

SCHOOL OF COMPUTER

SCIENCE, TELECOMMUNICATIONS

AND INFORMATION SYSTEMS

SCHOOL OF COMPUTER SCIENCE, TELECOMUNICATIONS AND INFORMATION SYSTEMS

ADMINISTRATION

HELMUT EPP, PH.D.
Dean
DAVID MILLER, PH.D.
Associate Dean
JACOB D. FURST, PH.D.
Associate Dean
LINDA V. KNIGHT, PH.D.
Associate Dean
ANNE B. MORLEY
Assistant Dean
TERRY SKWAREK
Director, Institute for Professional Development
Assistant Dean
HENRY HARR, PH.D.
Director of Undergraduate Studies
STEVE JOST, PH.D.
Associate Director of Undergraduate Studies
JOHN GLATZ,
Director, Student Services

FACILITIES

FACULTY

ADMISSION

ACADEMIC PROGRAMS

BACHELOR OF SCIENCE IN COMPUTER GRAPHICS AND ANIMATION

BACHELOR OF SCIENCE IN COMPUTER SCIENCE
Standard Computer Science
Data Analysis and Database
Telecommunications

BACHELOR OF SCIENCE IN E-COMMERCE TECHNOLOGY

BACHELOR OF SCIENCE IN HUMAN- COMPUTER INTERACTION

BACHELOR OF SCIENCE IN INFORMATION SYSTEMS

BACHELOR OF SCIENCE IN NETWORK TECHNOLOGY

BACHELOR OF ARTS IN COMPUTING

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 Science, Bachelor of Science in Information Systems, Bachelor of Science in Human- Computer Interaction, 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 for artificial intelligence, computer vision and graphics, database, programming languages, software engineering, telecommunications, local area networks and computer telephony. One laboratory allows students to explore specialized software. The laboratories include both PCs and UNIX workstations. The school also operates an IBM ES 9000/9221.

FACULTY

HELMUT EPP, PH.D.,
Associate Professor and Dean
Northwestern University

OLAYELE ADELAKUN, PH.D.,
Assistant Professor
Turku School of Economics and
Business Administration

L. EDWARD ALLEMAND, PH.D.,
Professor Emeritus
University of Louvain

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Old Dominion University

AFTAB AHMAD, PH.D.,
Associate Professor
George Washington University

GARY ANDRUS, PH.D.,
Associate Professor

Wayne State University

ANDRE BERTHIAUME, PH.D.,
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University of Montreal

GREGORY BREWSTER, PH.D.,
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University of Wisconsin

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Yale University

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Carnegie Mellon University

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University of Michigan

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Assistant Professor
University of Arizona

BAMSHAD MOBASHER, PH.D.,
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Iowa State University

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JOHN ROGERS, PH.D.,
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Wayne State University

ROSALEE WOLFE, PH.D.,
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YONGHE YAN, PH.D.,
Assistant Professor
University of Hong Kong
CHONGHUA ZHANG, M.S.,
Adjunct Professor
DePaul 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@wppost.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.

PROGRAM AND CURRICULUM INFORMATION

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 Chicago land 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. Each certificate program is taught by a team of instructors, that includes full-time faculty with consulting experience and part-time instructors from industry. Each program requires a substantial commitment of time, as classes meet two nights per week and in the morning on 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.

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 students 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.

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

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. PHL/REL/MGT 228 is strongly 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 Europe; 5) 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 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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. See your advisor for help in choosing your classes.

Allied Fields

Communication (CMN) 220 Public Speaking
Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II, 309 Object Oriented Programming in C++, 321 Design and Analysis of Algorithms

English (ENG) 204 Technical Writing
Human-Computer Interaction (HCI) 315 Theory and Perception of Color
Mathematics (MAT) 140 Discrete Mathematics I, 150 Calculus I, 151 Calculus II, 220 Linear Algebra

Core

Computer Graphics and Animation (GPH) 211 Perceptual Principles for Digital Environments I, 212 Perceptual Principles for Digital Environments II, 329 Computer Graphics Development, 339 Advanced Rendering Techniques, 371 Computer Graphics Survey, 372 Principles of Animation, 375 Advanced Computer Graphics Development, 395 Computer Graphics Senior Project.

