

# DEPARTMENT OF COMPUTER SCIENCE

## COLLEGE OF ARTS AND SCIENCES

### Faculty

**G. Jan Wilms** (1992). Professor of Computer Science and Department Chair. B.A., Katholieke Universiteit Leuven, Belgium; M.A. (English), University of Mississippi; M.S. (Computer Science), University of Mississippi; Ph.D. (Computer Science), Mississippi State University.

**Stephanie Edge** (1996). Associate Professor of Computer Science. A.S., Middle Georgia College; B.S., West Georgia College; M.S., Georgia State University; M.Div., Southern Baptist Theological Seminary; THM, New Orleans Baptist Theological Seminary.

**Haifei Li** (2004). Associate Professor of Computer Science. B.E., Xi'an Jiaotong University; M.S. and Ph.D., University of Florida.

**James Kirk** (2001). Associate Professor of Computer Science. B.M., Union University; M.M. and M.A., Indiana University; Ph.D., University of Louisville.

### Student Awards

A **Departmental Award** is given to the senior who places first in the Major Field Test for Computer Science as partial fulfillment of 498.

**First Year Programming Award** is awarded to a computer science student by the Department of Computer Science. A student is selected for excellence and expertise in first year programming courses.

### Curriculum

The department offers five plans of study: Computer Science major, Information Technology major, Digital Media Studies major, Computer Science minor, and Computer Information Systems minor.

Upon completion of the Computer Science Major, the student will have an understanding of and an appreciation for the interrelation of the main areas of study in Computer Science. The major provides a solid foundation of the concepts while emphasizing practical application; therefore, the graduate will be able to continue study in Computer Science at the graduate level or enter the job market.

Whereas the CS major is more theoretical in nature, Information technology is more practical and includes organizational issues and information systems. It deals more with soft skills and has fewer math prerequisites. IT produces graduates who possess the right combination of knowledge and practical, hands-on expertise to take care of both an organization's information technology infrastructure and the people who use it.

The Digital Media Studies major is an interdisciplinary program joining Art, Communication Arts, and Computer Science. Its purpose is to produce a student aesthetically, theoretically, and technologically trained and capable of excellence in the relatively new area of the design, production, and implementation of digital

communications media. Included are such areas as web page design, digital visual and aural communications strategies and theory, interactive media design, media programming, digital presentation techniques, and technological advances in digital communications.

The Computer Science Minor is intended for students interested primarily in pursuing a career in computer science or a related field immediately upon graduation.

The Computer Information Systems Minor will provide the student with a general understanding of analysis, design, and implementation of applications via third- and fourth-generation programming languages and pre-written packages. This minor is intended for the student expecting to use computers in a job-supportive mode.

CSC 105 is not applicable to any major/minor in the department.

#### I. Major in Computer Science—42 hours

- A. CSC 115 (or 105 & 106), 160, 170, 125, 205, 255.
- B. CSC 321, 365, 425, 455, 498.
- C. CSC 220 or 235—3 hours.
- D. CSC 335 or 341—3 hours.
- E. CSC 395, 351, or 485—3 hours.
- F. Prerequisites: MAT 205, 211-12, 315.

#### II. Major in Digital Media Studies—64 hours

- A. Core requirements for all emphases—39 hours
  1. ART 120, 221, 345, 348.
  2. COM 220, 320, 327, 365.
  3. CSC 115 (or 105 & 106), 200, 351, 360.
  4. DMS 190 and 490.
- B. Computer Science Emphasis Requirements—25 hours
  1. CSC 125, 235, 255, 335, 425—16 hours.
  2. CSC 395 or 485—3 hours.
  3. CSC 341 or 455—3 hours.
  4. CSC 220 or 365—3 hours.

C. Art Emphasis—(32 hours) and Communication Arts Emphasis (25 hours)

See the respective departments for details.

#### III. Major in Information Technology—39 hours

- A. Prerequisites: MAT 205 and Technical Writing
- B. CSC 115, 125, 130, 235, 265—16 hours
- C. CSC 310, 321, 341, 360, 365—15 hours
- D. CSC 455, 485, 498—8 hours

#### IV. Minor in Computer Science—21 or 22 hours

- A. CSC 115 (or CSC 105 & 106), 235; CSC 321 or 365—9 hours.
- B. CSC 125 or 255—4 or 3 hours.
- C. Select CSC Upper-level Elective—3 hours
- D. Select one track:
  1. CSC 205 and 341.
  2. CSC 160 and 170.
  3. CSC 220 and 425.
  4. CSC 360 and 351.

