COMPUTER SCIENCE (CSCI)

CSCI 1200 COMPUTER SCIENCE PRINCIPLES (3 credits)
This course introduces students to the foundational principles of computer science. It aims to help students learn the essential thought processes used by computer scientists to solve problems, expressing those solutions as computer programs. The exercises and projects make use of mobile devices and other emerging platforms.
Prerequisite(s)/Corequisite(s): MATH 1120 or MATH 1130 or MATH 1220 or equivalent with C- or better, or permission of the instructor
Distribution: Natural/Physical Sci General Education lecture

CSCI 1204 COMPUTER SCIENCE PRINCIPLES LABORATORY (1 credit)
This is a laboratory course for students enrolled in CSCI 1200. It consists of programming exercises designed to help students practice computational thinking and apply computational solutions to practical problems. The exercises make use of mobile devices and other emerging platforms.
Prerequisite(s)/Corequisite(s): CSCI 1200, prior or concurrent
Distribution: Natural/Physical Sci General Education lab course

CSCI 1280 INTRODUCTION TO COMPUTATIONAL SCIENCE (3 credits)
Introduction to Computational Science explores the role of computer science in scientific inquiry. Through the construction and analysis of block-based visual artifacts (e.g., pixel art and geometric patterns), this course aims to help students learn the essential thought processes used by computer scientists to solve problems, expressing those solutions as computer programs. When executed, these computer programs produce visual artifacts that can be displayed and interacted with using a variety of tools/software including LEGO Digital Designer, Minecraft, LDraw, 3D Builder, and Virtual Reality systems such as the HTC Vive.
Prerequisite(s)/Corequisite(s): Math 1220 (or equivalent)
Distribution: Natural/Physical Sci General Education lecture and Natural/Physical Science General Education course

CSCI 1620 INTRODUCTION TO COMPUTER SCIENCE II (3 credits)
Advanced topics in programming; topics in data representation and manipulation, data structures, problem solving and algorithm design. This course has a required laboratory component; students must register for a laboratory section when enrolling in lecture.
Prerequisite(s)/Corequisite(s): (CIST 1400 with grade of C or better) AND (MATH 1930 or MATH 1950 with grade of C- or better)

CSCI 2030 MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (3 credits)
This course introduces discrete mathematics concepts that are foundational for the study of computer science such as functions, relations, and sets, basic logic, methods of proof, mathematical induction, computational complexity, recursion, counting, recurrences, and relations.
Prerequisite(s)/Corequisite(s): (CIST 1400 with grade of C or better) AND (MATH 1930 or MATH 1950 with grade of C- or better)

CSCI 2240 INTRODUCTION TO C PROGRAMMING (3 credits)
Programming in 'C' in a UNIX operating system environment; algorithm and program development and file manipulation using 'C'; UNIX-like utility development.
Prerequisite(s)/Corequisite(s): CSCI 1620 with grade of C or better

CSCI 2310 VIDEO GAME DESIGN (3 credits)
The course will cover game design and theory techniques used by the gaming industry. This course is designed for students who have gone through the introductory programming course and have an interest in what it takes to design current games.
Prerequisite(s)/Corequisite(s): CIST 1400 with grade of C or better.

CSCI 2410 INTRODUCTION TO DATA ANALYTICS USING PYTHON (3 credits)
This course is an introduction to the basic concepts and principles of data analytics using the Python programming language. The first part of the course covers major Python language topics including procedures and functions, iteration, recursion, arrays and matrices, strings, operational model of procedure and function calls, algorithms, exceptions, object-oriented programming, and file input/output. The coverage of Python language features are aimed mainly at the data analytics studies of this course. The second part of the course emphasizes applying Python and its rich functional libraries and special software packages to data munging, analysis, mining, and visualization, and machine learning techniques including statistical analysis, parameter estimation, regression, classification, predictive modeling construction, etc.
Prerequisite(s)/Corequisite(s): (CSCI 1620 with grade of C or better) AND (CIST 2500 or equivalent statistics course with grade of C- or better). Not open to non-degree graduate students.

