



College of Computing and Informatics

www.cci.uncc.edu

Dean: Mirsad Hadzikadic

Associate Dean: Richard A. Lejk

Executive in Residence: Olin Broadway

The University of North Carolina at Charlotte's College of Computing and Informatics (CCI) is part of a dynamic and exciting, educational, and research institution that combines the knowledge and expertise of multidisciplinary faculty, industry professionals, and students. The CCI was formed in 2000 as the College of Information Technology, with the mission of educating information specialists, conducting leading-edge research, and partnering with area businesses of great importance to the Charlotte community and the University. It was renamed the College of Computing and Informatics in 2006 in an effort to reflect the College's commitment to maintain relevancy with the ever-changing world of information technology that impacts all of our lives on a daily basis.

With educational programs rooted in a strong foundation of research, the CCI combines the talents of on- and off-campus partners in achieving its mission. Academic programs include Bachelor's, Master's, and Ph.D. degree programs in computer science, software and information systems, and information technology. Committed to the concept of life-long learning, the College also offers undergraduate and graduate certificate programs.

A key component of all CCI academic programs is the team interaction between students, faculty, and community partners. Through their involvement in real-world projects, students apply what they learn, thus, giving them practical experience as they help businesses solve computing and informatics challenges.

The three primary missions of the CCI are:

- to educate and prepare the computing and informatics professionals of tomorrow

- to conduct leading-edge research in enterprise information systems
- to partner with area industry to develop computing and informatics solutions

Computer Science Program. The Computer Science Department offers a wide variety of programs to match the diverse requirements of employers. The computer science major may pursue either a Bachelor of Science or a Bachelor of Arts degree.

The Bachelor of Science program offers the student two very different concentrations: computer science or computer engineering. The computer science option is centered on software development. Theoretically based, this program prepares students to continue their education in master's or doctoral programs, or to enter the business world as a computer scientist. The computer engineering option prepares the graduate to enter the computer industry either as a computer hardware design engineer or as a computer scientist with a heavy dose of mathematics, the physical sciences, and electrical engineering.

The Bachelor of Arts option is in computer science. As in the Bachelor of Science program, the computer science concentration prepares the student to enter the business world as a computer scientist. The emphasis in this program is less theoretical and mathematical, and more on the applied side.

The curriculum provides flexibility for the student to tailor a program to meet her or his needs and objectives. For the computer science option in the Bachelor of Science or Bachelor of Arts degrees, the student must select a minimum of 15 hours outside of computer

science in which to study. This "minor-like" program allows the student to select from the full spectrum of University programs and majors, including the University Honors Program.

Software and Information Systems Program. The Department of Software and Information Systems is primarily focused on the study of technologies and methodologies for information system architecture, design, implementation, integration, and management. An illustrative list of questions/issues of interests includes:

- Analysis and design methodologies of component-based software systems
- Integration and interoperation of information systems
- Theories and methodologies of software development
- Information system security architecture and protocols
- Design of efficient heterogeneous computer networks
- Architectures for distributed systems
- Collaborative system technology and design
- Human/computer interaction
- Design of information systems based on ubiquitous/pervasive computing
- Software engineering
- Quality, testing, and simulation of software designs
- Social, ethical, and policy issues related to IT
- Information system architectures for electronic enterprise
- Technologies for information system privacy

The Department of Software and Information Systems offers a Bachelor of Arts program that focuses on the applications of information technology. Software is the driving force of the emerging information economy. The Department of Software and Information Systems focuses on issues related to developing software, information systems, and their interactions with people. This degree program is committed to best prepare students to match the diverse requirements of employers.

Experiential Learning Programs. Students are encouraged to participate in professional work experiences in support of their academic and career development through the cooperative education, 49ership, and internship programs offered to them. The College works with the University Career Center to expand experiential learning offerings to enable more students to graduate with career-related experience. For more information about experiential learning programs, please see "Experiential Learning Programs" in the "Student Services and Programs" section in this *Catalog*.