Six Computer Graphics and Animation electives chosen from the list below in consultation with the student's advisor. Courses from the list, which were previously used to satisfy specific requirements, may not be chosen as electives.

Open Electives

Four courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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. 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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. See your advisor for help in choosing your classes.

Allied Fields

Art (ART) 102 Principles of Art History, 106 Beginning Drawing, 203 Survey of Non-Western Art, 222 Contemporary Art
Communication (CMN) 220 Public Speaking
Computer Science (CSC) 211 Programming in Java I, 255 Information Structures and Representations, 336 Visual Basic for Programmers
English (ENG) 204 Technical Writing
Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction, 315 Theory and Perception of Color
Mathematics (MAT) 140 Discrete Mathematics I

Core

Computer Graphics and Animation (GPH) 211 Perceptual Principles for Digital Environments I, 212 Perceptual Principles for Digital Environments II, 250 Digital Modeling I, 338 Computer Animation Survey, 339 Advanced Rendering Techniques 371 Computer Graphics Survey, 395 Computer Graphics Senior Project

Six Computer Graphics and Animation electives chosen from the list below in consultation with the student's advisor. Courses from the list which were previously used to satisfy specific requirements may not be chosen as electives.

Open Electives

Four courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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.

Computer Graphics and Animation Elective list: Courses from the list which were previously used to satisfy specific requirements may not be chosen as electives.

Art (ART) 225 Beginning Photography, 261 Graphic Design II, 329 Digital Photography, 360 Illustration, 373 History of Design, Computer Science (CSC) 323 Data Analysis and Statistical Software I, 336 Visual Basic for Programmers, Computer Graphics and Animation (GPH0 250 Digital Modeling, 259 Design Geometry, 329, Computer Graphics I, 350 Digital Modeling II, 360 Modeling Spaces, 374 Computer Games, 375 Advanced Computer Graphics Development, Human-Computer Interaction (HCI) 270 Formatting Digital Pages I, 271 Formatting Digital Pages II, 310 Introduction to HCI, 322 Multimedia, 332 User Centered Web Development, 341 Usability Issues for Electronic Commerce, Mathematics (MAT) 150 Calculus I, 151 Calculus II, 152 Calculus III

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

I. COMPUTER SCIENCE CONCENTRATION

This concentration is designed for students who want a solid foundation in traditional computer science. It is more theoretical and technical and requires a more extensive analytical background. This concentration is designed to prepare students for advanced studies or for employment in computer science where extensive programming is required.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 200 Survey of Computer Technology, 211 Programming in Java I, 212 Programming in Java II, 313 Data Structures in Java Mathematics (MAT) 140 Discrete Mathematics I

Sophomore Courses

Computer Science (CSC) 309 Object Oriented Programming in C++, 319 Database Technology, 323 Data Analysis and Statistical Software I Mathematics (MAT) 150 Calculus I, 151 Calculus II One course chosen from Mathematics (MAT) 141 Discrete mathematics II, 152 Calculus III or 220 Linear Algebra One course chosen from Communication (CMN) 220 Public Speaking or 212 Small Group Communication

Junior Courses

Computer Science (CSC) 312 Assembly Language and Computer Organization, 321 Design and analysis of Algorithms, 343 Introduction to Operating Systems Telecommunication Systems (TDC) 361 Basic Communication systems Information Systems (IS) 315 Analysis and Design Techniques. One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

Senior Courses

Computer Science (CSC) 347 Concepts of Programming Languages, 394 Software Projects One 300-level CTI elective to be chosen in consultation with student’s advisor.