CSCI 2510 INTRODUCTION TO GAME PROGRAMMING (3 credits)
The course will cover programming and development techniques used in a game programming environment. The course is designed for students who have an interest in game programming to be eased into the concepts in a familiar environment.
Prerequisite(s)/Corequisite(s): CSCI 2240 with C- or better. Not open to non-degree graduate students.

CSCI 2620 2D GRAPHICS: IMAGE PROCESSING (3 credits)
This class introduces the 2D graphics area of image processing, which takes an image, creates an internal model of the image, modifies it using a computer program, and produces a new image. Specific techniques covered in this course include color spaces, image transformations, edge detection, file formats, object tracking, and background removal.
Prerequisite(s)/Corequisite(s): CSCI 1620 with grade of C or better

CSCI 2840 C++ & OBJECT-ORIENTED PROGRAMMING (3 credits)
C++ and Object Oriented Programming (OOP) is taught in the UNIX environment. Topics include C++ as a ‘Better C,' OOP with C++, classes and data abstration, operator overloading, inheritance, virtual functions and polymorphism, C++ stream I/O.
Prerequisite(s)/Corequisite(s): CSCI 2240; High-level programming language like Pascal, Java, or C--; solid understanding of pointers & scope; ability to design & implement solutions to modest problems (with C- or better).

CSCI 2850 PROGRAMMING ON THE INTERNET (3 credits)
This course is an introduction to and overview of Internet-based application development focusing on the use of Java, Perl and other server-based programming languages. Software development in the context of the World Wide Web and other Internet services will be emphasized. Internet application development will also be discussed. Other techniques will be covered.
Prerequisite(s)/Corequisite(s): CSCI 1620 or CSCI 1840.

CSCI 2980 TOPICS IN COMPUTER SCIENCE (3 credits)
A variable topic course in computer science at the sophomore level. Topics not covered in the computer science degree program, but suitable for sophomore-level students.
Prerequisite(s)/Corequisite(s): CSCI 1620. Permission of instructor. Additional prerequisites may be required for particular topic offerings with C- or better.

CSCI 3100 APPLIED COMBINATORICS (3 credits)
Basic counting methods, generating functions, recurrence relations, principle of inclusion-exclusion. Polya’s formula. Elements of graph theory, trees and searching network algorithms. (Cross-listed with CSCI 8105, MATH 3100, MATH 8105).
Prerequisite(s)/Corequisite(s): MATH 2030, MATH 2040, MATH 2230, or CSCI 2030 all with a C- or better. Mathematical logic; Set theory; Relations; Functions; Congruences; Inductive and recursive definitions; Discrete probability; sets, graphs, trees, & matrices.
CSCI 3300 NUMERICAL METHODS (3 credits)
This course involves solving nonlinear algebraic equations and systems of equations, interpolation and polynomial approximation, numerical differentiation and integration, numerical solutions to ordinary differential equations, analysis of algorithms and errors, and computational efficiency. (Cross-listed with CSCI 8305, MATH 3300, MATH 8305).
Prerequisite(s)/Corequisite(s): MATH 1960 with a C- or better or permission of instructor

CSCI 3320 DATA STRUCTURES (3 credits)
This is a core that will cover a number of data structures such as tree, hashing, priority queues and graphs as well as different algorithm design methods by examining common problem-solving techniques. (Cross-listed with CSCI 8325)
Prerequisite(s)/Corequisite(s): CSCI 1620 and CSCI 2030 or MATH 2030. Programming Languages: Java or C++ Topics: Arrays, Pointers, Introductory Lists, Storage Allocation (with C- or better).

CSCI 3450 NATURAL LANGUAGE PROCESSING (3 credits)
The course will provide an overview of the topics in natural language processing such as word and sentence tokenization, syntactic parsing, semantic role labeling, text classification. We will discuss fundamental algorithms and mathematical models for processing natural language, and how these can be used to solve practical problems. We will touch on such applications of natural language processing technology as information extraction and sentiment analysis. (Cross-listed with CYBR 3450).
Prerequisite(s)/Corequisite(s): Prereq: CSCI 2030 with C- or better; Co-req: CSCI 3320 with C- or better; Students should be comfortable w/ scripting (Python is the language extensively used in natural language processing tools including NLTK). Not open to non-degree graduate students.