Department of Computer Science

www.cs.uncc.edu

Chair and Professor: L. Hodges

Associate Chair and Professor: K. Chen

Assistant Chairperson and Director of Freshman Programs: J. Frazier

Director of MS Program: B. Wilkinson

Director of Information Technology PhD Program: J. Xiao

Bank of America Endowed Chair: W. Ribarsky

Professors: L. Mays, Z. Ras, W. Ribarsky, B. Wilkinson, J. Xiao

Professors Emeriti: M. Allen, G. Epstein, G. Revesz, J. Schell

Associate Professors: T. Dahlberg, C. Gibas, R. Lejk, D. Livesay, T. Mostafavi, K. Subramanian

Associate Professor Emeritus: H. Razavi

Assistant Professors: T. Barnes, J. Fan, A. Fodor, R. Kosara, A. Lu, K. Najarian, J. Payton, M. Shin, R. Souvenir, Z. Su, Y. Wang, Z. Wartell, D. Wilson, X. Wu, J. Yang, M. Youngblood

Senior Lecturer: D. Cassidy, J. Frazier

Lecturers: C. Goodrum, R. Ilson, L. Lehmann, S. Scott

Adjunct Professor: Wiczorkowski

Computer science spans a wide range, from its theoretical and algorithmic foundations to cutting-edge developments in robotics, computer vision, intelligent systems, bioinformatics, and other exciting areas. We can think of the work of computer scientists as falling into three categories:



- 1.) They design and implement software. Computer scientists take on challenging programming jobs. They also supervise other programmers, keeping them aware of new approaches.
- 2.) They devise new ways to use computers. Progress in the CS areas of networking, database, and human-computer-interface enabled the development of the World Wide Web. Now, researchers are working to make robots that demonstrate intelligence, are using databases to create new knowledge, and are using computers to help decipher the secrets of our DNA.
- 3.) They develop effective ways to solve computing problems. For example, computer scientists develop the best possible ways to store information in databases, send data over networks, and display complex images. Their theoretical background allows them to determine the best performance possible, and their study of algorithms helps them develop new approaches that provide better performance. Computer science spans the range

from theory to programming. While other disciplines can produce graduates better prepared for specific jobs, computer science offers a comprehensive foundation that permits graduates to adapt to new technologies and new ideas.

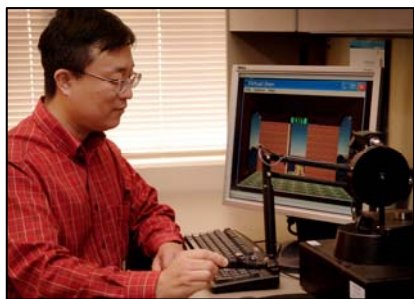
The Department of Computer Science offers programs leading to four degrees: Bachelor of Arts, Bachelor of Science, Master of Science, and Ph.D. in Information Technology. (See the *UNC Charlotte Graduate Catalog* for information on the M.S. and Ph.D. degrees). Students are prepared for their profession through a comprehensive program of courses and research opportunities in Departmental state-of-the-art computing labs.

Cooperative Education in Computer Science. By participating in the Cooperative Education program, students in computer science may pursue their education along with alternating work experiences so that they may be better prepared to enter their chosen professional career. Interested students should contact the University Career Center for more information.

BACHELOR OF ARTS: COMPUTER SCIENCE

The Computer Science Concentration consists of 48 hours in computer science, and 12 hours in mathematics. Courses included are: ITCS 1214, 1215, 2163, 2175, 2214, 2215, 3155, 3160, 3166, 3688, 4102, nine semester hours of approved ITCS or ITIS courses numbered 3000 or above, and six additional semester hours of approved ITCS courses numbered 4000 or above; ENGL 2116 and COMM 2105; MATH 1120, 2164, STAT 2220, 2223; or MATH 1241, 1242, 2164, STAT 2122.

A component of 15 semester hours of approved non-computer science courses forming an integrated program of outside concentration must be included. The business outside concentration consists of a prescribed set of courses from the College of Business and one 3000-level course from a restricted set of choices. The mathematics outside concentration consists of 9



semester hours of approved mathematics courses at the 3000 level or above (6 hours of additional free electives must be taken in this case). In general, an outside

concentration consists of 6 hours at the 3000-level or above, plus an additional 9 hours of approved non-computer-related courses, forming an integrated program of secondary strength.

BACHELOR OF SCIENCE: COMPUTER SCIENCE

The Computer Science Concentration consists of 54 hours of computer science and 12 hours in mathematics. Courses included are: ITCS 1214, 1215,

2175, 2181, 2214, 2215, 3143, 3155, 3160, 3166, 3182, 3688, 4102, nine semester hours of approved ITCS or ITIS courses numbered 3000 or above, and six additional semester hours of approved ITCS courses numbered 4000 or above; MATH 1241, 1242, 2164, STAT 2122. ENGL 2116 is also required.