Open Electives

Nine courses to be chosen in consultation with student’s advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in Liberal Studies

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. DATA ANALYSIS AND DATABASE CONCENTRATION

This concentration emphasizes computer-based statistical analysis of data. It looks at the storage, retrieval, and post-processing of data from database systems. The concentration includes programming and design of applications; it develops a strong foundation in statistical concepts and theories and puts them into practice using statistical software.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 200 Survey of Computer Technology, 211 Programming in Java I, 212 Programming in Java II, 255 Information Structures and Representation Mathematics (MAT) 140 Discrete Mathematics I

Sophomore Courses

Computer Science (CSC) 319 Database Technology
Mathematics (MAT) 150 Calculus I, 151 Calculus II
Telecommunication Systems (TDC) 361 Basic Communication Systems
One course chosen from Computer Science (CSC) 309 Object Oriented Programming in C++, 313 Data Structures in Java, 336 Visual Basic for Programmers or Information Systems (IS), 313 Business Application Programming in Java
One course chosen from Mathematics (MAT) 141 Discrete Mathematics II, 152 Calculus III or 220 Linear Algebra
One course chosen from Communication (CMN) 220 Public Speaking or 212 Small Group Communication

Junior Courses

Computer Science (CSC), 323 Data Analysis and Statistical Software I, 324 Data Analysis and Statistical Software II
Information Systems (IS) 315 Analysis and Design Techniques
One course chosen from Computer Science (CSC) 328 Data Analysis for Experimenters or 334 Advanced Data Analysis
One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

Senior Courses

One course chosen from Computer Science (CSC) 394 Software Projects or Information Systems (IS) 376 Information Systems Project

Two 300-level CTI electives to be chosen in consultation with student’s advisor.

Open Electives

Nine courses to be chosen in consultation with student’s advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in Liberal Studies

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.

III. SOFTWARE ENGINEERING HONORS CONCENTRATION

The Honors Software Engineering (HSE) concentration has been designed for students who are interested in studying advanced software development techniques and technologies. Because of its advanced nature, much of this material is normally accessible only to graduate students. It is therefore only available to students with a strong academic background. Furthermore, students

must apply for admission to the program.

Students should apply for the HSE concentration by the end of the winter quarter of their sophomore year, and will be notified of their acceptance (pending completion of requirements) in the spring quarter. Progress will be reviewed at the end of the third year to determine eligibility for continuing to the fourth year. Review is automatic for all students, but students may “opt out of review” and voluntarily change to another concentration.

Nineteen (19) Liberal Studies courses (see above) plus the following courses. Note that the grouping of courses into First-Year, Sophomore, Junior, and Senior courses **is a recommendation only**. See your advisor for help in choosing your classes. Also, note that courses designated First-Year and Sophomore would usually be completed before admission to the concentration.

First-Year (prior to admission into honors concentration) Courses

Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II, 313 Data Structures in Java

Mathematics (MAT) 140 Discrete Mathematics I, 150 Calculus I

Sophomore (prior to admission into the honors concentration) Courses

Computer Science (CSC) 321 Design and Analysis of Algorithms, 309 Object Oriented Programming in C++, 323 Data Analysis and Statistical Software I, 319 Database Technology

Mathematics (MAT) 140 Discrete Mathematics II

English (ENG) 204 Technical Writing

One course from Communication (CMN) 212 Small Group Communication or 220 Public Speaking

Junior (after admission into the honors concentration) Courses

Computer Science (CSC) 343 Introduction to Operating Systems, 347 Concepts of Programming Languages

Software Engineering (SE) 330 Object-Oriented Modeling, 350 Object-Oriented Software Development, 352 Object-Oriented Enterprise Application Development, 370 Software Development Processes

Senior (after admission into the honors concentration) Courses

Software Engineering (SE) 391 Software Engineering Studio I (honors), 392 Software Engineering Studio II (honors)

Five 300-level CTI electives. Three of the five must be from the following list:

Software Engineering (SE) 368 Software Measurement and Project Estimation, 360 Structured Document Interchange and Processing, 355 Distributed Software Development, 356 Software Development for Mobile Systems, 357 Concurrent System Development, 358 Software Development for Limited and Embedded Devices, 375 Design and Architecture of Secure Software Systems, 380 Design of Object-Oriented Languages, 354 Enterprise Component Architecture

Computer Science (CSC) 345 Computer Architecture, 348 Introduction to Compiler Design, 358 Symbolic Programming, 380 Foundations of Artificial Intelligence, 389 Theory of Computation

Students may also take other advanced SE graduate classes or “CSC 535- Formal Semantics of Programming Languages” as an independent study, by arrangement with the instructor, subject to approval of the program director.