CSCI 3470 FUNDAMENTALS AND ALGORITHMS OF MACHINE LEARNING (3 credits)
This course discusses the fundamentals and algorithms of machine learning and contains both theory and application. Machine learning, as a subset of artificial intelligence, is the scientific study of models that computer systems use to perform a specific task without explicit instructions. Topics in this course will include supervised learning such as Decision Tree, Perceptron, Support Vector Machine, Naive Bayes, and Regression, unsupervised learning such as clustering, dimensionality reduction, kernel methods, learning theory such as bias/variance trade-offs, Generalization and Overfitting and large margins. Other crucial topics will include discussions such as Stacking, Semi-Supervised Learning and Interactive Learning. This course will also discuss a few applications in problem domains such as in computer vision.
Prerequisite(s)/Corequisite(s): CSCI 2410 or instructor permission. Not open to non-degree graduate students.

CSCI 3510 ADVANCED GAME PROGRAMMING (3 credits)
This course is intended for those with an interest in video game programming. This course introduces the advanced concepts of game programming including 3D programming, game networking, and development of a multiplayer, networked game by learning and using the XNA environment.
Prerequisite(s)/Corequisite(s): CSCI 2510 and CSCI 3320 with C- or better, or Instructor permission. Not open to non-degree graduate students.

CSCI 3550 COMMUNICATION NETWORKS (3 credits)
This course is designed to bring students up to the state of the art in networking technologies with a focus on Internet. It will cover the principles of networking with an emphasis on protocols, implementations and design issues. (Cross-listed with CSCI 8555).
Prerequisite(s)/Corequisite(s): CSCI 3320 or CSCI 8325 with C- or better. Data structures and algorithms. C or C++ programming.

CSCI 3660 THEORY OF COMPUTATION (3 credits)
The course is intended to introduce the students to the theory of computation in a fashion that emphasizes breadth and away from detailed analysis found in a normal undergraduate automata course. The topics covered in the course include methods of proofs, finite automata, nondeterminism, regular expressions, context-free grammars, pushdown automata, no-context free languages, Church-Turing Thesis, decidability, reducibility, and space and time complexity.
Prerequisite(s)/Corequisite(s): CSCI 3320

CSCI 3710 INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION (3 credits)
The course is intended to introduce the students to the topics found in introductory digital design and computer organization classes.
Prerequisite(s)/Corequisite(s): CSCI 3320 (could be taken concurrently)

CSCI 3830 ADVANCED JAVA PROGRAMMING (3 credits)
This course teaches students web application development using advanced concepts in the Java programming language. It introduces students to distributed computing models such as the client-server model and how it is implemented in web applications using modern Java technology stacks.
Prerequisite(s)/Corequisite(s): CSCI 1620 with C or better) AND (CSCI 3320 with C- or better) AND (basic knowledge of HTML and SQL)

CSCI 3850 FOUNDATIONS OF WEB SEARCH TECHNOLOGIES (3 credits)
This course provides students a basic understanding of how search and information flow works on the web. Main topics include: document representation, inverted indexing, ranking of web search results, vector-space model, web graph, PageRank, search-based advertising, information cascades, and web crawling.
Prerequisite(s)/Corequisite(s): CSCI 2030 and CSCI 2850 with C- or better, or instructor Approval. Not open to non-degree graduate students.

CSCI 4000 ASSESSMENT (0 credits)
This course provides various resources to students about to graduate, and provides a mechanism that guarantees these students complete the final assessments required to maintain the currency and quality of the program. It is intended for undergraduate computer science majors in their last semester prior to graduation. It is required for all students entering after the spring 2004 semester. All degree requirements should be completed by the end of the semester during which this course is taken. Students taking this course will be expected to file an application for graduation during the semester.
Prerequisite(s)/Corequisite(s): All degree requirements should be completed by the end of the semester during which this course is taken. Students taking this course will be expected to file an application for graduation during the semester. Not open to non-degree graduate students.