A component of 15 semester hours of approved non-computer science courses forming an integrated program of outside concentration must be included. The business outside concentration consists of a prescribed set of courses from the College of Business and one 3000-level course from a restricted set of choices. The mathematics outside concentration consists of 9 semester hours of approved mathematics courses at the 3000 level or above (6 hours of additional electives must be selected in this case). In general, an outside concentration consists of 6 hours at the 3000-level or above, plus an additional 9 hours of approved non-computer-related courses, forming an integrated program of secondary strength.

BACHELOR OF SCIENCE: COMPUTER SCIENCE, COMPUTER ENGINEERING CONCENTRATION

The Computer Engineering Concentration consists of 42 hours of computer science, 15 hours of mathematics, 12 hours of technical electives, ECON 2101, and ENGL 2116. These include: ITCS 1214, 1215, 2175, 2181, 2214, 2215, 3143, 3155, 3182, 3183, 3688, 4102, and six additional semester hours of approved ITCS courses numbered 4000 or above; MATH 1241, 1242, 2164, 2171, STAT 2122. Twelve hours of ITCS/ITIS and ECGR technical electives must be approved by the Department.

Students must also complete PHYS 2101, 2101L, 2102, 2102L, and 3141, and CHEM 1251 and 1251L. A component of related work must include 11 hours of electrical and computer engineering courses: ECGR 2111, 2112, 2155, 2156, and 3131.

MINOR IN COMPUTER SCIENCE

Requirements for the minor in Computer Science include completion of 24 hours of computer science: ITCS 1214, 1215, 2175, 2214, 2215, 3155, 3160, and 3688.

MINOR IN INFORMATION SCIENCE

Requirements for the minor in Information Science include completion of 24 hours of computer science: ITCS 1214, 1215, 2175, 2214, 3112, 3143, 3155, and 3160.

CERTIFICATE IN COMPUTER PROGRAMMING

The Department of Computer Science offers a certificate in Computer Programming. A certificate will be awarded by the Department of Computer Science to post-baccalaureate students (students having earned a bachelor's degree in any field, with one semester of calculus, who have enrolled with the graduate school as

a post-baccalaureate student), who have completed the course requirements listed below:

- ITCS 1214 Introduction to Computing I
- ITCS 1215 Introduction to Computing II
- ITCS 2175 Logic and Algorithms
- ITCS 2214 Data Structures
- ITCS 2215 Design and Analysis of Algorithms
- ITCS 3112 Design and Implementation of Object-Oriented Systems
- ITCS 3155 Software Engineering
- ITCS 3160 Database Design and Implementation
OR ITCS 4145 Parallel Computing

CERTIFICATE IN COMPUTER ARCHITECTURE

The Department of Computer Science offers a certificate in Computer Architecture. A certificate will be awarded by the Department of Computer Science to post-baccalaureate students (students having earned a bachelor's degree in any field, with one semester or calculus, who have enrolled with the graduate school as a post-baccalaureate student), who have completed the course requirements listed below:



- ITCS 1214 Introduction to Computing I
- ITCS 1215 Introduction to Computing II
- ITCS 2181 Computer Logic and Design
- ITCS 3143 Operating Systems
- ITCS 3182 Computer Org and Architecture
- ITCS 3183 Hardware Systems Design
- ITCS 4145 Parallel Computing
- ITCS 4181 Microcomputer Interfacing

**SUGGESTED CURRICULUM:
B.A. DEGREE IN COMPUTER SCIENCE**

Freshman Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 1214	3	ITCS 1215	3
MATH 1120*	3	ITCS 2175	3
ENGL 1101	3	STAT 1220*	3
Social Science	3	Science	4
LBST 110x	3	ENGL 1102	3

Sophomore Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 2214	3	ITCS 2215	3
ITCS 2163	3	COMM 2105	3

STAT 1223*	3	MATH 2164*	3
ENGL 2116	3	LBST 2102	3
LBST 2101	3	LBST 221x	3

Junior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 4102	3	ITCS 3155	3
ITCS/ITIS Elective	3	ITCS 3160	3
Science	3	ITCS 3166	3
Related Work	3	Related Work	6
Elective	1		

Senior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 4xx	3	ITCS 4xx	3
ITCS 3688	3	ITCS/ITIS Elective	3
ITCS/ITIS Elective	3	Electives	7
Related Work	3	Related Work	3
Elective	3		

Total Hours = 120

* A mathematics option consisting of MATH 1241, 1242, and 2164, and STAT 2122 may be selected as an alternate to the math courses listed.

