DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Web Site: http://www.twu.edu/math-computer-science/

Chair: Don E. Edwards, Professor
Location: MCL 302
Phone: 940-898-2166
Fax: 940-898-2179
E-Mail: mathcs@twu.edu

Undergraduate Degrees Offered

- B.S. in Mathematics (4-8 Mathematics Certification) (http://catalog.twu.edu/archives/2018-2019/undergraduate/arts-sciences/mathematics-computer-science/math-4-8-certification)

The Department of Mathematics and Computer Science (http://www.twu.edu/math-computer-science) offers programs leading to the degrees of Bachelor of Science, Master of Science, and Master of Science in Mathematics Teaching.

The baccalaureate programs in mathematics and in computer science are intended to prepare the student for further work in mathematics or computer science at the graduate level, for teaching at the middle and high school levels, for employment as a mathematician or computer scientist, or for employment in a mathematics-related or computer science-related area in industry or government. The baccalaureate programs in Informatics and Health Informatics prepare students for graduate study in Informatics related disciplines or for employment in high demand areas such as data science, business, and healthcare informatics.

Special Requirements

A Mathematics or Computer Science major requires a minor of at least 18 semester credit hours of which a minimum of 6 semester credit hours must be upper division. Students may choose a minor from any offered at the university. For students seeking teacher certification, the required education courses will be taken in lieu of a minor. Informatics majors will choose a minor in either Data Science or Community Informatics. Health Informatics majors will choose a minor in either Clinical Applications or Health Studies.

Only courses in which a grade of C or better is received may be counted as part of a mathematics, computer science major, or informatics major or minor.

Informatics

The B.S. programs in Informatics and Health Informatics provide students with a flexible, adaptable, interdisciplinary, and interprofessional approach to the study of Informatics and Health Informatics in a hybrid learning environment. Academic components, in addition to Mathematics and Computer Science, that are actively involved in delivery of the programs include Nursing, Health Studies, and Information Studies.

Teacher Certification

The department offers teacher certification in Mathematics at both the 4-8 and 7-12 levels and in Computer Science (8-12). Students should contact the chair of Mathematics and Computer Science for details or check the department web pages for more information.

Engineering – A Special Opportunity for TWU Students

In collaboration with the University of North Texas (UNT), TWU provides a dual degree option enabling students to attend the two universities simultaneously and graduate with a B.S. in mathematics degree from TWU and a B.S. in engineering degree (electrical, mechanical and energy, biomedical, or materials science) from UNT. Scholarships are available for qualified applicants.

For information about these engineering options, contact the department or visit our website (http://www.twu.edu/math-computer-science).

Graduate Courses

Please refer to the Graduate Catalog (http://catalog.twu.edu/archives/2018-2019/graduate) for information regarding graduate courses.

Admissions

Please see Admission (http://catalog.twu.edu/archives/2018-2019/undergraduate/admission-information) section of this catalog. The same standards for admission to the University apply to the Department of Mathematics and Computer Science.
Minors

The department offers minors in Mathematics, Computer Science, and Data Science. Course selections are tailored to the student’s needs in consultation with departmental advisors.

Mathematics Minor

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>MATH 2014</td>
<td>Calculus I</td>
<td>4</td>
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<tr>
<td>Total SCHs</td>
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<td>18</td>
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Select 14 additional semester credit hours of mathematics courses, at least 6 of which must be advanced.

A departmental advisor must approve the minor program.

Computer Science Minor

Students interested in a minor in Computer Science may choose from Computer Programming/Software Engineering, or Computer Applications or Information Systems. For more detailed information regarding this minor, please refer to the department web page. A departmental advisor must approve the minor program.

Data Science Minor

The minor in Data Science, concerned with the extraction of knowledge from data, employs techniques and theories drawn from many fields within the broad areas of mathematics, statistics, information theory and information technology. The minor requires 18 hours of coursework including at least 6 upper level hours and must be approved by a department advisor.

