must be taken to satisfy the PI liberal studies requirement.

The Major Field courses for the BS in CS consist of 18 required (4 credit) courses and 6 Major Field elective courses (or 24 credits) chosen from the list below.

THE 18 REQUIRED COURSES are intended to provide training in the foundations of computer science:

A. the mathematical tools,

- B. problem solving, algorithms, and structured programming,
- C. modeling and object-oriented programming, and
- D. computer systems.

They also include:

- E. the communication requirement, and
- F. the senior capstone course.

A. Mathematical Tools (5 courses):

MAT 140 Discrete Mathematics I
 MAT 141 Discrete Mathematics II
 IT 223 Data Analysis
 and any of the following calculus sequences (160/161 or 170/171 are highly recommended):
 MAT 150 Calculus I
 and MAT 151 Calculus II
 or
 MAT 160 Calculus for Mathematics and Science Majors I
 and MAT 161 Calculus for Mathematics and Science Majors II
 Or
 MAT 170 Promath Calculus for Mathematics and Science Majors I
 and MAT 171 Promath Calculus for Mathematics and Science Majors II

B. Problem solving, algorithms, and structured programming (3 courses):

CSC 241 Introduction to Computer Science I
 CSC 242 Introduction to Computer Science II
 CSC 321 Design and Analysis of Algorithms

C. Modeling and Object-Oriented Programming (3 courses):

CSC 224 Object-Oriented Programming in Java
 CSC 383 Data Structures and Algorithms in Java
 (or CSC 393 Data Structures in C++)
 SE 350 Object-Oriented Software Development (x-listed with SE 450)

D. Computer Systems (4 courses):

CSC 309 Object-Oriented Programming in C++
 CSC 373 Computer Systems I
 CSC 374 Computer Systems II
 CSC 347 Programming Languages (x-listed with CSC 447)

E. Capstone

CSC 394 Software Projects

F. Communication

ENG 204 Technical Writing
 CMN 220 Public Speaking

MAJOR FIELD ELECTIVE COURSES

At least 4 of the 6 Major Field elective courses (i.e. 16 out of 24 credits) must be taken from the list of "ADVANCED MAJOR FIELD COURSES" (see below).

I. INTRODUCTORY MAJOR FIELD COURSES

IT 130 The Internet and the Web
IT 209 Introduction to Programming Through Animation
IT 230 Building Internet Applications
IT 236 User Interface Development
IT 240 Introduction to Desktop Databases
IT 263 Applied Networks and Security
HCI 210 Introduction to Human-Computer Interaction
GAM 244 Game Development I
CSC 233 Codes and Ciphers
CSC 235 Problem Solving

II. ADVANCED MAJOR FIELD COURSES

The courses are listed by area; there is NO requirement that the 4 courses must be from the same or from different areas.

Theory of Computation

CSC 333 Cryptology
CSC 344 Automata Theory and Formal Grammars
CSC 389 Theory of Computation
CSC 327 Problem Solving for Contests

Data Storage

CSC 351 Database Design
CSC 352 Database Programming
CSC 353 Advanced Database Concepts

Computer Systems

CSC 348 Introduction to Compiler Design (x-listed with CSC 448)
DS 320 Foundations of Distributed Systems I (x-listed with DS 420)
DS 321 Foundations of Distributed Systems II (x-listed with DS 421)
TDC 368 Network Programming

Data Analysis and Mining

CSC 324 Data Analysis and Statistical Software II
CSC 328 Data Analysis for Experimenters
CSC 367 Introduction to Data Mining
CSC 334 Advanced Data Analysis

Computational Sciences

CSC 331 Scientific Computing
CSC 387 Operations Research I: Linear Programming
CSC 388 Operations Research II: Optimization Theory

Artificial Intelligence

CSC 357 Expert Systems
CSC 358 Symbolic Programming
CSC 380 Artificial Intelligence

Computer Vision

CSC 381 Introduction to Digital Image Processing
CSC 382 Applied Image Analysis
CSC 384 Introduction to Computer Vision

Software Engineering

SE 325 Principles and Practices of Software Engineering
SE 330 Object Oriented Modeling
SE 331 Model-Driven Software Development
SE 333 Software Testing
CNS 340 Fundamentals of Information Assurance
SE 352 Object-Oriented Enterprise Application Development

SE 368 Software Measurement and Project Estimation
SE 375 Design and Architecture of Secure Software Systems

Human-Computer Interaction

HCI 334 User Interface Implementation
HCI 360 User-centered evaluation

Computer Graphics

GPH 325 Survey of Computer Graphics
GPH 329 Computer Graphics Development
GPH 336 Smooth Surface Modeling for Graphics and Animation
GPH 339 Advanced Rendering Techniques
GPH 372 Principles of Computer Animation
GPH 375 Advanced Graphics Development
GPH 380 Visualization
GPH 389 Real-Time Graphics Techniques
GPH 395 Computer Graphics Senior Project

Computer Gaming

GAM 350 Physics for Game Developers
GAM 374 Action Games Programming
GAM 376 Artificial Intelligence for Computer Games
GAM 378 Strategy Games Programming
GAM 394 Game Development Project I
GAM 395 Game Development Project II

The Bachelor of Science in Computer Science: Software Engineering Concentration Program

PROGRAM REQUIREMENTS

The coursework for the BS in CS: SE Track consists of the DePaul University Liberal Studies Program (19 courses), Major Field courses (24 courses or 96 credits), and Open Elective courses (5 courses or 20 credits).