Open Electives

4 courses to be chosen in consultation with student’s advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

Note: To satisfy the requirements of the HSE concentration, students must earn a grade of B or better for all junior and senior year courses (A- or better for non-honors sections).

IV. TELECOMMUNICATIONS CONCENTRATION

This concentration is designed to provide focused coursework in networking technologies, including detailed instruction in data communications, local area networks, and voice telecommunications networks.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 200 Survey of Computer Technology, 211 Programming in Java I, 212 Programming in Java II

Mathematics (MAT) 140 Discrete Mathematics I

Sophomore Courses

Computer Science (CSC) 309 Object Oriented Programming in C++, 319 Database Technology, 323 Data Analysis and Statistical Software I

Mathematics (MAT) 150 Calculus I, 151 Calculus II

Telecommunication Systems (TDC) 361 Basic Communication Systems

One course chosen from Mathematics (MAT) 141 Discrete Mathematics II, 152 Calculus III or 220 Linear Algebra

One course chosen from Communication 220 (CMN) Public Speaking or 212 Small Group Communication

Junior Courses

Computer Science (CSC), 343 Introduction to Operating Systems, Information Systems (IS) 315 Analysis and Design Techniques

Telecommunication Systems (TDC) 362 Principles of Data Communications, 363 Introduction to Local Area Networks, 364 Voice Communications Technologies

One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

Senior Courses

Computer Science (CSC) 394 Software Projects

One 300-level TDC elective to be chosen in consultation with student's advisor.

One 300-level CTI elective to be chosen in consultation with student's advisor.

Open Electives

Eight courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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

The Bachelor of Science program in E-Commerce Technology is a pioneering degree in an emerging technological field. With the explosive growth of the Internet, industries are increasingly employing Internet and related electronic commerce technologies. E-Commerce has expanded

beyond its early roots in electronic funds transfer and data interchange to embrace the use of Internet technologies for such applications as Web-based retailing, electronic supply chain management, and Web publishing. This technical degree program is designed to meet that demand. Students earning a B.S. 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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 211 Programming in Java I, 255 Information Structures and Representation

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology, 270 Client Side Web Application Development

One course chosen from Mathematics (MAT) 140 Discrete Mathematics I or Business Math and Statistics (BMS) 125 Business Calculus I

Sophomore Courses

Computer Science (CSC) 212 Programming in Java II, 336 Visual Basic for Programmers, 319 Database Technology, 323 Data Analysis and Statistical Software I

E-Commerce Technology (ECT) 353 Server Side Web Application Development

One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

One course chosen from Communication (CMN) 220 Public Speaking or 212 Small Group Communication

Junior Courses

E-Commerce Technology (ECT) 355 E-Commerce Web Application Models

Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction

Information Systems (IS) 315 Analysis and Design Techniques, 370 Computer Information Systems

Telecommunication Systems (TDC) 361 Basic Communication Systems

One course chosen from Marketing (MKT) 301 Principles of Marketing, Psychology (PSY) 380 Industrial and Organization Psychology or Art (ART) 260 Graphic Design I

Senior Courses

E-Commerce Technology (ECT) 359 ECT Senior Project, 372 Software Project Development & Management

Two 300-level CTI elective chosen in consultation with student's advisor.