Community Informatics Minor

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>SCHs</th>
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<tbody>
<tr>
<td>CSCI 4623</td>
<td>Big Data and High Performance Computing</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 4823</td>
<td>Principles of Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>LS 3153</td>
<td>Knowledge Economy</td>
<td>3</td>
</tr>
<tr>
<td>Any Community Informatics related courses approved by advisor</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total SCHs</td>
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Clinical Applications Minor

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<tr>
<td>NURS 3213</td>
<td>Business Analysis of Health-Generated Data</td>
<td>3</td>
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<tr>
<td>NURS 3223</td>
<td>Internet Resources for Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>NURS 4113</td>
<td>Applications and Devices for Health Promotion</td>
<td>3</td>
</tr>
<tr>
<td>NURS 4213</td>
<td>Interface Design in Health Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NURS 4313</td>
<td>Telecommunications/Networking for Remote Management</td>
<td>3</td>
</tr>
<tr>
<td>NURS 4723</td>
<td>Applied Statistics in Healthcare Informatics</td>
<td>3</td>
</tr>
<tr>
<td>Total SCHs</td>
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</table>

Courses

Computer Science Courses

CSCI 1403. A First Course in Computing. (TCRN COSC 1301)
Encompasses the various aspects of "computer literacy" including computer systems - their structure, elementary programming, languages, and applications within various disciplines; the many facets of the Internet and the World Wide Web; and consideration of what has led to the current state of technology and implications for the future. Cannot be counted toward a major in computer science. Three lecture hours a week. Credit: Three hours.


CSCI 1423. Programming Fundamentals I. (TCRN COSC 1436)
Introduction to the fundamental concepts of structured and Object Oriented programming. Topics include software development methodology, data types, control structures, functions, arrays, files, classes, program testing and debugging techniques. Prerequisites: CSCI 1403, CSCI 2433, or equivalent. Co-requisite: CSCI 1421. Three lecture hours a week. Credit: Three hours.

CSCI 1513. Introduction to Informatics. Components of informatics: people, information, and technology. Topics include user-centered data collection and information generation, impact of technologies in people’s lives, security and ethics issues, and interprofessional applications such as healthcare, nursing, and business informatics. Prerequisites: Computer literacy and experience with data analysis applications such as spreadsheet software. Three lecture hours a week. Credit: Three hours.

CSCI 2433. Microcomputer Applications. (TCRN COSC 1301) Introduction to operating systems and software tools of a microcomputer. Learning how to use various software packages, such as: word processing, presentation software, spreadsheets, graphics, and databases. Three lecture hours a week. Credit: Three hours.


CSCI 2493. Programming Fundamentals II. (TCRN COSC 1437) Advanced topics include object oriented problem solving, software design, methodology and development; introduction to basic principles of algorithm analysis and design, searching and sorting techniques, recursion. GUI design and development, data structures and software engineering. Prerequisites: CSCI 2412 and CSCI 2433; or equivalents. Three lecture hours a week. Credit: Three hours.

CSCI 2513. Information Security and Ethics. Security and ethical issues important to informatics professionals. Emphasizes ethical decision-making, legal and social responsibility, and security threats and countermeasures. Topics include information security, ethics, limits, and effects of computing in informatics fields. Prerequisite: Computer literacy. Three lecture hours a week. Credit: Three hours.
CSCI 3002. Advanced Computing Technology. Advanced applications for students preparing to enter careers in training or education that utilize computer-based technologies. Includes integration of software packages in a project-oriented, real-world environment. Introduction to Web-based client/server systems, databases, distributed computing, application development with object-based programming, mark-up languages such as HTML, and scripting languages. Creation of graphical, animated, multi-media-based, audio-intensive, database-intensive, network-based products. Prerequisite: Computer literacy. One lecture and two laboratory hours a week. Credit: Two hours.

CSCI 3013. Applied Computational Thinking. Application and programming of software to engage computational thinking approaches to scientific processes: understanding what can be computed and its use to solve, model, analyze, and visualize problems scientifically. Explore a broad array of programming and software tools to create and modify models. Prerequisite: Permission of instructor. Three lecture hours a week. Credit: Three hours.

CSCI 3053. Data Structures. Introduction to the representation of information; data objects, classes, and structures; string processing; searching and sorting; stacks and queues; hash coding; lists, trees, and manipulation of data structures. Prerequisites: six hours in one high level programming language. Three lecture hours a week. Credit: Three hours.