Note: CSC 208 The Computer and Social Responsibility must be taken to satisfy the PI liberal studies requirement.

The Major Field courses for the BS in CS: SE Concentration consist of 21 required (4 credit) courses and 3 SE Concentration elective courses (or 12 credits). The 21 required courses include the 18 courses required for the BS in CS as well as the following 3 SE courses:

SE 325 Principles and Practices of Software Engineering
SE 330 Object Oriented Modeling
SE 352 Object-Oriented Enterprise Application Development

SE Concentration Elective courses (3 courses or 12 credits):

SE 331 Model-Driven Software Development
SE 333 Software Testing
CNS 340 Fundamentals of Information Assurance
DS 320 Foundations of Distributed Systems I
HCI 334 User Interface Implementation
SE 368 Software Measurement and Project Estimation
SE 375 Design and Architecture of Secure Software Systems

Students taking the SE Concentration have the option of taking the below senior capstone 2 course (or 8 credits) sequence in lieu of CSC 396 (which then reduces the Open Elective list to 4 courses):

SE 391 Software Engineering Studio I
SE 392 Software Engineering Studio II

BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN DIGITAL CINEMA

Digital Cinema is an innovative production program dedicated to defining and developing the relationship between changing technologies and creative artistic expression.

The convergence of cinema, animation and gaming in the BS and BA in Digital Cinema will train you to redefine cinematic reality.

The B.A. degree, with its greater number of electives, offers the student a chance to create an interdisciplinary program of study. It also offers two concentrations: Animation and Screenwriting.

The B.S. degree, with its increased technical emphasis, provides students with more comprehensive training in the three areas of digital cinema.

Please note: Students in the both Digital Cinema programs are required to take 8 quarter hours in Mathematical and Technological Literacy (ISP120 and 121). Students who complete 8 credits of Mathematical and Technological Literacy will replace one course from any one of the six Learning Domains with the second course in the sequence (ISP 121), as long as they take at least one course in each domain. Students whose program of study requires calculus or discrete mathematics are exempt from the Mathematical and Technological Literacy requirement. Students may elect to take a proficiency exam to place out of one or both courses in the Mathematical and Technological Literacy sequence.

BACHELOR OF ARTS IN DIGITAL CINEMA

I. Standard Concentration

ANI 101 Animation or ANI 201 Animation I

Or ANI 201 Animation I

DC 201 Narrative Techniques in Digital Cinema

DC 205 Foundations of Digital Cinema

DC 207 History of American Cinema, 1890-1945

DC 208 History of American Cinema, 1946-1975

DC 209 History of American Cinema, 1976-Present

DC 210 Digital Cinema Production I

DC 215 Digital Sound Design

DC 220 Non-Linear Editing I

DC 225 Digital Cinema Practicum

DC 270 Topics in Digital Cinema

DC 275 Cinematography and Lighting

DC 301

DC 310 Digital Cinema Production II

DC 311 Music Video Production

DC 315 Advanced Digital Sound Design

DC 320 Non-Linear Editing II

DC 371 Documentary Production

DC 378 Compositing and Special Effects

DC 389 The Big Picture

DC 390 Topics in Directing

DC 395 Topics in Production

DC 398 Digital Cinema Capstone

Open Electives (5)

- GAM 224 is required as one of the A&L Liberal Studies courses.

II. Animation Concentration

Liberal Studies

ART 106 Beginning Drawing and ART 239 20th Century Art are required as two of the three A&L Liberal Studies courses. GAM 224 Strategies in Game Design is highly recommended

ANI 105 Motion Design
ANI101 or ANI 201 Animation I
ANI 200 3d Modeling
ANI 210 3d Animation
ANI 300 3d Character Animation
ANI 206 History of Animation
ANI 220 Pre-production Art
ANI 240 Animation II
ANI 340 Animation III
ANI 350 Animation Production Studio
DC 201 Narrative Techniques
DC 205 Foundations of Digital Cinema
DC 210 Digital Cinema Production I
DC 215 Digital Sound Design
DC 220 Non-Linear Editing I
DC 206 Introduction to Film History
DC 275 Cinematography and Lighting
ART 218 Figure Drawing
ART 318 Advanced Figure Drawing
Animation Electives (5)
Any ANI, ART, CGA, DC, GAM, or HCI course

Senior Year Capstone:

DC 398 Digital Cinema Capstone (Can substitute GAM 394. If GAM 394 is used, then the student MUST also take GAM 395 as an elective.)