Recommended courses from these electives are as follows: E-Commerce Technology (ECT) 341 Usability Issues for E-Commerce, 356 Advanced Server Side Programming, 357 Introduction to Mobile Commerce, 390 Topics in E-Commerce Technology, Computer Graphics and Animation (GPH) 371 Survey of Computer Graphics, Human-Computer Interaction (HCI) 360 Evaluating HCI, Information Systems (IS) 313 Business Application Development in Java, 371 Introduction to IT Management, 373 Large Systems Implementation

Open Electives

Seven courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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

Human-Computer Interaction (HCI) 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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Graphics and Animation (GPH) 211 Perceptual Principles for Digital Environments I, 212 Perceptual Principles for Digital Environments II
Computer Science (CSC) 255 Information Structures and Representation
Human-Computer Interaction (HCI) 270 Formatting Digital Pages I

Sophomore Courses

Communication (CMN) 220 Public Speaking, 212 Small Group Communication
Computer Science (CSC) 211 Programming in Java I, 319 Database Technology, 323 Data Analysis and Statistical Software, 336 Visual Basic for Programmers.
Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction

Junior Courses

Human-Computer Interaction (HCI) 312 Analysis and Design for HCI, 350 Usability in Computer Systems, 360 Evaluating Human Computer Interaction
Two 300-level HCI electives to be chosen in consultation with student's advisor. See course lists below for HCI elective options

Senior Courses

Computer Science (CSC) 394 Software Projects
Three 300-level HCI electives to be chosen in consultation with student's advisor.
See course lists for HCI electives below.

Open Electives

Nine courses to be chosen in consultation with student's advisor.
Note: PHL/REL/MGT 228 Business, Ethics and Society and PSY 105 Introductory Psychology I are required courses which are already credited in the Liberal Studies Program.
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.

Course Lists for HCI Electives: The five HCI electives must be chosen from the following lists.
At least one course must be chosen from each list.

List 1 (Design):

Art (ART) 217 Advanced 3D Design, 262 Publication Design, 360 Illustration, 361 Package Design, 362 Typography
Communication (CMN) 327 Argumentation and Debate, 329 Persuasion
Computer Graphics and Animation (GPH) 250 Digital Modeling, 259 Design Geometry, 350 Digital Modeling II, 360 Modeling Spaces
E-Commerce Technology (ECT)/Human-Computer Interaction (HCI) 341 Usability Issues E-Commerce
Human-Computer Interaction (HCI) 315 Theory and Perception of Color, 390 Topics in HCI

List 2 (Computer Science):

Computer Graphics and Animation (GPH) 338 Computer Animation Survey, 339 Advanced Rendering Techniques, 371 Computer Graphics Survey

Computer Science (CSC) 212 Programming in Java II, 324 Data Analysis and Statistical Software II, 352 Database Design, 365 Introduction to Software Engineering, 366 Introduction to Quality Assurance, 373 Information Systems

Human-Computer Interaction (HCI) 322 Multimedia, 332 User-Centered Web Development
Telecommunication Systems (TDC) 361 Basic Communications Systems

Information Systems (IS) 315 Analysis and Design Techniques

List 3 (Evaluation):

Psychology (PSY) 241 Methods of Psychological Inquiry, 242 Experimental Psychology I, 355 Small Groups and Leadership, 360 Theories of Learning and Cognition, 373 The Psychology of Judgment and Decision Making, 375 Sensation and Perception

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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 211 Programming in Java I, 255 Information Structures and Representation

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology, 270 Client Side Web Application Development

Mathematics (MAT) 140 Discrete Mathematics I

Sophomore Courses

Computer Science (CSC) 212 Programming in Java II, 319 Database Technology

Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction

Information Systems (IS) 313 Business Application Programming

One course chosen from Mathematics (MAT) 141 Discrete Mathematics II or 145 Calculus for Information Systems

One course chosen from Communication (CMN) 220 Public Speaking or 212 Small Group Communication

Junior Courses

Computer Science (CSC) 323 Data Analysis and Statistical Software

Information Systems (IS) 315 Analysis and Design Techniques, 371 Introduction to IT System Management, 372 Fundamentals of Software Management

Telecommunication Systems (TDC) 361 Basic Communication Systems

One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

Senior Courses

Information Systems (IS) 370 Computer Information Systems, 375 Object Oriented Analysis and Design, 376 Information Systems Project