CSCI 3103. Applied Computer Graphics. Evaluation and use of 2D and 3D graphics software for presentations and visualization; study of computer animation and programming techniques for use in Web-based applications and in computer games; analysis of file structures used for computer graphics images and methods of acquiring and manipulating graphic images. Prerequisite: CSCI 1403, CSCI 2433, or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 3113. Fundamentals of SAS Programming. SAS and SAS programming. Focuses on the use of Base SAS and internal procedures to generate queries and reports, to access local data sources, to create user-defined data formats, to generate descriptive statistics and tabular reports. Reviews elementary programming techniques to solve problems related to data analysis, list reports, t-test, ANOVA, regression analysis, data clustering, and data mining. Prerequisite: MATH 1713 or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 3333. Fundamentals of Software Testing. Concepts and techniques for testing, modifying and maintaining computer software. Reporting and analyzing software errors, test case design, testing tools, testing planning, and test documentation. Prerequisite: CSCI 2493 or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 3353. Interactive Digital Art. Exploration of microcontrollers and computers as tools for interactive artistic expression; investigation of technical issues, programming, and the use of sensors and other input to create audience interfaces; examination of conceptual issues related to current work in the field of Emergent Media; includes team interaction between students in Computer Science and Art/Performing Arts. Two lecture and two laboratory hours a week. Credit: Three hours.

CSCI 3413. Software Engineering. Modeling and simulation of systems in organizations, systems flow charting, data dictionaries, and software engineering concepts. Prerequisite: CSCI 3053. Three lecture hours a week. Credit: Three hours.

CSCI 3423. Database Management. Organization and retrieval techniques for computer based information systems, techniques of design, implementation, and utilization of database management systems. Prerequisite: CSCI 2433 or permission of instructor. Three lecture hours a week. Credit: Three hours.


CSCI 3443. Digital Logic and Computer Architecture. An introduction to the concepts of digital logic, number systems, and codes. Digital circuit design, combinational logic design, decoder, multiplexers, adders, sequential design of flip-flops, latches, counters, and shift registers. Elements of CPU arithmetic, architecture, and instruction sets provide the basic concepts associated with computer architecture. Prerequisite: CSCI 2443 or equivalent, and advanced standing. Co-requisite: CSCI 3441. Three lecture hours a week. Credit: Three hours.

CSCI 3513. Information Systems Project Management. Technical and behavioral aspects of information systems project management. Topics include the knowledge areas, standards, processes, and professional responsibility as established by the Project Management Institute (PMI), and their application in managing informatics projects. Prerequisite: CSCI 1513 or CSCI 1423, or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 3613. Introduction to Algorithms. Techniques for design of efficient algorithms and their performance. Design methodologies include sorting, graph algorithms, dynamic programming, searching, pattern matching, set manipulations, matrices, and trees. Prerequisite: CSCI 3053 or permission of instructor. Three lecture hours a week. Credit: Three hours.

CSCI 3703. Interface Design and Development. Design, development, and evaluation of computer/technical device user interfaces in their various forms. Usability, accessibility, efficiency, transferability, and maintainability. Theory, practice, and discipline-grounded applications. Prerequisite: CSCI 2493 or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 3803. Web Site Development. Introduction to the design and development of Web sites with markup languages (XHTML [eXtensible HyperText Markup Language]), Cascading Style Sheet (CSS) language and scripting languages; creation of Web sites with simple text editor and Web authoring software; site architecture, screen and page layout, site navigation, and color templates. Prerequisite: CSCI 2493 or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 4303. Advanced Modeling and Visualization. Explores techniques and algorithms used in the modeling and visualization process. Evaluate the effectiveness of advanced features of spreadsheet, graphics, and statistics packages in processing large volumes of data. VRML and other modeling languages are introduced. Prerequisites: CSCI 1413 and CSCI 2433, or equivalents, and advanced standing. Three lecture hours a week. Credit: Three hours.

