DEPARTMENT OF COMPUTER SCIENCE
COLLEGE OF ARTS AND SCIENCES

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

Brian Glas (2019). Assistant Professor of Computer Science. B.S. (Computer Science) and M.B.A., Union University.

Staff

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.

The Bill Truex Award in Computer Science is presented to the outstanding senior in the department based on demonstrated creativity, enthusiasm, and academic achievement.

Curriculum
The department offers eight plans of study: Computer Science major, Information Technology major, Cybersecurity major, Computer Science minor, Cybersecurity minor, Computer Information Systems minor, interdisciplinary minors in Digital Media Studies and Computational Engineering Science.

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 Cybersecurity major is based on a foundation of Computer Science with broad coverage of the Cybersecurity disciplines and will provide a world class Cybersecurity education with a Christian foundation. Students will learn the what, when, why, and how of Cybersecurity; and be able to materially contribute on their first day in the workforce. As the major is 61 hours, there is no minor required.

The Digital Media Studies minor 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 Cybersecurity Minor is intended to augment another major and provide instruction in the areas of Cybersecurity that crossover into other disciplines like business and technology. The minor will provide a foundation of human security, data analytics, risk management, privacy, and audit.

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 100 and 105 are not applicable to any major/minor in the department.

I. Major in Computer Science—42 hours
A. Prerequisites: MAT 205, 211-12, 315.
B. CSC 115 (or 105 and 106), 125, 160, 205, 255, 270.
C. CSC 321, 365, 425, 347 or 455, 498.
D. Electives: 9 hours (3 hours must be upper-level).

II. Major in Information Technology—39 hours
A. Prerequisites: MAT 205 and Technical Writing
B. CSC 115 (or CSC 105 and 106), 125, 130, 235, 265—16 hours
C. CSC 321, 347, 360, 365—12 hours
D. CSC 455, 485, 498—8 hours
E. Electives—3 hours

III. Major in Cybersecurity—61 hours
A. Prerequisites: MAT 114 and MAT 205
B. CSC 115, 125, 205, 235—13 hours.
C. CSC 321, 365, 425, 455, 498—15 hours.
D. CSC 117, 224, 317, 327—12 hours.
E. CSC 337, 347, 357, 377, 417, 437, 447—21 hours

IV. Minor in Computer Science—21 or 22 hours
A. CSC 115 (or CSC 105 and 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 347.
2. CSC 160 and 270.
3. CSC 220 and 425.
4. CSC 360 and 361.

V. Minor in Cybersecurity—18 hours
A. Prerequisite: MAT 114
B. CSC 117–3 hours
C. CSC 224, 337–6 hours
D. CSC 357, 437, 447–9 hours

VI. 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.
D. CSC 395 or 411–3 hours.

VII. Minor in Digital Media Studies—21 hours
A. Choose two courses from each list:
   1. ART 120, 221, 345, 346, 347, 348
   2. COM 220, 236, 320, 327, 356, 365
   3. CSC 200, 265, 335, 360, 361
B. A -3-hour course in area of emphasis must be chosen from one of the lists above.

VIII. Minor in Computational Engineering Science—18 hours
A. EGR 109, 209, 325
B. CSC 255, 329
C. MAT 315, 360

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**Course Offerings in Computer Science (CSC)**

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

100. **Introduction to Computer Literacy** (3) F, S
An introductory class on computer literacy for the non-major/ minor adult student. This course is not intended for the traditional student. The purpose of the course is to prepare the student for successful use of computer technology and to achieve competency through hands-on practice. Cannot be taken after CSC 105.

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. Due to content overlap, students cannot get credit for both 105 and 115. Must earn a C or higher to apply to majors in the department.

106. **Algorithm Development** (1) As Needed
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 and 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. Due to content overlap, students cannot get credit for both 105 and 115.* Must earn a C or higher to apply to majors in the department.

117. **Human Security and Awareness** (3) F, S
Introduction to the human security element and awareness programs. This course will address Cybersecurity core concepts of confidentiality, integrity, and availability along with areas like business email compromise, phishing, social engineering, password management, and overall awareness of security and privacy as it would relate to personal and business lives.

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 major/minor.
130. System Administration and Maintenance (3) S—Alternate Years
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.

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.

200. Mobile Device Programming (3) F
Prerequisite: CSC 115.
Recommended Prerequisite: CSC 125
Covers the fundamental programming principles, software architecture and user experience considerations underlying handheld software applications and their development environments.