Open Electives (3)

III. Screenwriting Concentration

DC 201 Narrative Techniques in Digital Cinema
DC 205 Foundations of Digital Cinema
DC 207 History of American Cinema, 1890-1945
DC 208 History of American Cinema, 1946-1975
DC 209 History of American Cinema, 1976-present
DC 210 Digital Cinema Production I
DC 215 Digital Sound Design
DC 220 Non-Linear Editing I
DC 250 Working With Actors
DC 270 Topics in Digital Cinema
DC 301 Advanced Screenwriting I
DC 304 Topics in Screenwriting
DC 302 Advanced Screenwriting II
DC 303 Advanced Screenwriting III
DC 389 The Big Picture: The Entertainment Industry
DC 390 Topics in Directing
DC 398 Capstone

Theatre Courses:

THE 206 History of Dramatic Literature (3 quarters; 4 credit hours each)
THE 244 Dramatic Writing for Non-Majors

English Courses:

Two 200 level or higher English Literature classes

Open Electives (5)

BACHELOR OF SCIENCE IN DIGITAL CINEMA

ANI 101 Animation or ANI 201 Animation I
ANI 105 Motion Design
ANI 200 3D Modeling for Animation and Gaming
ANI 210 3D Animation for Cinema and Gaming
ANI 300 3D Character Animation
ANI 310 Motion Capture Workshop
DC 201 Narrative Techniques in Digital Cinema
DC 205 Foundations of Digital Cinema
DC 207 History of American Cinema, 1890-1945
DC 208 History of American Cinema, 1946-1975
DC 209 History of American Cinema, 1976-Present
DC 210 Digital Cinema Production I
DC 215 Digital Sound Design
DC 220 Non-Linear Editing I
DC 225 Digital Cinema Practicum
DC 275 Cinematography and Lighting
DC 310 Digital Cinema Production II
DC 315 Advanced Digital Sound Design
DC 320 Non-Linear Editing II
DC 375 High Definition Cinematography
DC 378 Compositing and Special Effects
DC 390 Topics in Directing
DC 395 Topics in Production
DC 398 Digital Cinema Capstone
GAM 224 Strategies in Game Design
GAM 244 Game Development I
GAM 245 Game Development II

- Open Electives (2)
- GAM224 is required as one of the A&L Liberal Studies courses.

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN E-COMMERCE TECHNOLOGY

Students earning the Bachelor of Science program in E-Commerce Technology will acquire computer programming, user-centered design, and E-Commerce system development skills, as well as knowledge of the technology of databases, networking, and middleware.

CMN 212 Small Group Communication or CMN 220 Public Speaking
CSC 211 Programming in Java I
CSC 212 Programming in Java II
ECT 330 Advanced Internet Application Development
ECT 355 E-Commerce Application Models
ECT 359 E-Commerce Technology Senior Project
ECT 360 Introduction to Xml
ECT 365 Web Server Operations
ECT 372 Software Project Development and Management
ENG 204 Technical Writing or ENG 301 Writing in the Professions
HCI 210 Introduction to Human-Computer Interaction
IT 130 The Internet and the Web
IT 201 Introduction to Information Systems
IT 215 Analysis and Design Techniques

IT 223 Data Analysis
 IT 230 Building Internet Applications
 IT 240 Introduction to Desktop Databases
 IT 263 Applied Networks and Security
 MAT 140 Discrete Mathematics I or BMS 125 Business Calculus I
 SE 330 Object Oriented Modeling

- 300-level CTI elective (2) - chosen in consultation with student's advisor.
- Open Electives (6)

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN HUMAN-COMPUTER INTERACTION

The Bachelor of Science in Human-Computer Interaction is a multidisciplinary degree program designed to study methods that improve the working relationship between humans and computers. HCI practitioners enable individuals and groups to make more effective use of computers by creating better user interfaces and supportive surrounding environments. Drawing on principles from such diverse disciplines as art, psychology, engineering and computer science, HCI involves the analysis, design, development and evaluation of interfaces that are easy to use but powerful enough to accomplish complex tasks.

CMN 212 Small Group Communication or CMN 220 Public Speaking
 CSC 211 Programming in Java I
 CSC 394 Software Projects
 ENG 204 Technical Writing or ENG 301 Writing in the Professions
 GPH 211 Perceptual Principles for Digital Environments I
 HCI 210 Introduction to Human-Computer Interaction
 HCI 270 Formatting Digital Pages I
 HCI 360 Evaluating Human-Computer Interaction
 IT 130 The Internet and the Web
 IT 201 Introduction to Information Systems
 IT 215 Analysis and Design Techniques
 IT 223 Data Analysis
 IT 230 Building Internet Applications
 IT 236 User Interface Development
 IT 240 Introduction to Desktop Databases
 PSY 241 Research Methods I
 PSY 242 Research Methods II

- HCI Electives (4)
- Open Electives (7)
- ART 105 is a required Liberal Studies Course

HCI Elective List

The degree requires 4 electives chosen from the list of courses below, at least one per group.

Design:

ART 261 Art and Design II: Word and Image
 ART 264 Typography I
 ART 359 Publication Design
 GPH 212 Perceptual Principles for Digital Environments II
 GPH 250 Digital Modeling I
 HCI 271 Formatting Digital Pages II
 HCI 315 Theory and Perception of Color
 HCI 322 Multimedia

HCI 332 User-centered Web Development

Technology:

CSC 212 Programming in Java II
CSC 351 Database Design
ECT 330 Advanced Internet Application Development
GAM 244 Game Development I
GPH 325 Survey of Computer Graphics
HCI 334 User Interface Implementation
IT 263 Applied Networks and Security

Methods and human factors:

ANT 201 Ethnographic Research Methods
CSC 324 Data Analysis and Statistical Software II
IS 372 Fundamentals of Software Project Management
PSY 360 Theories of Learning and Cognition
PSY 375 Sensation and Perception
PSY 380 Industrial and Organizational Psychology
PSY 383 Psychology of Design

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

Note: Liberal Studies: Required: PSY 105 Introductory Psychology I

BACHELOR OF SCIENCE IN INFORMATION ASSURANCE ENGINEERING

The Bachelor of Science in Information Assurance and Security Engineering prepares students for many possible careers in the rapidly growing Information Assurance and Security industry.