CSCI 4311. Seminar in Computer Science. Capstone course. Compilation of a professional portfolio, completion of a multifaceted project on a current issue in or application of computer science, development of skills in defining problems and opportunities, and generation of strategies and solutions for those problems. Requires a written component, an oral presentation of project, and an exit exam. Prerequisite: 24 hours of course work in computer science or permission of instructor. One seminar hour a week. Credit: One hour.

CSCI 4313. Networking and Data Communication. Introduction to hardware, software design, and protocols used in networking and data communication. Depending on emphasis, topics will be selected from architectures, OSI Reference Models, transmission media, software design, LANs, performance modeling, and other related subjects. Prerequisite: 15 hours of computer science. Three lecture hours a week. Credit: Three hours.
CSCI 4353. Advanced Interactive Digital Art. Advanced development of interactive digital art technologies in terms of artistic concepts, physical presentation, and the use of electronic components and code; involves iterative development of participatory work for public exhibition; teaches organizational and leadership skills for working in creative teams. Prerequisite: CSCI 3353. Two lecture and two laboratory hours a week. Credit: Three hours.

CSCI 4523. Advanced Data Design. Advanced relational data base design and implementation, including reporting, picture objects, macros, and programming. Emphasis on logical organization of data and table design. Discussion of advanced issues important in the development and design in client server, distributed, object oriented data bases, and security. Prerequisite: CSCI 3423. Three lecture hours a week. Credit: Three hours.

CSCI 4533. Trends and Issues in Computer Science. Focuses on contemporary issues in computer science by addressing the current designs in both software and hardware. Topics of specialized nature such as parallel algorithms, parallel architecture, computer performance, network security, social impact, history, and the like. May be repeated for credit. Three lecture hours a week. Credit: Three hours.

CSCI 4623. Big Data and High Performance Computing. Big data, the challenges its analysis presents, the role of high performance computing in big data analytics, and the tools and techniques used in big data scenarios, (e.g. statistical software, NoSQL, MapReduce and Hadoop). Exploration of case studies in varied application domains. Prerequisites: CSCI 3423 and statistical software knowledge. Three lecture hours a week. Credit: Three hours.

CSCI 4723. Machine Learning. Theories and algorithms of machine learning and artificial intelligence, with emphasis on how they are used to solve real world problems from diverse application areas. Searching, knowledge representation and reasoning, machine learning algorithms, and rule-based systems. Typical approaches including expert systems, neural networks, evolutionary computation (genetic algorithms), two-player game-tree search, hill climbing, and multi-agent systems. Prerequisite: CSCI 3053 or CSCI 4823. Three lecture hours a week. Credit: Three hours.

CSCI 4803. Programming for the Web. Creation and development of Web sites with dynamic content, including multimedia, forms, adaptive page layout, navigation, and content; application of scripting and programming languages, such as JavaScript, XML, and Perl to generate dynamic content; application of structured and Object Oriented programming principles, design, implementation, testing, and evaluation techniques. Prerequisites: CSCI 3803 or equivalent. Three lecture hours a week. Credit: Three hours.

CSCI 4823. Principles of Data Mining. Methodologies, technologies, mathematics, and algorithms of data mining; nontrivial extraction of implicit, previously unknown, and potentially useful information from data; analysis of algorithms which merge knowledge from statistics, machine learning database, and computer science; and application to real data sets. Prerequisites: MATH 1703 and six hours of programming. Three lecture hours a week. Credit: Three hours.

CSCI 4903. Special Topics. Variable content in computer science. Three lecture hours a week. Credit: Three hours.

CSCI 4911. Independent Study. Individual study in computer science. Credit: One hour.

CSCI 4913. Independent Study. Individual study in computer science. Credit: Three hours.

CSCI 4923. Capstone in Interprofessional Informatics. Culminating organization and/or community-based interdisciplinary/interprofessional project supported through informatics and technology and applied to a specific domain to demonstrate knowledge and skills acquired in the informatics or health informatics program. Prerequisite: Completion of all but the last 24 hours (SCHs) of the program. Credit: Three hours.

CSCI 4951. Cooperative Education. Credit: One hour.

CSCI 4953. Cooperative Education. Credit: Three hours.

CSCI 4956. Cooperative Education. Credit: Six hours.