**SUGGESTED CURRICULUM:
B.S. DEGREE IN COMPUTER SCIENCE**

Freshman Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 1214	3	ITCS 1215	3
MATH 1241	3	ITCS 2175	3
ENGL 1101	3	MATH 1242	3
Social Science	3	ENGL 1102	3
LBST 110x	3	Science	4

Sophomore Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 2181	3	ITCS 2215	3
ITCS 2214	3	MATH 2164	3
STAT 2122	3	LBST 2102	3
LBST 2101	3	Science	3

ENGL 2116	3	Related Work	3
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Junior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3182	3	ITCS 3155	3
ITCS 4102	3	ITCS 3688	3
ITCS/ITIS Elective	3	ITCS/ITIS Elective	3
Related Work	3	Related Work	3
Elective	2	LBST 221x	3

Senior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3160	3	ITCS 3143	3
ITCS 4xxx	3	ITCS 3166	3
ITCS/ITIS Elective	3	ITCS 4xxx	3
Related Work	3	Related Work	3
Elective	3	Elective	3

Total Hours = 120

SUGGESTED CURRICULUM: B.S. DEGREE, COMPUTER ENGINEERING CONCENTRATION

Freshman Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 1214	3	ITCS 1215	3
MATH 1241	3	ITCS 2175	3
CHEM 1251	3	MATH 1242	3
CHEM 1251L	1	PHYS 2101	3
ENGL 1101	3	PHYS 2101L	1
LBST 110x	3	ENGL 1102	3

Sophomore Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 2181	3	ITCS 2215	3
ITCS 2214	3	EOGR 2111	3
ENGL 2116	3	EOGR 2155	1
LBST 2101	3	MATH 2164	3
PHYS 2102	3	MATH 2171	3
PHYS 2102L	1	LBST 2102	3

Junior Year			
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Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3182	3	ITCS 3155	3
ECON 2101	3	ITCS 3688	3
ECGR 2112	3	ITCS 4102	3
ECGR 2156	1	ECGR 3131	3
PHYS 3141	3	LBST 221x	3
STAT 2122	3		

Senior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3183	3	ITCS 3143	3
ITCS 4xxx	3	ITCS 4xxx	3
Tech Electives	6	Tech Electives	6
Free Elective	1		

Total Hours = 120

**EARLY-ENTRY PROGRAM:
Master of Science in Computer Science**

Exceptional undergraduate students at UNC Charlotte may be accepted into the Master of Science in Computer Science and begin work toward a graduate degree before completion of the baccalaureate degree. The criteria for admission are the following:

1. A student may be accepted into the Early-Entry Program at any time after completion of 75 semester hours of undergraduate work applicable to the appropriate degree although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken.
2. The application process and all required documentation (e.g., test scores, transcripts, letters of recommendation) are the same for early entry students as for other applicants to the program. Admission must be recommended by the Department of Computer Science and approved by the Graduate School. The admission status will be "provisional" pending the award of the undergraduate degree.
3. To be accepted into this program an undergraduate student must have at least a 3.2 overall GPA and a minimum 3.3 GPA in the department of Computer Science.
4. If an Early-Entry student has not met the normal graduate admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.
5. Students accepted into an Early-Entry Program will be subject to the same policies that pertain to other

matriculated graduate students. Generally, it will be assumed that early entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work.

6. This Early-Entry Program is also accelerated in which up to 12 hours earned at the graduate level may be substituted for required undergraduate hours. In other words, up to 12 hours of graduate work may be "double counted" toward both the baccalaureate and graduate degrees.