CSCI 4010 INTRODUCTION TO THE THEORY OF RECURSIVE FUNCTIONS (3 credits)
This is a proof-oriented course presenting the foundations of Recursion Theory. We present the definition and properties of the class of primitive recursive functions, study the formal models of computation, and investigate partially computable functions, universal programs. We prove Rice’s Theorem, the Recursion Theorem, develop the arithmetic hierarchy, demonstrate Post’s theorem. Introduction to the formal theories of computability and complexity is also given. (Cross-listed with MATH 4010, MATH 8016, CSCI 8016).
Prerequisite(s)/Corequisite(s): MATH 2230 or MATH 2030 with a C- or better or CSCI 3660 with a C- or better or instructor’s permission.

CSCI 4100 INTRODUCTION TO ALGORITHMS (3 credits)
The course provides students a basic understanding of algorithm analyses. Main topics include: growth of functions, asymptotic notation, recurrences, divide and conquer, sorting and its lower bounds, dynamic programming, greedy algorithms, and graph traversal.
Prerequisite(s)/Corequisite(s): CSCI 3320 with C- or better.
CSCI 4150  GRAPH THEORY & APPLICATIONS (3 credits)
Introduction to graph theory. Representations of graphs and graph isomorphism. Trees as a special case of graphs. Connectivity, covering, matching and coloring in graphs. Directed graphs and planar graphs. Applications of graph theory in several fields such as networks, social sciences, VLSI, chemistry and parallel processing. (Cross-listed with CSCI 8156, MATH 4150, MATH 8156).
Prerequisite(s)/Corequisite(s): MATH 2030 with a C- or better, or MATH 2030 with a C- or better, or MATH 2230 with a C- or better, or permission of instructor.

CSCI 4220  PRINCIPLES OF PROGRAMMING LANGUAGES (3 credits)
This course covers the foundational concepts and principles underlying the design and implementation of programming languages. Language constructs including assignment, equality, references, aggregations, scope, encapsulation, and parameter passing are discussed. A central theme is how a particular language construct relates to the concept of equalational reasoning (referential transparency). Formal notations for describing syntax and semantics are presented.
Prerequisite(s)/Corequisite(s): CSCI 3320 and CSCI 3660 with C- or better.

CSCI 4250  HUMAN COMPUTER INTERACTION (3 credits)
Human computer interaction is concerned with the joint performance of tasks by humans and machines; human capabilities to use machines (including learnability of interfaces); algorithms and programming of the interface; engineering concerns that arise in designing and building interfaces; the process of specification, design, and implementation of interfaces; and design trade-offs. (Cross-listed with CSCI 8256).
Prerequisite(s)/Corequisite(s): Either CSCI 3320 or ITIN 3330 with a grade of C- or better.

CSCI 4260  USER EXPERIENCE DESIGN (3 credits)
User experience (UX) design is concerned with the application of user-centered design principles to the creation of computer interfaces ranging from traditional desktop and web-based applications, mobile and embedded interfaces, and ubiquitous computing. This course provides in-depth, hands-on experience with real world application of the iterative user-centered process including contextual inquiry, task analysis, design ideation, rapid prototyping, interface evaluation, and reporting usability findings. (Cross-listed with CSCI 8266, ITIN 4260, ITIN 8266).
Prerequisite(s)/Corequisite(s): Required: C- or better in CIST 2500 and junior standing, or by permission of instructor. Recommended: C- or better in CSCI 4250 or ITIN 3330.

CSCI 4300  DETERMINISTIC OPERATIONS RESEARCH MODELS (3 credits)
This is a survey course of deterministic operations research models and algorithms. Topics include linear programming, network programming, and integer programming. (Cross-listed with CSCI 8306, MATH 4300, MATH 8306).
Prerequisite(s)/Corequisite(s): MATH 2050 with a C- or better or permission of instructor.