The program of study allow the student to learn the necessary foundations of Information Assurance theory, technology , and technique as well as the knowledge of Security Engineering processes used to implement, support and manage them in real-world systems.

A graduate will be prepared to join an information security team and perform risk assessment, security infrastructure design, network security administration, vulnerability assessment/scanning and incident response as well as any technology position where information security is an important part of the work function.

Graduates' possible career paths include Information Security Engineer, Technical Security Auditor, Network Security Engineer, Information Assurance Analyst and Forensics Engineer.

ACC 101 Introduction to Accounting I
or FIN 290 Finance for Non-Commerce Majors
CMN 212 Small Group Communication
or CMN 220 Public Speaking
CNS 320 Computer Forensic and Incident Response
CNS 228 Legal, Ethical and Social Issues in Information Security
CNS 340 Fundamentals of Information Assurance
CNS 394 Information Systems Security Engineering I
CNS 395 Information Systems Security Engineering II
CSC 211 Programming in Java I
CSC 212 Programming in Java II
or CSC 261 Programming Languages I: C/C++
CSC 262 Programming Languages II: C/C++
CSC 233 Codes and Ciphers
CSC 373 Computer Systems I
ENG 204 Technical Writing

IT 130 The Internet and the Web
 IT 230 Building Internet Applications
 IT 240 Introduction to Desktop Databases
 IT 263 Applied Networks and Security
 IT 378 Host and Information Security
 MAT 140 Discrete Mathematics I
 TDC 362 Principles of Data Communications
 TDC 365 Network Interconnection Technologies
 TDC 377 Fundamentals of Network Security

- 300-Level CTI electives (2) - chosen in consultation with your advisor.
- Open Electives (3)

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

Information Systems is devoted to the application of computers and related technologies to organizational and business problems. IS professionals apply their knowledge of hardware, software, business processes and procedures to help organizations improve performance and meet tactical and strategic goals. IS graduates gain employment in a wide variety of positions, including business application programmers, help desk analysts, end user training and support personnel, database analysts, process consultants, user liaisons, and business system analysts.

CMN 212 Small Group Communication or CMN 220 Public Speaking
 CSC 211 Programming in Java I
 CSC 212 Programming in Java II
 CSC 324 Data Analysis and Statistical Software II
 CSC 390 Fundamentals of Information Assurance
 ENG 204 Technical Writing or ENG 301 Writing in the Professions
 HCI 210 Introduction to Human-Computer Interaction
 IS 371 Introduction to I.T. System Management
 IS 372 Fundamentals of Software Project Management
 IS 373 Introduction to Large Systems Implementation
 IS 375 Object-Oriented Analysis and Design
 IS 376 Information Systems Project
 IT 130 The Internet and the Web
 IT 201 Introduction to Information Systems
 IT 215 Analysis and Design Techniques
 IT 223 Data Analysis
 IT 230 Building Internet Applications
 IT 236 User Interface Development
 IT 240 Introduction to Desktop Databases
 IT 263 Applied Networks and Security

- 300-Level CTI electives (2) - chosen in consultation with your advisor.
- Open Electives (6)

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BACHELOR OF ARTS

The Bachelors of Arts in Information Technology program will give students a broad education in current areas of information technology, with a focus on producing educated and sophisticated consumers of information technology.

CMN 212 Small Group Communication or CMN 220 Public Speaking
CSC 223 The Impact of Computing Technology On Our Lives
CSC 378 Software Projects for Community Clients
ENG 204 Technical Writing or ENG 301 Writing in the Professions
HCI 210 Introduction to Human-Computer Interaction
ICS 200 Introduction to Business
IT 121 Mathematical and Technological Literacy II
IT 130 The Internet and the Web
IT 201 Introduction to Information Systems
IT 223 Data Analysis or CSC 239 Personal Computing
IT 230 Building Internet Applications
IT 240 Introduction to Desktop Databases
IT 263 Applied Networks and Security or TDC 361 Basic Communication Systems
SOC 394 Sociology and Society (Also counts as a liberal studies course)

- 300-Level CTI electives (8)
- Open Electives (3)
- Technical Grounding Courses (3)

Technical Grounding Courses

CSC 211 Programming in Java I
CSC 212 Programming in Java II
CSC 261 Programming Languages I: C/C++
CSC 262 Programming Languages II: C/C++
ECT 330 Advanced Internet Application Development
GAM 244 Game Development I
GAM 245 Game Development II
GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
HCI 322 Multimedia
IT 215 Analysis and Design Techniques
IT 230 Building Internet Applications
IT 236 User Interface Development
SE 325 Principles and Practices of Software Engineering
TDC 363 Introduction to Local Area Networks

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE

The Bachelor of Science in Information Technology is a technical degree that will instruct students in core competencies in the areas of problem solving and programming, networks and communications systems, databases, Internet and Web technologies, security, and project management, along with a foundation in business concepts and technical communication. The proposed degree is suitable background for employment in the area of software development and testing, application support, network maintenance, database development, IT management, technical sales, technical liaison within a business or operational unit, and IT services.