205. Computer Science II: Algorithms and 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.

224. Introduction to Business Analytics and Decision Making (3) F, S
Prerequisites: MAT 111 or 201 or higher; MAT 114 or 208.
Reciprocal credit: BAD 224.
An introduction to data-driven decision making using computer-based techniques to convert data into information. Topics include optimization, regression, descriptive/ inferential statistics, and spreadsheet-based simulation. Examples are from business disciplines including economics, finance, management, and marketing.

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) F—Alternate Years
Corequisite: CSC 115
Introduces HCI, including human factors, HCI aspects of application domains, human-centered evaluation, developing effective interfaces, accessibility, emerging technologies, human-centered software development.

270. 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.

317. Identity and Access Management (3) F
Prerequisite: CSC 115.
Introduction to the discipline of identity and access management, covering topics like authentication, access control, identity, provisioning and deprovisioning lifecycles, and other related topics both for local networks and cloud-based systems.

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.

327. Operational Security (3) S
Prerequisite: CSC 115.
Operational level security topics including digital forensics and incident response (DFIR), logging and monitoring, asset management, service level agreements, operational threat modeling, and other related topics. This course touches on the daily security tasks at most organizations.

329. Parallel Computing (3) F—Alternate Years
Pre-requisite: CSC 255
An overview of the various forms of parallelism currently used in computing, including the role of hardware, the operating system, and software. Modern techniques for parallelism are examined, including threads, distributed computing, and GPU-based computation. Students will achieve proficiency in at least one tool for parallel programming and will use that tool to solve real-world problems that can benefit from a parallel rather than a sequential approach.

335. Computer Graphics (3) F—Alternate Years
Prerequisite: CSC 125 or 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.
337. Data Visualizations (3) F
Prerequisites: MAT 114, CSC 224.
Reciprocal credit: BAD 337.
This class will build on data analysis and focus on the presentation of those results. Techniques for storytelling and decision-making leveraging data analysis in visual forms. Core principles in visualizations with practical applications and exercises. Learn Tableau (or other current leading software), along with R (programming language) to bring the date to life and tell the story that needs to be told.

347. Secure Software Engineering (3) F—Alternate Years
Prerequisite: CSC 125
This class will cover working through the full software assurance lifecycle included in-house developed, off the shelf, and open source software. Topics will include development methodology like Waterfall, Agile, and DevOps along with how automation and security integrate into the lifecycle.

357. Security and Risk Management (3) S
Prerequisite: CSC 235
Introduction to the management and compliance side of Cybersecurity. Topics will include security governance, compliance, legal and regulatory, government and private industry security frameworks, policy and procedures, standards and guidelines, along with related topics.

360. Web Building and Site Management (3) F
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.

361. 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.

365. Data Communications and Networking (3) S
Prerequisite: CSC 115.
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.

Prerequisite: CSC 115.
Introduction to modern application architecture patterns for cloud computing, IoT, mobile, web, and other technologies. Security patterns, threat modeling, secure design principles, and related topics will be included as well.

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.

417. Communication and Network Security (3) F
Prerequisite: CSC 365.
Introduction to securing data in transit and related areas. Topics include endpoint security, firewalls, network access control, secure communication channels, Transport Layer Security, and related topics.

425. Operating Systems (3) F
Recommended Prerequisites: CSC 130, 220, 270, 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.

437. Data Security and Privacy (3) F
Prerequisite: CSC 357.
Introduction to the concepts around data security and privacy. Topics will include data classification, ownership, security controls, privacy controls and relationship with security, global regulations, and related topics.

447. Security Assessment and Audit (3) S
Prerequisite: CSC 357.
Introduction to the different worlds of security assessments and audits. Topics will include various forms of assessments such as security testing, vulnerability scanning, penetration testing, process integration, regulations, formal auditing, and related topics.

455. Programming Languages (3) S—Alternate Years
Prerequisite: CSC 125 or 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) 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 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. The course may be modified at the discretion of the department. Students may be required to take the Major Field Exam or some other industry certification.

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.

179PF-279PF-379PF-479PF. External Domestic Study Programs (Pass/Fail) 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.

180PF-280PF-380PF-480PF. Study Abroad Programs (Pass/Fail) As Needed
All courses and their applications 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. Individual research under the guidance of a faculty member(s)