CSCI 4310  PROBABILISTIC OPERATIONS RESEARCH MODELS (3 credits)
This is a survey course of probabilistic operations, research models and algorithms. Topics include Markov chains, queuing theory, inventory models, forecasting, and simulation. (Cross-listed with CSCI 8316, MATH 4310, MATH 8316).
Prerequisite(s)/Corequisite(s): MATH 2050 and either MATH 4740 or MATH 8746 or STAT 3800 or STAT 8805 all with a C- or better or permission of instructor.

CSCI 4350  COMPUTER ARCHITECTURE (3 credits)
The course deals with: Computer evolution, top view of processor design, cache memory and organization, hierarchical memory design and management, performance metrics, RISC versus CISC architecture, and pipeline computer design and architecture. The course also covers analytic design alternatives as needed.
Prerequisite(s)/Corequisite(s): CSCI 3710, CSCI 3320 or CSCI 8325 with C- or better.

CSCI 4380  DIGITAL FORENSICS (3 credits)
Digital forensics involves the preservation, identification, extraction, analysis and documentation of digital evidence stored on a variety of electronic devices. The aim of this course is to introduce students to acceptable approaches for collecting, analyzing and reporting data from a forensics investigation. Topics include: an introduction to digital forensics, data acquisition, first response, memory forensics, operating system forensics, and network forensics. Students will be required to perform several forensics analyses in a controlled lab environment, including acquiring forensically sound hard drive images, memory images and analyzing these using industry standard tools, such as Forensic Toolkit (FTK). The Digital Forensics class is designed for Cybersecurity, Computer Science and other qualified students to learn what actions are both appropriate and required for preserving, collecting and analyzing digital evidence in cases of intrusion, data theft or other cybercrimes. (Cross-listed with CYBR 4380).
Prerequisite(s)/Corequisite(s): The student must take the following before enrolling: CYBR 3600 or CIST 3600, CSCI 3550 or ISQA 3400, CYBR 3370, CYBR 3350. Alternatively, instructor permission can be sought for students who have not met all of the above requirements.

CSCI 4430  QUANTUM COMPUTING AND CRYPTOGRAPHY (3 credits)
The course builds an understanding of exciting concepts behind quantum computing and quantum cryptography. In doing so it will introduce the principles of qubits, superposition, entanglement, teleportation, measurement, quantum error correction, quantum algorithms such as quantum Fourier transformation, Shor’s algorithm and Grover’s algorithm, quantum key exchange, quantum encryption, and secure quantum channels that are built using these principles. It will also discuss advantages of quantum computing and cryptography over classical computing and cryptography and limitations thereof. The students will come out with a working understanding of the field of quantum computing and quantum cryptography. During the course, students will also implement several of the quantum algorithms. (Cross-listed with CYBR 8436, CYBR 4430).
Prerequisite(s)/Corequisite(s): Co-requisites: CYBR 3570 or CSCI 4560; or Instructor permission.

CSCI 4440  INTRODUCTION TO PARALLEL COMPUTING (3 credits)
Need for higher-performance computers. Topics discussed include: classification of parallel computers; shared-memory versus message passing matchings; for ms of parallelism, measure of performance; designing parallel algorithms; parallel programming and parallel languages; synchronization constructs; and operating systems for parallel computers. (Cross-listed with CSCI 8446)
Prerequisite(s)/Corequisite(s): CSCI 4500 which may be taken concurrently.

CSCI 4450  INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3 credits)
An introduction to artificial intelligence. The course will cover topics such as machine problem solving, uninformed and informed searching, propositional logic, first order logic, approximate reasoning using Bayesian networks, temporal reasoning, planning under uncertainty and machine learning. (Cross-listed with CSCI 8456).
Prerequisite(s)/Corequisite(s): CSCI 3320 with C- or better.
CSCI 4470 PATTERN RECOGNITION (3 credits)
Structures and problems of pattern recognition. Mathematics model of
statistical pattern recognition, multivariate probability, Bay's decision
theory, maximum likelihood estimation, whitening transformations.
Parametric and non-parametric techniques, linear discriminant function,
gradient-descent procedure, clustering and unsupervised learning, and
feature selection algorithms. (Cross-listed with CSCI 8476).
Prerequisite(s)/Corequisite(s): CSCI 1620 with C- or better, and
MATH 2050. Recommended: MATH 4740/8746 or STAT 3800/8805.