ACC 101 Introduction to Accounting I or FIN 290 Finance for Non-Commerce Majors

CMN 212 Small Group Communication or CMN 220 Public Speaking

CSC 211 Programming in Java I and CSC 212 Programming in Java II

or CSC 261 Programming Languages I: C/C++ and CSC 262 Programming Languages II:
C/C++

CSC 309 Object-Oriented Programming in C++ (Take this if you took JAVA programming.)

or CSC 224 Java for Programmers (Take this if you took C++ programming.)

CSC 352 Database Programming

CSC 373 Computer Systems I

CSC 383 Data Structures and Algorithms in Java or CSC 393 Data Structures in C++

ENG 204 Technical Writing or ENG 301 Writing in the Professions

ICS 200 Introduction to Business

IS 372 Fundamentals of Software Project Management

IT 130 The Internet and the Web

IT 215 Analysis and Design Techniques

IT 223 Data Analysis

IT 230 Building Internet Applications

IT 240 Introduction to Desktop Databases

IT 263 Applied Networks and Security

IT 378 Host and Information Security

MAT 140 Discrete Mathematics I

MKT 301 Principles of Marketing

- Capstone (Any CTI Capstone)
- Open Electives (4)
- Expansion Area (4)

EXPANSION AREA

GAM 244 Game Development I

GAM 245 Game Development II

GPH 211 Perceptual Principles for Digital Environments I

GPH 212 Perceptual Principles for Digital Environments II

GPH 213 Perceptual Principles for Digital Environments III

GPH 250 Digital Modeling I

GPH 259 Design Geometry

HCI 210 Introduction to Human-Computer Interaction

HCI 270 Formatting Digital Pages I

HCI 271 Formatting Digital Pages II

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

BACHELOR OF SCIENCE IN MATH/COMPUTER SCIENCE

The Mathematics and Computer Science major is meant for mathematics students with talent and interest in computer science and computer science students with talent and interest in mathematics to develop the necessary background to be able to work in areas which depend on

knowledge from both fields. It is designed to prepare the student for graduate study in various areas of computer science such as theoretical computer science, graphics, and computational methods and in areas in applied mathematics such as numerical analysis or discrete mathematics. It is also a good preparation for the more intellectually demanding jobs in computer software development.

CSC 211 Programming in Java I or CSC 261 Programming Languages I: C/C++
CSC 212 Programming in Java II or CSC 262 Programming Languages II: C/C++
CSC 321 Design and Analysis of Algorithms
CSC 373 Computer Systems I
CSC 374 Computer Systems II or CSC 347 Concepts of Programming Languages
CSC 378 Software Projects for Community Clients
 or CSC 394 Software Projects
 or GPH 395 Computer Graphics Senior Project
 or MAT 398 Senior Capstone Seminar
CSC 383 Data Structures and Algorithms in Java or CSC 393 Data Structures in C++
IT 130 The Internet and the Web or IT 209 Introduction to Programming through Animation
MAT 140 Discrete Mathematics I
MAT 141 Discrete Mathematics II
MAT 150 Calculus I
 or MAT 160 Calculus for Mathematics and Science Majors I
 or MAT 170 Promath Calculus for Mathematics and Science Majors I
 or MAT 147 Calculus with Integrated Precalculus I
MAT 151 Calculus II
 or MAT 161 Calculus for Mathematics and Science Majors II
 or MAT 171 Promath Calculus for Mathematics and Science Majors II
 or MAT 148 Calculus with Integrated Precalculus II
MAT 152 Calculus III
 or MAT 162 Calculus for Mathematics and Science Majors III
 or MAT 172 Promath Calculus for Mathematics and Science Majors III
 or MAT 149 Calculus with Integrated Precalculus III
MAT 260 Multivariable Calculus I
MAT 262 Linear Algebra

- Math Elective (3)
- Math or CTI Elective (1)
- CTI Elective (3)

Students choose seven courses from the following area lists. At least three of the courses have to be in computer science (or graphics) and at least three in mathematics. Courses not on this list need to be approved by an advisor. In particular, students are encouraged to take an independent study (MAT 399 or CSC 399).

I. THEORY CONCENTRATION

The theory concentration is aimed at students with an interest in the mathematical and foundations of computer science.

CSC 333 Cryptology
CSC 344 Automata Theory and Formal Grammars
CSC 348 Introduction to Compiler Design
CSC 358 Symbolic Programming
CSC 387 Operations Research I: Linear Programming or MAT 387 Operations Research I: linear Programming
CSC 389 Theory of Computation
MAT 302 Combinatorics
MAT 303 Theory of Numbers
MAT 310 Abstract Algebra I
MAT 311 Abstract Algebra II
MAT 312 Abstract Algebra III
MAT 351 Probability and Statistics I
MAT 370 Advanced Linear Algebra
MAT 372 Logic and Set Theory

II. COMPUTATIONAL METHODS CONCENTRATION

The computational methods concentration is intended for students with an interest in quantitative and computational methods in computer science.

CSC 385 Numerical Analysis or MAT 385 Numerical Analysis I
CSC 386 Advanced Numerical Analysis or MAT 386 Numerical Analysis II
MAT 330 Methods of Computation and Theoretical Physics I
MAT 331 Methods of Computation and Theoretical Physics II

III. GRAPHICS CONCENTRATION

The graphics concentration is intended for students who want to study the technical and mathematical foundations of computer graphics and animation.

GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
GPH 325 Survey of Computer Graphics
GPH 329 Computer Graphics Development
GPH 336 Smooth Surface Modeling for Graphics and Animation
GPH 339 Advanced Rendering Techniques
GPH 372 Principles of Computer Animation
MAT 261 Multivariable Calculus II
MAT 337 Complex Analysis
MAT 370 Advanced Linear Algebra
MAT 385 Numerical Analysis I or CSC 385 Numerical Analysis

IV. ARTIFICIAL INTELLIGENCE CONCENTRATION

For students with an interest in the computational relations between syntax and semantics.

CSC 357 Expert Systems
CSC 358 Symbolic Programming
CSC 380 Artificial Intelligence

V. DATA ANALYSIS CONCENTRATION

The graphics courses are intended for students who want to study the technical and mathematical foundations of computer graphics and animation.

CSC 328 Data Analysis for Experimenters
CSC 332 Simulation and Modeling or MAT 359 Simulation Models and the Monte Carlo Method
CSC 334 Advanced Data Analysis or MAT 354 Multivariate Statistics
CSC 367 Introduction to Data Mining
CSC 381 Introduction to Digital Image Processing
CSC 382 Applied Image Analysis
CSC 384 Introduction to Computer Vision
MAT 261 Multivariable Calculus II
MAT 348 Applied Statistical Methods
MAT 351 Probability and Statistics I
MAT 352 Probability and Statistics II
MAT 353 Probability and Statistics III
MAT 355 Stochastic Processes
MAT 356 Applied Regression Analysis
MAT 357 Nonparametric Statistics
MAT 370 Advanced Linear Algebra
MAT 384 Mathematical Modeling

BACHELOR OF SCIENCE IN NETWORK TECHNOLOGIES

I. STANDARD CONCENTRATION

The Bachelor of Science in Network Technologies degree program is designed for students who wish to learn to select, justify, configure, and manage appropriate network technologies for a wide variety of business applications. Course topics include the foundations of networking, local area

network design and management, Internet access technologies, routing, and interconnection technologies. There is also a concentration in Network Security.

First Year

CMN 212 Small Group Communication or CMN 220 Public Speaking

CSC 211 Programming in Java I or CSC 261 Programming Languages I: C/C++

CSC 212 Programming in Java II or CSC 262 Programming Languages II: C/C++

ENG 204 Technical Writing or ENG 301 Writing in the Professions

IT 130 The Internet and the Web

IT 201 Introduction to Information Systems

IT 223 Data Analysis

IT 230 Building Internet Applications

IT 240 Introduction to Desktop Databases

IT 263 Applied Networks and Security

MAT 140 Discrete Mathematics I

TDC 311 Computers in Telecommunications Systems

TDC 362 Principles of Data Communications

TDC 363 Introduction to Local Area Networks

TDC 364 Voice Communications Technologies

TDC 365 Network Interconnection Technologies

TDC 376 Network Project

Open Electives (5)

- 300-level TDC elective chosen in consultation with student's advisor (3).
- IT 378 Host and Information Security may be substituted for one of the 300-level TDC electives.

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

II. NETWORK SECURITY

This concentration is designed to provide focused coursework in network security technologies, including detailed instruction in security infrastructure design, deployment, configuration and support.

While this concentration is designed for students that are planning to start their career as network security engineers, security administrators, security auditors and security infrastructure designers, it is also appropriate for any student that wants to integrate security practice within their career.

CMN 212 Small Group Communication or CMN 220 Public Speaking

CSC 261 Programming Languages I: C/C++

CSC 262 Programming Languages II: C/C++

CSC 390 Fundamentals of Information Assurance

ENG 204 Technical Writing or ENG 301 Writing in the Professions

IT 130 The Internet and the Web

IT 201 Introduction to Information Systems

IT 230 Building Internet Applications

IT 240 Introduction to Desktop Databases

IT 263 Applied Networks and Security

IT 378 Host and Information Security

MAT 140 Discrete Mathematics I

TDC 311 Computers in Telecommunications Systems

TDC 362 Principles of Data Communications

TDC 363 Introduction to Local Area Networks

TDC 365 Network Interconnection Technologies

TDC 368 Network Programming

TDC 375 Network Protocols

TDC 376 Network Project
TDC 377 Fundamentals of Network Security
TDC 379 Telecommunication and Network Security Practicum

- 300-level TDC elective chosen in consultation with student's advisor (2).
- Open Electives (5)

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

Open Electives

Open Electives may be taken from any department or program. These are the only courses that may be taken under the pass/fail option (see the undergraduate Bulletin for details). If you wish to pursue a minor, most minor field courses will be credited as open electives.

Note: Grades for all courses in the students major (i.e. non-Liberal Studies and non-Open Elective) must be 'C' or better. Grades of 'C-' may be accepted provided the overall grade point average in the major is 2.0 or better.

COMBINED BACHELOR OF SCIENCE AND MASTER OF SCIENCE DEGREES

The Combined Degree Programs at CTI are designed to allow academically gifted students to complete both a bachelor and master's degree in a shorter amount of time by taking three Master's level courses in their junior and senior year that count toward both their bachelor and master's degree requirements at same time. Students in this program will receive both a bachelor degree, after 192 undergraduate credit hours, and a master's degree after 10 more graduate courses (40 hours), instead of the standard 13 (52 hours).