Two Major Field electives to be chosen from the following list in consultation with the student's advisor: Computer Science (CSC) 203 COBOL Programming, 309 Object Oriented Programming in C++, 336 Visual Basic for Programmers, E-Commerce Technology (ECT) 353 Server Side Web Application Development, 355 E-Commerce Web Application Models, 356 Advanced Server Side Programming, 357 Introduction to Mobile Commerce, Information Systems (IS) 373 Large Systems Implementation, 374 Management Support Systems, Telecommunication systems (TDC) 363 Local Area Networks

Open Electives

Seven courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

I. THEORY CONCENTRATION

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

First-Year Courses

Mathematics (MAT) 140 Discrete Mathematics I, 141 Discrete Mathematics II

Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II

Sophomore Courses

Computer Science (CSC) 313 Data Structures in Java

Mathematics (MAT) 303 Theory of Numbers

Choose one three-course sequence from the Mathematics (MAT):

MAT 150- MAT 151- MAT 152 Calculus I-II-III

Or MAT 160- MAT 161- MAT 162 Calculus for Mathematics and Science Majors I-II-III

Or MAT 147- MAT 148- MAT 149 Calculus with Integrated Precalculus I-II-III

Junior Courses

Computer Science (CSC) 321 Design and Analysis of Algorithms, 347 Concepts of Programming Languages

Mathematics (MAT) 260 Multivariable Calculus I, 262 Linear Algebra, 310 Abstract Algebra I, 351 Probability and Statistics I

Senior Courses

Computer Science (CSC) 333 Automata Theory and Formal Grammars, 358 Symbolic Programming

Choose one: MAT 398 Mathematics Capstone or CSC 394 Computer Science Capstone

One course chosen from MAT 302 Combinatorics, MAT 311 Abstract Algebra II, MAT 370 Advanced Linear Algebra, or MAT 372 Logic and Set Theory

Open Electives

Eight courses to be chosen in consultation with an advisor.

Concentration Electives

Two advanced courses in computer science or mathematics to be chosen in consultation with student's advisor. Possible classes:

CSC 389 (CSC 544) Theory of Computation, CSC 348 Compiler Design, CSC 387/MAT 387 Operations Research I, MAT 399 or CSC 399 Independent Study, or any course listed above that is not already included in the student's program.

II. COMPUTATIONAL METHODS CONCENTRATION

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

First-Year Courses

Mathematics (MAT) 140 Discrete Mathematics I, 141 Discrete Mathematics II

Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II

Choose one three-course sequence from the Mathematics (MAT):

MAT 150- MAT 151- MAT 152 Calculus I-II-III

Or MAT 160- MAT 161- MAT 162 Calculus for Mathematics and Science Majors I-II-III

Or MAT 147- MAT 148- MAT 149 Calculus with Integrated Precalculus I-II-III

Sophomore Courses

Computer Science (CSC) 309 Object-Oriented Programming in C++

Mathematics (MAT) 141 Discrete Mathematics II, 260 Multivariable Calculus I, 261 Multivariable Calculus II, 262 Linear Algebra

Junior Courses

Computer Science (CSC) 321 Design and Analysis of Algorithms, 343 Introduction to Operating Systems

Mathematics (MAT) 351 Probability and Statistics I, 352 Probability and Statistics II, 353 Probability and Statistics III

CSC 385/ MAT 385 Numerical Analysis I

Senior Courses

MAT 398 Mathematics Capstone or CSC 394 Computer Science Capstone

Two classes from one of the following sub-concentrations. Students in the Artificial Intelligence concentration are recommended to take CSC 313 as an open elective.

- Artificial Intelligence:

Computer Science (CSC) 380 Artificial Intelligence, 357 Expert Systems, 358 Symbolic Programming

- Data Analysis:

Computer Science (CSC) 328 Data Analysis for Experimenters, 481 Pattern Recognition and Image Processing

Mathematics (MAT) 370 Advanced Linear Algebra, 356 Applied Regression Analysis

CSC 334 Advanced Data Analysis or MAT 354 Multivariate Statistics

CSC 332 Simulation and Modeling or MAT 359 Simulation Models and the Monte Carlo Methods

Open Electives

Eight courses to be chosen in consultation with an advisor.