Approved Course Substitutions for Early/Accelerated Entry into Computer Science MS program

Required CSCI U/G	Graduate substitutions
ITCS 3160 Database Design & Implementation	ITIS 5160 Applied Database, (applies for graduate credit only if entering the MSIT program), or ITCS 6160 Database Systems, (applies for graduate credit only if entering the MS Computer Science program)
ITCS 3143 Operating Systems	ITCS 6144 Operating Systems Design
ITCS 3155 Software Engineering	ITCS 6112 S/W Systems Design & Implementation
ITCS 4102 Programming Languages	ITCS 5102 Survey of Programming Languages
ITCS 3182 Computer Organization & Architecture	ITCS 5141 Computer Org & Architecture
ITCS 3183 Hardware Systems Design	ITCS 6182 Advanced Computer Architecture
ITCS 3166 Intro to Computer Networks	ITCS 6166 Computer Communications & Networks
ITCS 3XXX/4XXX (up to 9 credit hours)	Any graduate courses from CCI that are not otherwise used in a substitution above (up to 9 hours)

Department of Software and Information Systems

www.sis.uncc.edu

Chair and Professor: B. Chu
Professor: Y. Zheng
Associate Professor: G. Ahn, W. Tolone

Assistant Professors: B. Kang, C. Latulipe, S. Lee, Z. Liu, A. Raja, H. Richter, Y. Wang, D. Wilson
Lecturers: B. Long, A. Kombol
Adjunct Professors: Foley, T. Inskeep, T. Kitrick, Williams
Adjunct Lecturers: Callahan, He, Jancula
Director of Undergraduate Studies: B. Long

The Bachelor of Arts in Software and Information Systems is designed for students interested in pursuing a career in Software Engineering or Information Technology. This degree will also well prepare students to pursue graduate studies in related areas. The focus of this program includes:

- Network-based Application Development
- Software Engineering (design, integration, testing, and assurance)
- e-Business Technologies
- Information Security and Privacy
- Human – Computer Interaction
- IT Infrastructure Design
- Ubiquitous Computing

The Department of Software and Information Systems offers both undergraduate and graduate programs. The undergraduate program leads either to the Bachelor of Arts in Software and Information Systems or to a minor in Software and Information Systems. The graduate program leads to a Master of Science in Information Technology (see the *UNC Charlotte Graduate Catalog* for information on the M.S. degree). Graduate certificate programs in Information Security and Privacy and Information Technology Management are also available. To assist them in their studies, students have access to advanced computer labs and software where they can practice and experiment in controlled environments. In addition, the Department maintains a high degree of interaction with working industry professionals who provide real-world expertise and experience.



Cooperative Education in Software and Information Systems. By participating in the Cooperative Education program, students in the department may pursue their education along with alternating work experiences so that they may be better prepared to enter their chosen professional career. Interested students should contact the University Career Center for more information.

BACHELOR OF ARTS: SOFTWARE AND INFORMATION SYSTEMS (Traditional Series)

Under this program, the requirements for the B.A degree may be fulfilled by completing either of two series of courses. The traditional series emphasizes advanced programming and mathematics skills. An alternate series, the Information Technology track,

emphasizes usability, security, and reliability of IT infrastructures, writing and communications skills. Both sets of courses prepare students for a wide variety of jobs or graduate studies.

The *Traditional Series* requires 120 credit hours total including 54 hours of major courses, 12 hours of English and communications courses, 12 hours in mathematics and statistics, 10 hours of sciences, and up to 17 hours of general education courses and free electives. Required major courses include: ITIS 2300, 3200, 3300, 3310, and 3320; ITCS 1214, 1215, 2175, 2214, 2215, 3143, 3160, 3166, and 3688; and twelve semester hours of approved ITIS or ITCS courses numbered 3000 or above. The mathematics and statistics requirements can be fulfilled by completing one of two course sequences:

- MATH 1120, 2164, and STAT 1220, 2223
- MATH 1241, 1242, 2164, and STAT 2122

In addition, each student must complete at least 15 semester hours of courses in a concentration of courses that form a coherent area of study related to developing applications of information systems. At least six of the 15 hours must be upper division courses. These courses must be completed in a major outside the College of Computing and Informatics and require approval of the student's academic advisor.

SUGGESTED CURRICULUM

Freshman Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 1214	3	ITCS 1215	3
MATH 1120*	3	ITCS 2175	3
ENGL 1101	3	ENGL 1102	3
LBST 110x	3	STAT 1220*	3
Science with lab	4	Science	3

Sophomore Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 2300	3	ITCS 2215	3
ITCS 2214	3	Social Science	3
ENGL 2116	3	COMM 2105	3
MATH 2164*	3	LBST 2101	3
STAT 2223*	3	Outside concentration	3

Junior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3166	3	ITCS 3143	3

ITCS 3688	3	ITCS 3160	3
ITIS 3300	3	ITCS 3310	3
LBST 2102	3	ITIS/ITCS Elective	3
Outside concentration	3	Outside concentration	3