Admission Criteria

Apply to enter the Combined Degree program any time after having achieved Junior standing (at least 88 credit hours completed) by sending an email to your advisor. Your advisor will then review your record and forward their recommendation along to the admissions office.

GPA of 3.5 or better in courses with a CTI label, eg. CSC, ECT, etc.

Overall GPA is at least 3.2

Maintaining Good Standing

Students who fail to maintain academic standards equivalent to the admission criteria will be dismissed from the Combined Degree and returned to normal undergraduate degree seeking status. Any graduate courses passed before dismissal will not be counted toward graduate credit and may not be retaken. If dismissed students wish to apply to a CTI graduate degree program, they may do so following normal CTI admissions procedures, but will still be required to take 13 graduate courses for a MS degree.

Please refer to the CTI web site for the most current combinations of combined degrees: <http://www.cti.depaul.edu/>

BACHELOR OF ARTS IN COMPUTING

The Bachelor of Arts in Computing is offered jointly by the School of Computer Science, Telecommunications and Information Systems and the School for New Learning. This degree is designed for working adults at least 24 years of age, who wish to obtain credit for their careers as technology professionals, and gain new skills in problem-solving, design, testing and communicating. The BA in Computing differs from the BS in Computer Science in that the BS places heavier emphasis on traditional programming and formal algorithmic analysis. The BA in computing program focuses on relating program design and computing to organizational dynamics and human relations. It helps to prepare students to analyze and negotiate the social, ethical, and technological systems of a business and to act as a liaison between the technical and non-technical sides of a company.

The computer competences in the BA in Computing program cover a variety of topics directly related to current industry practice. These competences include skills and knowledge in information systems, data communications, databases, software engineering, and the design and

evaluation of user interfaces. In the general studies area of the program, competences are tied to the humanities, the natural sciences and the social sciences. Students may select competences in the arts, design, ecology, human biology, multicultural relations, and politics and so on that are tailored to their individual goals and interests. The BA in Computing is completed by satisfying a total of fifty (50) competences; this amounts to the equivalent of 140 quarter hours. Typically these competences are satisfied through course work or equivalent work experience.

For a copy of the Program Guide for the Bachelor of Arts in Computing or to make reservations for a BA in Computing Information Session, please call either the School of Computer Science, Telecommunications and Information Systems at (312)362-8381 or the School for New Learning at (312)362-8001.

SPECIAL PROGRAMS

MINORS

A minor is a combination of courses that provides a cohesive introduction to an area of study. Typically, courses taken to satisfy minor field requirements are credited as open electives; however, there are some instances where minor field courses may be used for credit in other areas of the student's curriculum. Grades for all courses, taken to fulfill a minor field requirement must be 'C' or above. Grades of 'C-' may be accepted for credit in the minor provided the minor GPA is 2.0 or above. A minimum of one-half of the courses required for a minor must be completed at DePaul University.

MINORS IN THE COLLEGE OF COMMERCE

Students enrolled in the School of Computer Science, Telecommunications and Information Systems (CTI) may obtain a minor in Accounting, Business Administration, E-Business, Economics, Management, MIS, Marketing, and Pre-MBA. Please see the College of Commerce Section for Minor Requirements.

MINORS IN THE COLLEGE OF LIBERAL ARTS AND SCIENCES

Students enrolled in the School of Computer Science, Telecommunications and Information Systems (CTI) may obtain a minor through the College of Liberal Arts and Sciences. Most Liberal Arts and Science departments offer minor concentrations of study. In general, a minor in a Liberal Arts and Sciences discipline consists of a set of introductory courses plus another set of more specialized courses. Most minors require six courses, some of which may also be used for credit in the Liberal Studies Program. For a complete list of minors offered through the College of Liberal Arts and Sciences, please consult that section of this online Bulletin

MINORS IN THE COLLEGE OF COMPUTER SCIENCE, TELECOMMUNICATIONS AND INFORMATION SYSTEMS

Minors Within CTI for CTI Students

To obtain a minor in CTI when the major is also in CTI:

1. Satisfy all requirements for the major
2. Satisfy all requirements for the minor
3. Students must take at least 6 courses in the minor area that do not count towards their CTI major

Note: If you have already taken some of the courses listed under your minor on this page, work with your advisor to choose other courses within the same program area, ie. NT minor would look under NT major courses and Computer Graphics Software Development would look under Computer Graphics Courses, in order to have 6 distinct courses.