Concentration Electives

Students select **one** advanced course in computer science or mathematics in consultation with their advisors. This course may be chosen from those listed above that are not already included in a student's program, or it may come from a broader selection. Possible courses for the artificial intelligence sub-concentration include CSC 456 Foundations of Intelligent Databases and CSC 481 Pattern Recognition and Image Processing. Possible courses for the data analysis sub-concentration include SE 467 Software Reliability and SE 468 Software Measurement. Possible courses for either sub-concentration include CSC/MAT 386 Numerical Analysis II, CSC/MAT 387-388 Operations Research I & II, MAT 302 Combinatorics, MAT 384 Mathematical Modeling, MAT 355 Stochastic Processes, and MAT 357 Nonparametric Statistics.

III. GRAPHICS CONCENTRATION

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

First-Year Courses

Mathematics (MAT) 140 Discrete Mathematics I, 141 Discrete Mathematics II
Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II
ART 105 Two-Dimensional Foundations (counts in liberal studies)

Sophomore Courses

ART 113 Three-Dimensional Foundations (counts in liberal studies)
Computer Science (CSC) 309 Object-Oriented Programming in C++
Graphics (GPH) 212 Perpetual Principles for Digital Environments II, 371 Survey of Computer Graphics
Choose one three-course sequence from the Mathematics (MAT):
MAT 150- MAT 151- MAT 152 Calculus I-II-III
Or MAT 160- MAT 161- MAT 162 Calculus for Mathematics and Science Majors I-II-III
Or MAT 147- MAT 148- MAT 149 Calculus with Integrated Precalculus I-II-III

Junior Courses

Computer Science (CSC) 321 Design and Analysis of Algorithms, 343 Introduction to Operating Systems
Graphics (GPH) 329 Computer Graphics Development
Mathematics (MAT) 260 Multivariable Calculus, 261 Multivariable Calculus II, 262 Linear Algebra

Senior Courses

Mathematics (MAT) 370 Advanced Linear Algebra, 385 Numerical Analysis I or 337 Complex Analysis
Graphics (GPH) 372 Principles of Computer Animation, 395 Graphics Capstone Course, 339 Advanced Rendering Techniques or 336 Advanced Modeling Techniques

Open Electives

Eight courses to be chosen in consultation with an advisor.

IV. INDIVIDUALIZED CONCENTRATION

This concentration is intended for students who wish to combine advanced study of mathematics and computer science but whose particular area of interest is not exactly satisfied by one of the other three concentrations. Students wishing to create an individualized program of

study leading to a joint degree in mathematics and computer science will be counseled to consult with both mathematics and CTI faculty advisors.

The individualized concentration will consist of the core of 12 courses plus an additional 8 mathematics and computer science courses designed to provide a coherent program. At least three of these courses must be in mathematics and at least three must be in computer science. An individualized program of study must be approved by the chair of the mathematical sciences department and the dean of CTI.

BACHELOR OF SCIENCE IN NETWORK TECHNOLOGIES

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.

Nineteen (19) Liberal Studies courses (see above) plus the following 29 courses. Although all 29 courses are required, the grouping of the courses into First-Year, Sophomore, Junior, and Senior courses is a recommendation only. See your advisor for help in choosing your classes.

First-Year Courses

Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology, 270 Server Side Web Application Development

Mathematics (MAT) 140 Discrete Mathematics I

One course chosen from Mathematics (MAT) 141 Discrete Mathematics II or 145 Calculus for Information Systems

Sophomore Courses

Computer Science (CSC) 319 Database Technology, 323 Data analysis and Statistical Software
Telecommunication Systems (TDC) 311 Computers in Telecommunications Systems, 361 Basic Communication Systems

One course chosen from Communication (CMN) 220 Public Speaking or 212 Small Group Communication

Junior Courses

Computer Science (CSC) 336 Visual Basic for Programmers

E-Commerce Technology (ECT) 353 Server Side Web Application Development

Telecommunication Systems (TDC) 362 Principles of Data Communications, 363 Introduction to Local Area Networks, 365 Network Interconnection Technologies

One course chosen from English (ENG) 204 Technical Writing or 301 Writing in the Professions

Senior Courses

Telecommunication Systems (TDC) 376 Network project

Two 300-level TDC electives to be chosen in consultation with student's advisor.