#### V. Minor in Computer Information Systems—21 or 22 hours

- A. CSC 115 (or CSC 105 and 106).
- B. CSC 125 or 255—4 or 3 hours.
- C. CSC 235, 321, 360, 365.
- D. CSC 395 or 411—3 hours.

## Assessment of Majors

All senior computer science majors must take the Major Field Test in computer science as one requirement for CSC 498 (see below).

## Course Offerings in Computer Science (CSC)

( ) Hours Credit; F–Fall, W–Winter; S–Spring; Su–Summer

**105. Survey of Microcomputing Applications (3) F, S**  
An introduction, for the non major/minor, to computers and their applications. Includes computer and information literacy, but the main emphasis is on competency with software through hands-on practice. Cannot be taken for credit after 115.\*

### 106. Algorithm Development (1) W

How to analyze a problem and design a solution with a specific and explicit sequence of steps that must be performed. Emphasis is on logical thinking and debugging, not on the syntax of any particular programming language. This course is intended for students who need CSC 115 but have already completed CSC 105. It cannot be earned for credit after earning credit in CSC 115.

**115. Computer Science: Introduction & Overview (3) F, S**  
Introduction exposing majors/minors to the breadth and interrelationships of courses in the field and empowering others for a continuous exploration of today's technical society. A language-independent overview of hardware and software with emphasis on problem solving and algorithm development. Cannot be taken for credit after 105 without departmental approval.\* Must earn a C or higher to apply to CSC major/minor.

\*Either 105 or 115 apply to the B.S. specific core, but not both.

### 125. Computer Science I: Programming in Java (4) S

Prerequisite: CSC 115.  
Basic concepts of problem solving, algorithm design and analysis, abstract data types, and program structures. GUI development will be introduced and the object-oriented programming paradigm will be emphasized. Students will design, implement, debug, test, and document programs for various applications. Must earn a C or higher to apply to CSC major/minor.

### 130. System Administration and Maintenance (3) S

Introduces system administration and maintenance as well as platform technologies. Includes operating systems, applications, administrative activities and organization, and computing infrastructures. Focuses on the Linux operating system.

## Student Organizations

The ACM (Association for Computing Machinery) **Student Chapter** is composed of students who are interested in today's world of computing. The club promotes an increased knowledge of the science, design, development, construction, languages, and applications of modern computing machinery. It provides a means of communication between persons interested in computing machinery and their applications.

### 160. Digital Systems (3) F

Corequisites: CSC 115.

Binary codes, Boolean algebra, combinational logic design, flip-flops, counters, synchronous sequential logic, programmable logic devices, MSI logic devices, adder circuits.

### 170. Computer Architecture (3) S

Prerequisite: CSC 160.

Introduction to the architecture of stored-program digital computer systems including processor and external device structures and operations, machine operations and instructions, and assembly language concepts and programming.

### 200. Digital Media Programming (3) F

Prerequisite: CSC 115.

Hands-on introduction to programming with digital media, such as app development for mobile devices and rudimentary game design.

### 205. Computer Science II: Algorithms & Data Structures (3) F

Prerequisite: CSC 125.

A study of the complexity of algorithms and advanced data structures, including trees and graphs. Tools for analyzing the efficiency and design of algorithms, including recurrence, divide-and-conquer, dynamic programming, and greedy algorithms.

### 220. Computer Repair and Maintenance (3) S

Prerequisite: CSC 115.

A hands-on approach to competence in configuring, installing, diagnosing, repairing, upgrading, and maintaining microcomputers and associated technologies. The course covers both core hardware and OS technologies.

### 235. Computer Ethics (3) S

Major social and ethical issues in computers and the Internet, including impact of computers on society and the computer professional's code of ethics.

### 255. Programming in C (3) S

Prerequisites: CSC 115 or EGR 109.

Introduces the procedural programming paradigm using ANSI C. Must earn a C or higher to apply to CSC major/minor.

### 265. Fundamentals of Human Computer Interaction (3) S

Introduces HCL, including human factors, HCI aspects of application domains, human-centered evaluation, developing effective interfaces, accessibility, emerging technologies, human-centered software development.

**310. Information Assurance and Security (3) F**

Corequisites: CSC 130, 235, and 365.

Introduces IAS including fundamental aspects, security mechanism, operational issues, policy, attacks, security domains, forensics, information states, security services, threat analysis & vulnerabilities.

**321. Database Management Systems (3) F**

Prerequisites: CSC 115 and Junior standing.

Hands-on approach to the design of databases: conceptual design using E-R model and logical design using the relational model and database programming using SQL. The architecture of database application is discussed including the 3-tiered model and web access. Queries, forms, reports and application will be studied by implementing them in a client-server environment.

