

## COMPUTING, DATA, &amp; MATHEMATICAL SCIENCES

# Department of COMPUTING, DATA, & MATHEMATICAL SCIENCES

## Mission Statement

The mission of the Department of Computing, Data, & Mathematical Sciences (CDM) is to provide theoretical and applied understanding of computer systems and mathematical principles. The department offers degrees in Computer Science, Data Analytics, Cybersecurity & Information Systems, and Applied Mathematics.

Computer systems and mathematics have an increasing influence on the global exchange of information. Computer systems are increasingly applied to data communication, developing mobile applications, storing information, and providing information security. Mathematics is increasingly applied to organizing information about, modeling, and understanding the physical world. Mathematics also provides the language and techniques for developing computer systems.

All courses within these majors are presented in the context of a biblical worldview, which guides the use of computer systems and mathematical techniques. Courses are taught with updated and industry-recognized software, programming languages, and data analysis tools. Students are equipped to succeed in related courses, to use mathematics to solve practical problems, to integrate new computer systems, and to prepare for future work in industry, business, government, or graduate school.

NOTE: WHEN A STUDENT RECEIVES A "U" GRADE FOR THE LAB PORTION OF A SCIENCE COURSE, HE/SHE RECEIVES CREDIT FOR THE COURSE, BUT THE COURSE DOES NOT COUNT FOR LABORATORY SCIENCE CREDIT IN CORE CURRICULUM.

## Applied Mathematics Major Bachelor of Science

The Applied Mathematics major is designed to meet the increasing need for mathematicians in areas of science and technology; to prepare students to be quantitative problem solvers in areas of business, finance, technology, and science; and to prepare students for graduate studies in applied mathematics. The degree is granted upon completion of credits specified on pages 47–48 (40 credits must be in 3000- or 4000-level courses).

- **Scientific & Quantitative Literacy** mathematics course in core curriculum: MAT2121.

### Required Courses . . . . . 49 cr

BUS3835	Professional Skills Seminar . . . . .	2
EGR2206	MATLAB . . . . .	2
EGR4339	Numerical Analysis . . . . .	4
MAT2122	Calculus and Analytic Geometry II . . . . .	4
MAT2221	Foundations of Mathematics I . . . . .	2
MAT2222	Foundations of Mathematics II . . . . .	2
MAT2255	Statistics for Data Analysis . . . . .	4
MAT3211	Linear and Abstract Algebra . . . . .	4
MAT3223	Calculus and Analytic Geometry III . . . . .	4
MAT3225	Discrete Mathematics . . . . .	2
MAT3245	Geometry . . . . .	4
MAT3335	Differential Equations with Applied Linear Algebra . . . . .	4

MAT4845	Senior Project [ <b>OCE, WCE</b> ] . . . . .	2
MAT4995	Mathematics Internship . . . . .	1
<b>Select one of the following:</b>		
MAT2055	Statistics . . . . .	4
MAT3252	Calculus-based Statistics . . . . .	4
<b>Select one of the following:</b>		
MAT4337	Mathematical Models and Applications . . . . .	4
DAL-prefix course 3000-level or higher . . . . .		4

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OCE = ORAL COMMUNICATION EMPHASIS.  
SEE PAGE 48 FOR EXPLANATION AND PREREQUISITES.

Applied Mathematics Minor . . . . . 18 cr

The mathematics minor is designed to add quantitative problem solving and rigor to other related majors, especially those in fields of business, finance, technology, and science.

**Required Courses:** MAT2121, 2122, 2221, 3225; six MAT-prefix credits 3000-level or above.

## Computer Science Major Bachelor of Science

The Computer Science major is a four-year program designed to give students the knowledge to develop and use computer algorithms and computer-based systems. In addition, students will learn computing and mathematical principles that are used in the analysis and design of such systems. Students are provided with the fundamentals of the mathematics of computers, computer programming, operating systems, database management, and computer security, all of which provide a firm foundation upon which to apply and research new technologies. The program includes training in four broad areas:

- **Technical skills in programming and application development**
- **Applied mathematical skills for computations and simulations**
- **High-level design and analysis skills**
- **Application with databases, computer security, and communications**

Students completing this program are prepared to function effectively in a variety of careers as software developers, information technology consultants, information technology analysts, database administrators, and systems analysts. Students are also prepared for rigorous graduate programs in the computing sciences. The degree is granted upon completion of credits specified on pages 47–48 (40 credits must be in 3000- or 4000-level courses).

- **Scientific & Quantitative Literacy** mathematics course in core curriculum: C- or better in MAT2055.
- **Students must receive** a grade of C- or better in all COS and MIS required courses. Courses with grades below C- must be repeated.

