Department of Mathematics and Computer Science
College of Arts and Sciences

Faculty

G. Jan Wilms (1992). Associate 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.

Bryan Dawson (1998). Associate Professor of Mathematics and Coordinator of Mathematics. B.S. and M.S., Pittsburg State University; Ph.D., University of North Texas.

Richard Dehn (1969). Associate Professor of Mathematics. B.S., University of Memphis; M.A.T., Purdue University; M.S., University of Arkansas, Additional study, University of Wisconsin, University of Arkansas, University of Missouri-Rolla.

Stephanie Edge (1996). Assistant 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.

Terry Evans (1998). Visiting Assistant Professor of Computer Science. B.S., Southeast Missouri State University; B.S., Washington University; M.Ed., University of Missouri at St. Louis.

Chris Hail (1995). Associate Professor of Mathematics. B.S., Campbellsville College; M.A., Morehead State University; Ed.D., University of Kentucky.

Dwayne Jennings (1981). Associate Professor of Mathematics and Computer Science. B.S., Union University; M.S. (Mathematics) and M.S. (Computer Science), University of Memphis.

Matt Lunsford (1993). Associate Professor of Mathematics and Associate Dean of the College of Arts and Sciences. B.G.S., Louisiana Tech University; M.S., University of Nebraska; Ph.D., Tulane University.

Don Rayburn Richard (1983). Associate Professor of Mathematics. B.S., University of Memphis; M.A., University of Missouri; M.B.A., University of Colorado.

Troy Riggs (1993, 2000). Associate Professor of Mathematics. B.S., University of South Dakota; M.A., and Ph.D., University of Nebraska-Lincoln.

The Department of Mathematics and Computer Science offers majors in mathematics, computer science and digital media studies. Minors are offered in mathematics, mathematics with statistics emphasis, computer science and computer information systems.

Student Awards

The Academic Excellence Medal is awarded to the graduating senior with the highest average in the major provided the average is not less than 3.5. Before Awards Day, the student must have completed at least 15 credit hours in the major at Union University, exclusive of pass / fail courses. If no major is eligible, the medal will be given to the minor meeting the minimum requirements.

Departmental Awards are given to the 2 seniors who place first in the Major Field Achievement Test for Mathematics and Computer Science respectively. These tests are in partial fulfillment of 498.

Student Organizations

Kappa Mu Epsilon is a specialized honor society in Mathematics. The chapter's members are selected from students of mathematics who have achieved standards of scholarship, professional merit, and academic distinction. A student must have completed three semesters and rank in the upper 35%, completed three courses in mathematics, one of which must be calculus, and have a "B" or better average on all mathematics courses.

Sigma Zeta is a national honorary science society for those who have completed fifteen hours in natural science and mathematics and who have a minimum grade point average of 3.0 in these courses. Membership advantages include recognition for academic achievements by the Sigma Zeta Honor Award, participation in nationally recognized research projects, and a means of cooperation in similar areas of interest by students of different colleges.

@*116. Precalculus (3) F, S As Needed
Prerequisites: Two years of high school algebra and one of geometry.
An introduction to polynomial, exponential, logarithmic, and trigonometric functions and basic analytic geometry. This course is intended for students planning to take MAT 211, and is not recommended for students who have taken MAT 111 and / or 112.

@201. Calculus for Business/Social Sciences (3) As Needed
Prerequisite: MAT 111 or its equivalent.
Topics include a review of algebra principles, the development of differential calculus with an emphasis on applications of the derivative to business and to the social sciences, and a brief introduction to integral calculus with some elementary applications of the definite integral. Is not recommended for students that have taken MAT 211 and 212.

205. Discrete Mathematics (3) S, W As Needed
Prerequisite: MAT 111 or its equivalent.
Topics include elementary logic, sets, proof techniques including induction, relations and graphs, recurrence relations, basic counting techniques, equivalence relations, Boolean algebra, and algebraic structures.