Mathematics Courses

MATH 1013. Financial and Quantitative Literacy. (TCCN MATH 1332) Develops analytic reasoning and the ability to solve quantitative problems. Topics covered chosen from logic and problem solving, quantitative information, financial management, probability and statistics, and other applications of mathematics. Prerequisite: Satisfactory score on mathematics placement test. Three lecture hours a week. Credit: Three hours.

MATH 1023. Introduction to Mathematics. (TCCN MATH 1333) Topics from algebra, geometry, and mathematical modeling. Prerequisite: Satisfactory score on Mathematics Placement Test. Three lecture hours a week. Credit: Three hours.


MATH 1113. Fundamentals of Algebra. May not be used to satisfy any mathematics requirement and hours earned will not count toward any graduation requirement. May not be used for credit on any degree. Basic algebraic operations, linear equations and inequalities, polynomials, rational expressions, factoring, exponents, radicals, and quadratic equations. Prerequisite: Three lecture hours a week. Credit: Three hours.

MATH 1123. Transition to College Mathematics. May not be used to satisfy any mathematics requirement and hours earned will not count toward any graduation requirement. May not be used for credit on any degree. Review or introduce operations involving rational numbers and decimals, exponents, linear equations in one and two variables, graphing, polynomial arithmetic and factoring, quadratic equations, linear inequalities in one and two variables, rational expressions, measurement geometry. Prerequisite: Satisfactory score on Mathematics Placement Test or successful completion of MATH 1113. Three lecture hours a week. Credit: Three hours.

MATH 1303. Elementary Analysis I. (TCCN MATH 1314) College algebra with some attention to rigor; elements of set theory; exponential and logarithmic functions. Prerequisite: Satisfactory score on Mathematics Placement Test. Three lecture hours a week. Credit: Three hours.

MATH 1313. Elementary Analysis II. (TCCN MATH 1316) Algebraic, exponential, logarithmic, and trigonometric functions; an introduction to matrix algebra; complex numbers, sequences, the binomial theorem. Prerequisite: Completion of high school algebra. Three lecture hours a week. Credit: Three hours.

MATH 2323. Elementary Analysis III. (TCCN 2312) Develops an understanding of topics needed before calculus. Topics include an introduction to vectors, trigonometric form of a complex number, matrices, sequences and series, probability, conics, parametric equations, and polar equations. Prerequisite: MATH 1313 or equivalent. Three lecture hours a week. Credit: Three hours.
MATH 1523. Mathematics Concepts I. Selected topics for EC - 2 grades from Real Number Systems; fundamental operations of mathematics, algebraic thinking, geometry, measurement, data analysis, statistics, and personal financial literacy. Satisfies the mathematics requirement only for those seeking EC - 6 certification. Prerequisite: MATH 1013, MATH 1023, MATH 1303, MATH 1313, MATH 1703, MATH 1713, or MATH 2014. Three lecture hours a week. Credit: Three hours.

MATH 1533. Mathematics Concepts II. (TCCN MATH 1350) Selected topics from Real Number Systems; fundamental operations of mathematics, algebraic thinking, geometry, measurement, data analysis, statistics, and personal financial literacy for Grades 3-5. Satisfies the mathematics requirement only for those seeking EC - 6 and 4-8 certification. Prerequisite: MATH 1013, MATH 1023, MATH 1303, MATH 1313, MATH 1703, MATH 1713, or MATH 2014. Three lecture hours a week. Credit: Three hours.

MATH 1543. Mathematics Concepts III. (TCCN MATH 1351) Selected topics for grades 6-8 from real number systems, fundamental operations of mathematics, algebraic thinking, geometry, measurement, data analysis, statistics, and personal financial literacy. Satisfies the mathematics requirement only for those seeking EC - 6 and 4-8 certification. Prerequisite: Satisfactory score on Mathematics Placement Test. Three lecture hours a week. Credit: Three hours.

MATH 1703. Elementary Statistics I. (TCCN MATH 1342) Frequency distributions; graphical representation, measures of central tendency, and dispersion; normal curve; hypothesis testing confidence intervals. Prerequisite: Satisfactory score on Mathematics Placement Test. Three lecture hours a week. Credit: Three hours.