**Core Requirements . . . . . 12 cr**

COS1011	Principles of Computing I . . . . .	2
COS2005	Python Programming. . . . .	4
COS2112	Principles of Computing II. . . . .	2
MIS2062	Database Management I . . . . .	4

**Computer Science Requirements . . . . . 37 cr**

COS2071	Programming I – Java . . . . .	4
COS2081	Data Communications. . . . .	4
COS2201	C Programming Language . . . . .	2
COS2269	Computer Security Fundamentals. . . . .	4
COS3265	Tools and Techniques in Computer Science and Cybersecurity. .4	
COS3267	Operating Systems Concepts . . . . .	4
COS3272	Programming II - Mobile Application Development .4	
COS4855	Senior Capstone [ <b>OCE, WCE</b> ]. . . . .	2
COS4995	Computer Science Internship. . . . .	1
MAT3225	Discrete Mathematics . . . . .	2
MAT3226	Applications of Digital Logic . . . . .	2
MIS3265	Systems Analysis and Design. . . . .	4

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## Cybersecurity & Information Systems Major Bachelor of Science

The Cybersecurity & Information Systems major is designed to give students a strong academic experience in Cybersecurity while at the same time offering a career path in information systems. Cybersecurity permeates virtually all parts of technology today, providing information security, monitoring computer networks, and preventing and/or mitigating cyber threats. Cybersecurity professionals prescribe and use policies, procedures, and technology to address natural events, hackers, cyber terrorists, and technical problems that could compromise the confidentiality, integrity, or accessibility of systems and data. Students also receive valuable education in information systems leading to careers as software developers, systems analysts, and computer network administrators. The degree is granted upon completion of credits specified on pages 47–48 (40 credits must be in 3000- or 4000-level courses).

- **Scientific & Quantitative Literacy** mathematics course in core curriculum: C- or better in MAT2055.
- **Students must receive** a grade of C- or better in all COS and MIS required courses. Courses with grades below C- must be repeated.

**Core Requirements . . . . . 12 cr**

COS1011	Principles of Computing I . . . . .	2
COS2005	Python Programming. . . . .	4
COS2112	Principles of Computing II. . . . .	2
MIS2062	Database Management I . . . . .	4

**Cybersecurity & Information Systems Requirements . . . . . 38 cr**

COS2081	Data Communications I. . . . .	4
COS2269	Computer Security Fundamentals. . . . .	4
COS3265	Tools and Techniques in Computer Science and Cybersecurity. . . . .	4
COS3267	Operating Systems Concepts . . . . .	4
MAT3226	Applications of Digital Logic . . . . .	2
MIS3185	Server Administration . . . . .	3
MIS3265	Systems Analysis and Design. . . . .	4
MIS4245	Cybersecurity: Current Practices and Trends . . . . .	4
MIS4369	Introduction to Cryptography . . . . .	2
MIS4465	Computer Firewalls and Penetration Testing . . . . .	2
MIS4466	Digital Forensics. . . . .	2
MIS4855	Senior Capstone <b>[OCE, WCE]</b> . . . . .	2
MIS4995	Cybersecurity & Information Systems Internship . . . . .	1

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## Data Analytics Major Bachelor of Science

The Data Analytics major is a four-year program designed to give students the skills needed to manage and analyze large datasets to solve critical business problems. DA students are provided with the fundamentals of data analysis, data management, data storage, programming, and predictive analytics. The program provides students with training in techniques and software for researching and analyzing large data sets (big data) to further the understanding of organization and industry data and forecast business opportunity and strategy success rates. The program is designed to provide students with either immediate employment upon graduation or sufficient preparation for a master's-level program in data analytics or data science. The degree is granted upon completion of credits specified on pages 47–48 (40 credits must be in 3000- or 4000-level courses).

- **Scientific & Quantitative Literacy** mathematics course in core curriculum: C- or better in MAT2055.

**Core Requirements . . . . . 12 cr**

COS1011	Principles of Computing I . . . . .	2
COS2005	Python Programming. . . . .	4
COS2112	Principles of Computing II. . . . .	2
MIS2062	Database Management I . . . . .	4

**Data Analytics Requirements . . . . . 37 cr**

BUS2011	Introduction to Business Analysis. . . . .	2
DAL2012	Introduction to Data Analysis. . . . .	2
DAL2025	Data Visualization. . . . .	2
DAL2235	Principles of Data Analytics. . . . .	4
DAL3255	Data Mining. . . . .	4
DAL4235	Big Data Analytics and Applications. . . . .	4
DAL4275	Business and Economic Forecasting. . . . .	4
DAL4855	Senior Capstone <b>[OCE, WCE]</b> . . . . .	2
DAL4995	Data Analytics Internship . . . . .	1
MAT2255	Statistics for Data Analysis . . . . .	4

**Select 8 credits from the following:**

Courses not counted elsewhere with ACC, BUS, COS, DAL, ECO, FIN, MGT, MIS, or MKT prefixes or MAT course at 2000 level or above.

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Data Analytics Minor ..... 16–18 cr

**Required Courses:** BUS 2011 or DAL2012; DAL 2235, MAT2055; select 6–8 credits from DAL courses numbered 3000 or higher.

Cybersecurity Minor ..... 17 cr

The cybersecurity minor is designed to add awareness of cyber security threats as well as tools and techniques for providing a solid defense against attacks for those in fields such as computer science, accounting, business, and criminal justice.

**Required Courses:** COS2081, 2269; MIS3185, 4369, 4465, 4466.

## Mathematics Education Major Bachelor of Science

Full details are given under School of Education programs. See pages 107–111 and 118.