CSCI 4480 ALGORITHMS FOR ROBOTICS (3 credits)
This course provides an introduction to software techniques and algorithms
for autonomously controlling robots using software programs called
controllers. Students will be taught how to program and use software
controllers on simulated as well as physical robots. (Cross-listed with
CSCI 8486).
Prerequisite(s)/Corequisite(s): CSCI 3320 with C- or better.
CSCI 4450/8456 is a recommended but not essential pre-requisite.

CSCI 4500 OPERATING SYSTEMS (3 credits)
Operating system principles. The operating system as a resource manager;
I/O programming, interrupt programming and machine architecture as
it relates to resource management; memory management techniques for
uni-mpilcrogrammed systems; process description and implementation;
process management (scheduling); I/O device, controller, and channel
management; file systems. Operating system implementation for large
and small machines. (Cross-listed with CSCI 8506).
Prerequisite(s)/Corequisite(s): CSCI 3710, CSCI 3320/8325,
MATH 1950, and CSCI 4350/8356 with C- or
better.

CSCI 4510 ADVANCED OPERATING SYSTEMS (3 credits)
State-of-the art techniques for operating system structuring and
implementation. Special purpose operating systems. Pragmatic aspects of
operating system design, implementation and use.
Prerequisite(s)/Corequisite(s): CSCI 4500

CSCI 4560 NUMBER THEORY & CRYPTOGRAPHY (3 credits)
An overview of one of the many beautiful areas of mathematics and its
modern application to secure communication. The course is ideal for
any student who wants a taste of mathematics outside of, or in addition
to, the calculus sequence. Topics to be covered include: prime numbers,
congruences, perfect numbers, primitive roots, quadratic reciprocity,
sums of squares, and Diophantine equations. Applications include error-
correcting codes, symmetric and public key cryptography, secret sharing,
and zero knowledge proofs. (Cross-listed with CSCI 8566).
Prerequisite(s)/Corequisite(s): CSCI 3710, CSCI 3320/8325,
MATH 1950, and CSCI 4350/8356 with C- or
better.

CSCI 4620 COMPUTER GRAPHICS (3 credits)
An introduction to the acquisition, manipulation and display of graphical
information using digital techniques. Topics include discussion of the
various hardware devices used for input and output, the classical
algorithms and data structures used in manipulation of graphical objects,
the user interface to the graphics system, and applicable standards. (Cross-
listed with CSCI 8626).
Prerequisite(s)/Corequisite(s): ISQA 3300 or CSCI 3320

CSCI 4660 AUTOMATA, COMPUTABILITY, AND FORMAL LANGUAGES
(3 credits)
This course presents a sampling of several important areas of theoretical
computer science. Definition of formal models of computation, and
important properties of such models, including finite automata and Turing
machines. Definition and important properties of formal grammars and
their languages. Introduction to the formal theories of computability and
complexity. (Cross-listed with CSCI 8666, MATH 4660, MATH 8666).
Prerequisite(s)/Corequisite(s): MATH 2030. Recommended: CSCI 3320/ CSCI 8325.

CSCI 4700 COMPILER CONSTRUCTION (3 credits)
Assemblers, interpreters and compilers. Compilation of simple expressions
and statements. Analysis of regular expressions. Organization of a compiler,
including compile-time and run-time symbol tables, lexical scan, syntax scan,
object code generation and error diagnostics. (Cross-listed with CSCI 8706).
Prerequisite(s)/Corequisite(s): CSCI 3320 and CSCI 4220 with C- or
better. Recommended: CSCI 4500.