MATH 1713. Elementary Statistics II. Hypothesis testing, confidence intervals, nonparametric statistics, regression and correlation, time series, experimental design. Prerequisite: MATH 1703. Three lecture hours a week. Credit: Three hours.

MATH 2014. Calculus I. (TCCN MATH 2413) Analytic geometry; limits and continuity; differentiation of algebraic and transcendental functions; antiderivatives; definite integrals. Prerequisites: MATH 1303 and MATH 1313, or equivalent. Four lecture hours a week. Credit: Four hours.

MATH 2024. Calculus II. (TCCN MATH 2414) Differential equations; formal integration; applications of integration; improper integrals; infinite series; parametric functions. Prerequisite: MATH 2014. Four lecture hours a week. Credit: Four hours.

MATH 2053. Women and Minorities in Engineering, Mathematics, and Science. Examines reasons why women and minorities are traditionally underrepresented in the areas of engineering, mathematics, and science and includes strategies for increasing their representation. Introduction to problem-solving strategies, useful for any discipline, which emphasize solutions incorporating both current and emerging technologies. Prerequisite: Three hours of core math. Three lecture hours a week. Credit: Three hours.

MATH 2203. Business Analysis I. (TCCN MATH 1324) Algebraic functions, logarithmic functions, exponential functions, matrices and linear systems, and linear programming. Prerequisite: Satisfactory score on Mathematics Placement Test. Three lecture hours a week. Credit: Three hours.


MATH 3013. Discrete Mathematics. Sets, functions, Boolean algebra, logic, number theory and representations, graph theory, algorithms, and computability. Prerequisite: MATH 2014 or permission of department. Three lecture hours a week. Credit: Three hours.

MATH 3053. Abstract Algebra. Introduction to sets, relations, mappings, rings, integral domains, fields, groups. Prerequisite: MATH 3013 or permission of the instructor. Three lecture hours a week. Credit: Three hours.

MATH 3063. Linear Algebra. Linear equations and matrices; vector spaces; linear mappings; determinants. Prerequisite: MATH 2014 or permission of instructor. Three lecture hours a week. Credit: Three hours.

MATH 3073. Matrix Methods. Matrix operations, determinants, inverse of a matrix, solution of linear systems, eigenvalues and eigenvectors, matrix calculus. Prerequisite: MATH 2014 or permission of instructor. Three lecture hours a week. Credit: Three hours.

MATH 3083. Elementary Number Theory. Diophantine equations; congruences; divisibility properties of integers; prime numbers and factorization theorems; multiplicative functions. Prerequisite: MATH 2014 or permission of instructor. Three lecture hours a week. Credit: Three hours.

MATH 3104. Calculus III. Solid analytic geometry; vectors in space; functions of several variables; partial derivatives; multiple integrals; applications. Prerequisite: MATH 2024. Four lecture hours a week. Credit: Four hours.

MATH 3123. Differential Equations. Solutions of differential equations of the first order and applications; linear differential equations with applications; solution by power series and numerical methods; systems of differential equations; introduction to partial differential equations. Prerequisite: MATH 2024. Three lecture hours a week. Credit: Three hours.


MATH 4013. Probability and Statistics. The theory of discrete and continuous random variables and their distributions. Topics include expected values, binomial and normal distributions, the central limit theorem, confidence intervals, and hypothesis testing. Prerequisite: MATH 2014. Three lecture hours a week. Credit: Three hours.

MATH 4203. Problem Solving in the Mathematics Classroom. Strategies of problem solving; methods for teaching and applying different strategies in grades 4-12; assessment of problem solving skills; critical thinking skills. Prerequisite: Upper-level standing. Three lecture hours a week. Credit: Three hours.

MATH 4303. Algebra in the Mathematics Classroom. Patterns, relationships, ordered pairs, prime and composite numbers, orders of operations, exponents, number sentences, ratios, proportions, percents, modeling, formulas, equations, graphs, functions, systems of equations. Prerequisite: Upper-level standing. Three lecture hours a week. Credit: Three hours.
MATH 4311. Seminar in Mathematics. Capstone course. Compilation of a professional portfolio, completion of a multifaceted project on a current issue in or application of mathematics, development of skills in defining problems and opportunities, and generation of strategies and solutions for those problems. Requires a written component, an oral presentation of project, and an exit exam. Prerequisite: 24 hours of course work in mathematics or permission of the instructor. One seminar hour a week. Credit: One hour.