Open Electives

Nine courses to be chosen in consultation with student's advisor.

Note: PHL/REL/MGT 228 Business, Ethics and Society is a required course which is already credited in the Liberal Studies Program.

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 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, 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

TEACHER OF COMPUTER SCIENCE: SECONDARY LEVEL

In cooperation with the School of Education, the School of Computer Science, Telecommunications and Information Systems (CTI) offers a concentration of study which combines the requirements for a major in Computer Science with certification for teaching computer science at the junior high, middle, and senior high school levels. A student electing such a program should consult the School of Education counselor as soon as possible after entering DePaul.

MINORS

COMPUTER GRAPHICS MINOR

Computer Graphics and Animation (GPH) 211 Perceptual Principles for Digital Environments I, 212 Perceptual Principles for Digital Environments II, 338 Computer Animation Survey, 339 Advanced Rendering Techniques, 371 Computer Graphics Survey

Computer Science (CSC) 211 Programming in Java I

Either GPH 250 Digital Modeling or HCI 310 Introduction to Human-Computer Interaction

COMPUTER SCIENCE MINOR

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology, 270 Client Side Web Application Development

Computer Science 211 Programming in Java I, 212 Programming in Java II, 319 Database Technology, and either 309 Object Oriented Programming in C++ or 313 Data Structures in Java Mathematics (MAT) 140 and

Either 141 Discrete Mathematics II or 150 Calculus I

DATA ANALYSIS MINOR

Computer Science (CSC) 200 Survey of Computer Technology, 211 Programming in Java I, 212 Programming in Java II, 319 Database Technology, 323 Data Analysis and Statistical Software I, 324 Data Analysis and Statistical Software II, and either 328 Data Analysis for Experimenters or 334 Advanced Data Analysis

E-COMMERCE TECHNOLOGY MINOR

Computer Science (CSC) 211 Programming in Java I, 255 Information Structures and Representation

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology, 270 Client Side Web Application Development, 353 Server Side Web Application Development, 355

E-commerce Web Application Models

Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction

HUMAN-COMPUTER INTERACTION MINOR

Computer Graphics and Animation (GPH) 211 Perceptual Principles for Digital Environments I
Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction, 312 Analysis and Design for HCI, 360 Evaluating Human Computer Interaction

Psychology (PSY) 105 Introductory Psychology I

Three of the following: GPH 212 Perceptual Principles for Digital Environments, GPH 329 Computer Graphics Development, GPH 338 Computer Animation Survey, GPH 339 Advanced Rendering Techniques, GPH 371 Computer Graphics Survey, HCI 315 Theory and Perception of Color, HCI 332 User-Centered Web Development, HCI 350 Usability in Computer Systems

INFORMATION SYSTEMS MINOR

Computer Science (CSC) 211 Programming in Java I, 255 Information Structures and Representation, 319 Database Technology

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology

Human-Computer Interaction (HCI) 310 Introduction to Human-Computer Interaction

Information Systems (IS) 315 Analysis and Design Techniques and one from: 370 Computer Information Systems, 371 Introduction to IT System Management, 372 Fundamentals of Software Management

NETWORK TECHNOLOGIES MINOR

Computer Science (CSC) 211 Programming in Java I, 212 Programming in Java II

E-Commerce Technology (ECT) 250 Survey of E-Commerce Technology

Telecommunication Systems (TDC) 361 Basic Communication Systems, 362 Principles of Data Communications, 363 Introduction to Local Area Networks

One 300-level CTI course

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..