Senior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITIS 3200	3	ITIS/ITCS Elective	3
ITIS 3320	3	ITIS/ITCS Elective	3
ITIS/ITCS Elective	3	LBST 221x	3
Outside concentration	3	Outside concentration	3
Elective	3	Elective	2

Total Hours = 120

**A mathematics option consisting of MATH 1241, 1242, 2164, and STAT 2122 may be selected as an alternate to the math courses listed.*

**BACHELOR OF ARTS:
SOFTWARE AND INFORMATION SYSTEMS
(Information Technology Track)**

The *Information Technology Track* requires 120 credit hours total including 45-48 hours of major courses, 21 hours of English and communications courses, 6 hours in mathematics and statistics, 10 hours of sciences, and 14-17 hours of general education courses and free electives. Required major courses include: ITIS 1203, 1210, 2300, 3100, 3130, 3200, 3300, 3320; ITCS 1214, 1215, 3160, 3166 (or ITIS 4166), and 3688; INFO 3211; 3 semester hours of approved ITIS or ITCS courses numbered 3000 or above; and 3 hours of computer competency or free electives. Students must demonstrate competency in standard office applications such as word processing, spreadsheets, and presentation software or take ITCS 1101. The required mathematics and statistics courses are MATH 1100 (or MATH 1103) and STAT 1220.



In addition, each student, in consultation with his or her academic advisor, must complete at least 21 semester hours of courses by *either*:

- 1) Completing the requirements for a minor chosen by the student even if doing so requires more than 21 hours (if the minor can be completed in less than 21 hours, the remaining hours become free electives) **OR**
- 2) Completing a series of courses in a major that does not offer a minor. These courses must form a coherent area of study related to developing applications of information systems. The courses selected must include a minimum of 9 hours of upper division courses.

In completing this requirement, students must comply with prerequisites and other applicable academic regulations for courses offered by any department, even if doing so requires exceeding the 120 hour minimum necessary for graduation.

SUGGESTED CURRICULUM

Freshman Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITIS 1203	3	ITIS 1210	3
ITCS 1214	3	ITCS 1215	3
MATH 1100*	3	ENGL 1102	3
ENGL 1101	3	Elective**	3
Science with Lab	4	Social Science	3

Sophomore Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITIS 2300	3	ITIS 3130	3
COMM 2100	3	ITIS 3200	3
LBST 1xx	3	COMM 2105	3
STAT 1220	3	ENGL 2116	3
Minor -1	3	Minor-2	3

Junior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITIS 3300	3	ITCS 3160	3
LBST 2101	3	ITIS 3320	3
LBST 2102	3	ENGL 4181/4183	3
Science	3	Minor-4	3
Minor-3	3	Minor-5	3

Senior Year			
Fall Semester		Spring Semester	
Course	Cred	Course	Cred
ITCS 3166/ITIS 4166	3	ITIS 3100	3
ITCS 3688	3	ITIS/ITCS Elective	3
INFO 3211	3	ENGL 4182/COMM 3141	3
Free Elective	2	LBST 221x	3
Minor-6	3	Minor-7	3

Total Hours = 120

*MATH 1103 may be substituted for MATH 1100.

**If competency in office applications can be demonstrated. Otherwise, ITCS 1101 is required.

MINOR IN SOFTWARE AND INFORMATION SYSTEMS

This program is designed to provide students with the Information Technology knowledge necessary for today's information-based society. Students will not only gain hands-on knowledge of how to use the Internet to develop effective and easy-to-use applications but also will understand critical issues in designing information systems such as requirements development, integration, security and privacy, legal and policy considerations, and project management.

Program Requirements. The minor requires 18 credit hours. The following courses (9 credit hours) are required:

- ITIC 1214 Introduction to Computer Science I (3)
- ITIS 2300 Introduction to Web-Based Application Development (3)
- ITIS 3132 Information Systems (3)

Students should select three of the following courses (9 credit hours):

- ITCS 1215 Introduction to Computer Science II
- ITIS 3130 Human-Computer Interactions
- ITIS 3131 Human and Computer Information Processing
- ITIS 3200 Introduction to Information Security and Privacy
- ITCS 3160 Data Base Design and Implementation**
- ITCS 3688 Computers and their Impact on Society***

**If this course is to be selected, the student must also select ITCS 1215.

***This course meets the General Education Requirements for written and oral communications.