**335. Computer Graphics (3) F—Odd Years**

Prerequisite: CSC 255.

Recommended Prerequisite: MAT 315.

An investigation of a wide range of computer graphics via programming techniques. Topics include graphic display theory, graphic techniques, applications, and hardware.

**341. Software Engineering (3) F**

Prerequisite: CSC 125.

Issues involved with the life cycle of large and complex software systems. Topics include software planning, specifications, coding, testing, and maintenance.

**351. Web Applications (3) S.**

Prerequisite: CSC 360.

Recommended Prerequisites: CSC 125 and 321.

Examines the world of server-side web technologies and the development of web application tools. This will be accomplished by exploring methodologies for building web applications; exploring various methods of web data base exchange, and examining the aesthetics of a well-formed application for various applications like content management systems, personalized service centers, and other tools that push the power of databases to the web.

**360. Web Building & Site Management (3) F**

Prerequisite: CSC 115.

Fundamentals of web site development and management, graphical web-building tools, multi-level site planning and construction, navigation schemes, client- and server-side scripting, basic interactivity, information organization, and the delivery of basic multimedia content.

**365. Data Communications and Networking (3) S**

Prerequisite: CSC 115 and Junior standing.

Introduction to hardware and software components of computer data communications and networking. Emphasis is on practical, hands-on set-up and administration of a LAN, peer-to-peer networking, and the TCP/IP protocol. Topics include routing, shared file and application access, remote printing, and security.

**411. Systems Analysis (3) As Needed**

Prerequisite: CSC 321.

Process of designing computer-based systems for business applications, tools and techniques of systems development and management; advantages and disadvantages of conversion from existing to new systems will be discussed.

**425. Operating Systems (3) F**

Recommended Prerequisites: CSC 130, 170, 220, and 365.

Systems resource management: brief historical overview and case studies; discussion of multi-tasking and related concepts of scheduling, interprocess communication, and mutual exclusion/deadlock; overview of file management and memory management. Theory is augmented by detailed study of implementation of an existing operating system.

**455. Programming Languages (3) S**

Recommended Prerequisite: CSC 255.

Issues in programming language design, specification, and implementation: overview and comparison of major contemporary languages; analysis of translation process with focus on context-free grammars; and investigation of data representation, binding, sequence control, logic and object oriented paradigms. Theory is augmented by implementation of a tokenizer and parser for a simple language.

**465. Formal Language (3) F—As Needed**

Prerequisites: CSC 255 and MAT 315. Recommended prerequisite: CSC 455.

Theoretical foundations of computer science including formal languages and automata, parsing of context-free languages, Turing machines, computability, and complexity.

**485. Internship in Computer Science (1-3) As Needed**

Prerequisite: CSC 115; one of CSC 220, 235; one of 321, 360, 365.

Selected students are assigned as interns to obtain supervised practical work related to the CS discipline at a business or non-profit organization.

**498. Computer Science Seminar (2-3) S**

Prerequisite: 20 hours of CSC and taken in Senior Year.

The setting for administering the Major Field Test and addressing topics where the department perceives need for additional instruction. Students will synthesize previously learned concepts by developing and implementing a solution to a real-world programming problem. Each project will culminate in a report presented at a regional conference. The course may be modified at the discretion of the department.

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## Course Offerings in Digital Media Studies (DMS)

( ) Hours Credit; F–Fall, W–Winter; S–Spring; Su–Summer

**190. Digital Media Studies Freshman Seminar (0) F or S**  
An introduction to the Digital Media Studies major and to the field of digital media, with emphasis on program expectations. Graded Pass/Fail.

**490. Digital Media Studies Senior Seminar (3) F, S**  
Reciprocal with CSC and COM.

Capstone course for DMS major to bring the emphases together for exposure to the variety of fields of digital media and associated workplace cultures. Includes case studies, guest speakers, field trips, and an interdisciplinary group project culminating in the production of a computer-based portfolio for job search.

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Available in multiple departmental prefix:

**179-279-379-479. External Domestic Study Programs (1-3) As Needed**

All courses and their applications must be defined and approved prior to registering.

**180-280-380-480. Study Abroad Programs (1-4)**

All courses and their application must be defined and approved prior to travel.

**195-6-7. Special Studies (1-4)**

**295-6-7. Special Studies (1-4)**

Lower-level group studies which do not appear in the regular departmental offerings.

**395-6-7. Special Studies (1-4)**

Upper-level group studies which do not appear in the regular departmental offerings.

**495-6-7. Independent Study (1-4)**

Individual research under the guidance of a faculty member(s).

**499. Seminar (1-3)**

To be used at the discretion of the department for majors only.