208. Statistics (3) F; S—As Needed
Prerequisite: MAT 111.
An introductory course whose topics include descriptive and inferential statistics, probability theory, binominal and normal distributions, hypothesis testing, linear correlation and regression.

211. Calculus and Analytic Geometry I (4) F, S
Prerequisite: MAT 111 and 112, or 116.
Topics include basic concepts of plane analytic geometry, functions, limits, differentiation of algebraic and trigonometric functions, applications of the derivative, the indefinite and the definite integral, and the fundamental theorem of calculus.

212. Calculus and Analytic Geometry II (4) F, S
Prerequisite: MAT 211.
Topics include integration by substitution, numeral integration, applications of the definite integral, the calculus of transcendental functions, techniques of integration, and the calculus of parametrized curves.

213. Calculus and Analytic Geometry III (4) F, S As Needed
Prerequisite: MAT 212.
Topics include infinite series, polar coordinates, vectors in three-space, functions of several variables, partial derivatives, multiple integrals, and line integrals.

305. Statistical Methods (3) S or As Needed
Prerequisite: MAT 208.
Parametric and non-parametric statistical methods with an emphasis on applications. Topics include correlation and regression, analysis of variance, Chi-square distribution, contingency tables, and applications to the social sciences, life sciences and business.

314. Differential Equations (3) S or As Needed
Prerequisite: MAT 213.
Topics include linear first-order differential equations and applications, higher-order differential equations and applications.

315. Linear Algebra (3) S or As Needed
Prerequisite: MAT 212. Corequisite: MAT 205.
Topics include systems of linear equations, matrices, determinants, linear transformations, diagonalization of matrices, and major applications to business and the sciences.

Assessment of Majors

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

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.

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. A study of types of hardware associated with computer systems and how computers function, with an emphasis on the use of applications programs for microcomputers. Software packages will include word processing, an electronic spreadsheet, a database management system and an internal component. Cannot be earned for credit after 115.*

115. Computer Science: Introduction & Overview (3) F, S
An introductory course which exposes majors / minors to the breadth and interrelationships of future courses in the field and empowers students of other majors 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 earned for credit after 105 without departmental approval.*

125. Computer Science I: Programming in Java (4) F, 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.

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

205. Computer Science II: Algorithms & Data Structures (3) F, S
Prerequisites: CSC 125, MAT 205. Corequisite: MAT 212.
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.

235. Computer Ethics (2) S
Major social and ethical issues in computing, including impact of computers on society and the computer professional's code of ethics.

245. FORTRAN (3) As Needed
Prerequisite: CSC 115 and MAT 211.
The structures of FORTRAN will be studied: statements, subprograms, simple variables, arrays, and files. Design, coding, and testing of scientific problems will emphasize these structures. In addition, various implementations of FORTRAN will be discussed.

260. Digital Systems (3) F
Prerequisite: CSC 125 and MAT 205.
Binary codes, Boolean algebra, combinational logic design, flip-flops, counters, synchronous sequential logic, programmable logic devices, MSI logic devices, and adder circuits.

305. Programming in C (3) S
Prerequisites: CSC 125 and MAT 205.
Builds on the foundation of CS I & II, introducing the C command set and advanced data structures and algorithms.

311. Computer Architecture (3) S
Prerequisite: CSC 260.
Introduction to the architecture of stored-program digital computer systems including processor and external device structures and operation, machine operations and instructions, and assembly language concepts and programming.

321. Database Management Systems (3) F
Prerequisites: CSC 115 and Junior standing.
A hands-on approach to the design of databases: conceptual design using the E-R model and logical design using the relational model. The architecture of a database application is discussed including the 3-tiered model and webs

mutual exclusion / deadlock; overview of file management and memory management (virtual memory, paging, swapping, and segmentation). Theory is augmented by detailed study of implementation of an existing operating system.

455. Programming Languages (3) S
Prerequisite: CSC 305.