CTI MINOR REQUIREMENTS FOR NON-CTI MAJORS

Computer Games Development Minor

DC 201 Narrative Techniques in Digital Cinema
GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
GPH 213 Perceptual Principles for Digital Environments III
GAM 224 Strategies in Game Design
GAM 244 Game Development I

GAM 245 Game Development II

Computer Graphics Software Development Minor

CSC 261 Programming Languages I: C/C++
CSC 262 Programming Languages II: C/C++
GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
GPH 329 Computer Graphics Development
GPH 339 Advanced Rendering Techniques

Computer Science Minor

CSC 211 Programming in Java I or CSC 261 Programming Languages I: C/C++
CSC 212 Programming in Java II or CSC 262 Programming Languages II: C/C++
CSC 309 Object-Oriented Programming in C++ or CSC 224 Java for Programmers
CSC 393 Data Structures in C++ or CSC 383 Data Structures and Algorithms in Java
IT 130 The Internet and the Web
IT 240 Introduction to Desktop Databases
MAT 140 Discrete Mathematics I

- 1 300-level CTI elective

Data Analysis Minor

CSC 211 Programming in Java I
CSC 212 Programming in Java II
CSC 324 Data Analysis and Statistical Software II
IT 130 The Internet and the Web
IT 223 Data Analysis
IT 240 Introduction to Desktop Databases

One course from the following list:

- CSC 328 Data Analysis for Experimenters
- CSC 334 Advanced Data Analysis

Data Media Minor

GPH 211 Perceptual Principles for Digital Environments I
GPH 212 Perceptual Principles for Digital Environments II
GPH 213 Perceptual Principles for Digital Environments III
HCI 270 Formatting Digital Pages I
HCI 271 Formatting Digital Pages II
HCI 310 Introduction to Human-Computer Interaction

Possible Electives:

A. Computer Graphics

GPH 250 Digital Modeling I
GPH 338 Survey of 3-D Animation

B. Human Computer Interaction

HCI 312 Analysis and Design for Human-Computer Interaction
HCI 332 User-Centered Web Development
HCI 315 Theory and Perception of Color
HCI 322 Multimedia

Digital Cinema Minor

DC 205 Foundations of Digital Cinema
DC 225 Digital Cinema Practicum
DC 201 Narrative Techniques in Digital Cinema
DC 220 Non-Linear Editing I

Three courses from the following list:

ANI 101 Animation

DC 210 Digital Cinema Production I
DC 215 Digital Sound Design
DC 275 Cinematography and Lighting
DC 310 Digital Cinema Production II
DC 320 Non-Linear Editing II
DC 389 The Big Picture: the Entertainment Industry
GAM 224 Strategies in Game Design
GPH 211 Perceptual Principles for Digital Environments I
TDC 350 Modes of Digital Distribution

E-Commerce Technology Minor

CSC 211 Programming in Java I
CSC 212 Programming in Java II
ECT 330 Advanced Internet Application Development
HCI 210 Introduction to Human-Computer Interaction
IT 130 The Internet and the Web
IT 230 Building Internet Applications

One course from the following list:

- ECT 355 E-Commerce Application Models
- ECT 360 Introduction to Xml
- ECT 365 Web Server Operations

Human-Computer Interaction Minor

IT 130 The Internet and the Web
or HCI 201 Multimedia and the World Wide Web
HCI 210 Introduction to Human Computer Interaction
PSY 105 Introduction to Psychology I
GPH 211 Perceptual Principles for Digital Environments I
or ART 105 Two-Dimensional Foundations
HCI 270 Formatting Digital Pages I
or ART 227 Computer Applications for Design I: Illustrator and Photoshop
HCI 360 User-Centered Evaluation

One course from the following list:

- HCI 271 Formatting Digital Pages II
- HCI 322 Multimedia
- HCI 332 User-centered Web Development
- IT 215 Analysis and Design Techniques
- IT 230 Building Internet Applications
- IT 240 Introduction to Desktop Databases
- CSC 211 Programming in Java I
- IT 223 Data Analysis
- PSY 240 Statistics I
- PSY 241 Research Methods I

Information Systems Minor

CSC 211 Programming In Java I
HCI 210 Introduction To Human-Computer Interaction
IT 130 The Internet And The Web
IT 201 Introduction To Information Systems
IT 215 Analysis And Design Techniques
IT 230 Building Internet Applications
IT 240 Introduction To Desktop Databases

One course from the following list:

- IS 371 Introduction To I.T. System Management
- IS 372 Fundamentals Of Software Project Management
- IS 373 Introduction To Large Systems Implementation
- IS 374 Management Support Systems

Information Technology Minor

IT 130 The internet and the Web
IT 230 Building Internet applications
IT 240 Introduction to desktop databases
TDC 361 Basic Communication Systems
or IT 263 Applied Networks and Security
IT 215 Analysis and Design Techniques

One additional CTI course.

Network Technology Minor

CSC 211 Programming in Java I
or CSC 261 Programming Languages I: C/C++
CSC 212 Programming in Java II
or CSC 262 Programming Languages II: C/C++
IT 130 The Internet and the Web
IT 201 Introduction to Information Systems
IT 263 Applied Networks and Security
TDC 362 Principles of Data Communications
TDC 363 Introduction to Local Area Networks

Security Minor

IT 130 The Internet and the Web
AND CSC 211 Programming in Java I
AND CSC 212 Programming in Java II
OR
CSC 261 Programming Languages I: C/C++
AND CSC 262 Programming Languages II: C/C++
CSC 233 Codes and Ciphers
or CSC 333 Cryptology
IT 378 Host and Information Security
CNS 320 Computer Forensic and Incident Response
CNS 228 Legal, ethical, and social issues in information security
CNS 340 Fundamentals of Information Assurance

COURSES

Please visit Campus Connection at <https://campusconnect.depaul.edu> for current course information. If you do not have a password for Campus Connection you may log on as a guest. Once you are on Campus Connection please select Course Catalog followed by the department.