CSCI 4760 TOPICS IN MODELING (3 credits)
Selection of such topics as formulation and analysis of various models
involving Markov chains, Markov processes (including birth and death
processes), queues, cellular automata, difference and differential equations,
chaotic systems and fractal geometries. (Cross-listed with CSCI 8766).
Prerequisite(s)/Corequisite(s): MATH 2350 and MATH 4740 or
MATH 8746.

CSCI 4820 INTRODUCTION SOFTWARE ENGINEERING (3 credits)
Basic concepts and major issues of software engineering, current tools
and techniques providing a basis for analyzing, designing, developing,
maintaining and evaluating the system. Technical, administrative and
operating issues. Privacy, security and legal issues. (Cross-listed with
CSCI 8836).
Prerequisite(s)/Corequisite(s): CSCI 3320 with C- or better.

CSCI 4850 DATABASE MANAGEMENT SYSTEMS (3 credits)
Basic concepts of data base management systems (DBMSs). The relational,
hierarchical and network models and DBMSs which use them. Introduction
to database design. (Cross-listed with CSCI 8856).
Prerequisite(s)/Corequisite(s): CSCI 3320 or equivalent with C- or
better.

CSCI 4890 DATA WAREHOUSING AND DATA MINING (3 credits)
This course provides students with a theoretical foundation and practical
methods for designing and constructing data warehouse and implementing
data mining. After covering the essential concepts, issues, techniques to
build an effective data warehouse, this course emphasizes the various
techniques of data mining, such as association, classification, clustering
and prediction for on-line analyses within the framework of data warehouse
architectures. This course gives students an opportunity to undertake a real-
life data analysis project. (Cross-listed with ISQA 4890).
Prerequisite(s)/Corequisite(s): ISQA 3310 or CSCI 4850

CSCI 4900 INTERNET SYSTEMS DEVELOPMENT (3 credits)
This course focuses on contemporary techniques and technologies in
the design, development, and integration of web-enabled information
systems. This is a rapidly moving, hands-on course that mirrors real-world
development of internet-based applications.
Prerequisite(s)/Corequisite(s): CSCI 1620, CSCI 2850, (recommended)
CSCI 3830, CSCI 4830 with C- or
better.

CSCI 4950 INTERNSHIP IN COMPUTER SCIENCE (1-3 credits)
The purpose of this course is to provide students with opportunities to apply
their academic studies in non-academic environments such as those found
in business, industry and other non-academic organizations. The student
interns will sharpen their academic focus and develop better understanding
of non-academic application areas. The course is intended primarily for
juniors and seniors in computer science.
Prerequisite(s)/Corequisite(s): Permission of the computer science
program chair.

CSCI 4970 CAPSTONE PROJECT (3 credits)
The Capstone Project completes a Computer Science student’s
undergraduate experience. Students will work on a team-based real-world
project, practicing software engineering skills and applying fundamental
computer science principles acquired throughout their undergraduate
study.
Prerequisite(s)/Corequisite(s): CSCI 4830 with C- or better; Senior
standing in Computer Science. Not open to non-degree graduate students.
**CSCI 4980  TOPICS IN COMPUTER SCIENCE (1-3 credits)**
A variable topic course in computer science at the senior level. Topics not normally covered in the computer science degree program, but suitable for senior-level students. (Cross-listed with CSCI 8986).

**Prerequisite(s)/Corequisite(s):** Permission of instructor. Additional prerequisites may be required for particular topic offerings.

**CSCI 4990  INDEPENDENT STUDIES (1-3 credits)**
A variable credit course for the junior or senior who will benefit from independent reading assignments and research type problems. Independent study makes available courses of study not available in scheduled course offerings. The student wishing to take an independent study course should find a faculty member willing to supervise the course and then submit, for approval, a written proposal (including amount of credit) to the Computer Science Undergraduate Program Committee at least three weeks prior to registration.

**Prerequisite(s)/Corequisite(s):** Written permission required.

Independent study proposals must be approved by the Undergraduate Program Committee.