MATH 4313. Geometry in the Mathematics Classroom. Topics in geometry with an emphasis in problem solving, shapes, angles, polygons, circles, Pythagorean Theorem, symmetry, transformations, measurement area, and volume with an emphasis on technology. Prerequisite: Upper-level standing. Three lecture hours a week. Credit: Three hours.

MATH 4873. Real Analysis. Fundamentals of mathematical analysis: introduction to proofs, topology, convergence of sequences and series, continuity, differentiability, Riemann integral, sequences and series of functions, uniformity, and the interchange of limit operations; utility of abstract concepts and construction of proofs. Prerequisites: MATH 2024 and MATH 3053. Three lecture hours a week. Credit: Three hours.

MATH 4903. Special Topics. Variable content in mathematics. Three lecture hours a week. Credit: Three hours.


MATH 4953. Cooperative Education. Credit: Three hours.

MATH 4956. Cooperative Education. Credit: Six hours.

Faculty

Professors

DEMUYNCK, MARIE-ANNE, Professor of Computer Science. B.A., Catholic University of Leuven; M.A., Catholic University of Leuven; M.S., Texas Woman's University; Ph.D., University of North Texas.

EDWARDS, DONALD, Professor of Mathematics and Computer Science; Chair of the Department of Mathematics and Computer Science. B.S., University of North Texas; M.S., University of North Texas; Ph.D., Texas Christian University.

GRIGORIEVA, ELLINA, Professor of Mathematics. B.S., Moscow State Lomonsov University; M.S., Moscow State University; Ph.D., Moscow State University.

MALLAM, WINIFRED A., Professor of Mathematics. B.A., Shaw University; M.S.S.E., Texas Woman's University; Ph.D., University of Jos.

NAVARRA-MADSEN, JUNALYN, Professor of Mathematics. B.S.Ed., University of St. La Salle; M.S., University of Texas at Dallas; Ph.D., University of Texas at Dallas.

Associate Professors

HAMNER, MARK S., Associate Professor of Mathematics; Vice Provost of Institutional Research and Data Management. B.A., University of Texas at Austin; M.S., Baylor University; Ph.D., Baylor University.

WHEELER, ANN M., Associate Professor of Mathematics. B.S., Henderson State University; M.S.E., Henderson State University; Ph.D., University of Northern Colorado.

ZHANG, JIAN, Associate Professor of Computer Science. B.S., Hefei University of Technology, China, P.R.; M.S., Tulane University; Ph.D., Tulane University.

Assistant Professors

FALLEY, BRANDI N., Assistant Professor of Mathematics. B.A., Ouachita Baptist University; M.S., Baylor University; Ph.D., Baylor University.

GARDNER, DAVID M., Assistant Professor of Computer Science. B.B.A., University of North Texas; M.S., University of North Texas; Ph.D., University of North Texas.

MACHUCA, ALICIA, Assistant Professor of Mathematics. B.S., University of Texas at San Antonio; Ph.D., University of Texas at Arlington.

XU, WEN, Assistant Professor of Computer Science. Ph.D., The University of Texas at Dallas.

Lecturer

BANKS, CATHERINE CLEAVE LAND, Senior Lecturer of Mathematics. B.S., Stephen F. Austin State University; M.S., Stephen F. Austin State University.

Assistant Professors

FALLEY, BRANDI N., Assistant Professor of Mathematics. B.A., Ouachita Baptist University; M.S., Baylor University; Ph.D., Baylor University.

GARDNER, DAVID M., Assistant Professor of Computer Science. B.B.A., University of North Texas; M.S., University of North Texas; Ph.D., University of North Texas.

MACHUCA, ALICIA, Assistant Professor of Mathematics. B.S., University of Texas at San Antonio; Ph.D., University of Texas at Arlington.

XU, WEN, Assistant Professor of Computer Science. Ph.D., The University of Texas at Dallas.

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