

# 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, 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 46–47 (40 credits must be in 3000- or 4000-level courses).

- **Natural World** mathematics course in core curriculum must include MAT2121 and PHY1201.

### Required Courses . . . . . 50 cr

COS2201 C Programming . . . . .	2	MAT3226 Discrete Mathematics for Computer Science. . . . .	2
EGR2206 MATLAB . . . . .	2	MAT3245 Geometry . . . . .	4
EGR4339 Numerical Analysis . . . . .	4	MAT3252 Calculus-based Statistics . . . . .	4
MAT2005 Problem Solving . . . . .	2	MAT3335 Ordinary Differential Equations . . . . .	4
MAT2075 History of Mathematics . . . . .	2	MAT3835 Career Competencies Seminar. . . . .	1
MAT2122 Calculus and Analytic Geometry II. . . . .	4	MAT4337 Mathematical Models and Applications . . . . .	4
MAT2215 Linear Algebra . . . . .	2	MAT4845 Senior Project [ <b>WCE,OCE</b> ] . . . . .	2
MAT2221 Foundations of Mathematics I. . . . .	2	MAT4995 Mathematics Internship . . . . .	1
MAT2222 Foundations of Mathematics II . . . . .	2		
MAT3223 Calculus and Analytic Geometry III . . . . .	4		
MAT3225 Discrete Mathematics. . . . .	2		

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SEE PAGE 48 FOR EXPLANATION AND PREREQUISITES.

**COMPUTING, DATA & MATHEMATICAL SCIENCES**

**Applied Mathematics Minor . . . . . 20 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.

- **Natural World** courses in core curriculum must include MAT2121.

**Required Courses: MAT2005, 2122, 2215, 2221, 4339; 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 46–47 (40 credits must be in 3000- or 4000-level courses).

- **Natural World** mathematics course in core curriculum: C- or better in MAT2121.
- **Spiritual Formation and Integration Selectives** requirement in core curriculum: BUS4435 [**WCE**].
- **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 . . . . . 18 cr**

BUS2011	Introduction to Business Analysis. . . . .	2
BUS3835	Professional Skills Seminar . . . . .	2
BUS4435	Business Ethics [ <b>WCE</b> ]	
<small>(SEE SPIRITUAL FORMATION AND INTEGRATION SELECTIVES REQUIREMENT ABOVE)</small>		
COS1011	Principles of Computing I . . . . .	2
COS2112	Principles of Computing II. . . . .	2
COS2211	Computer Software Development I . . . . .	2
MAT2055	Statistics. . . . .	4
MIS3361	Database Management . . . . .	4

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

COS2071	Programming I – Java . . . . .	4
COS2212	Computer Software Development II . . . . .	2
COS3267	Operating Systems Concepts . . . . .	4
COS3272	Programming II - Mobile Application Development . . . . .	4
COS3369	Computer Security Fundamentals. . . . .	4
COS3381	Data Communications I. . . . .	4
COS4855	Senior Capstone [ <b>OCE</b> ]. . . . .	2
COS4995	Computer Science Internship. . . . .	1
DAL2012	Introduction to Data Analysis. . . . .	2
DAL2025	Data Visualization. . . . .	2
MAT3225	Discrete Mathematics . . . . .	2
MAT3226	Discrete Mathematics for Computer Science . . . . .	2
MIS3265	Systems Analysis and Design. . . . .	4

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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 46–47 (40 credits must be in 3000- or 4000-level courses).

- **Social Science** course in core curriculum: ECO2211 and 2212.
- **Natural World** mathematics course in core curriculum: C- or better in MAT2035 or 2121.
- **Spiritual Formation and Integration Selectives** requirement in core curriculum: BUS4435 [WCE].

<b>Core Requirements</b> . . . . .	<b>18 cr</b>
BUS2011 Introduction to Business Analysis. . . . .	2
BUS3835 Professional Skills Seminar . . . . .	2
BUS4435 Business Ethics [WCE] (SEE SPIRITUAL FORMATION AND INTEGRATION SELECTIVES REQUIREMENT ABOVE)	
COS1011 Principles of Computing I . . . . .	2
COS2112 Principles of Computing II. . . . .	2
COS2211 Computer Software Development I . . . . .	2
MAT2055 Statistics . . . . .	4
MIS3361 Database Management . . . . .	4

<b>Data Analytics Requirements</b> . . . . .	<b>37 cr</b>
COS2212 Computer Software Development II . . . . .	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 [OCE]. . . . .	2
DAL4995 Data Analytics Internship . . . . .	1
MAT2255 Statistics for Data Analysis . . . . .	2

**Select 10 credits from the following:**  
 Courses not counted elsewhere with ACC, DAL, COS, FIN, MGT, MIS, or MKT prefixes or MAT course at 2000 level or above.

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## Data Analytics Minor . . . . . 20 cr

**Required Courses: BUS2011; DAL2012, 2235, 3255, 4235, or 4275; MAT2055.**

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COMPUTING, DATA & MATHEMATICAL SCIENCES

## Information Systems Major Bachelor of Science

The Information Systems major is designed to give students the tools needed to develop, use, and manage computer-based systems. Training is provided in three broad areas: programming and application development; design and analysis skills; and management skills. Students completing this program are prepared to function effectively in a variety of positions such as application programmers, systems analysts, database administrators, and information systems managers. The degree offers emphases in networking, cybersecurity, and applications development. The degree is granted upon completion of credits specified on pages 46–47 (40 credits must be in 3000- or 4000-level courses).

- **Social Science** course in core curriculum: ECO2211 and 2212.
- **Natural World** mathematics course in core curriculum: C- or better in MAT2035 or 2121.
- **Spiritual Formation and Integration Selectives** requirement in core curriculum: BUS4435 [WCE].
- **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 . . . . . 18 cr**

BUS2011	Introduction to Business Analysis . . . . .	2
BUS3835	Professional Skills Seminar . . . . .	2
BUS4435	Business Ethics [WCE]	
<small>(SEE SPIRITUAL FORMATION AND INTEGRATION SELECTIVES REQUIREMENT ABOVE)</small>		
COS1011	Principles of Computing I . . . . .	2
COS2112	Principles of Computing II . . . . .	2
COS2211	Computer Software Development I . . . . .	2
MAT2055	Statistics . . . . .	4
MIS3361	Database Management . . . . .	4

**Information Systems Requirements . . . . . 27 cr**

COS2212	Computer Software Development II . . . . .	2
COS3369	Computer Security Fundamentals . . . . .	4
DAL2012	Introduction to Data Analysis . . . . .	2
DAL2025	Data Visualization . . . . .	2
MAT3226	Discrete Mathematics for Computer Science . . . . .	2
MIS3265	Systems Analysis and Design . . . . .	4
MIS4855	Senior Capstone [OCE] . . . . .	2
MIS4995	Informations Systems Internship . . . . .	1

**Select 8 credits from the following:**  
 Courses not counted elsewhere with ACC, COS, DAL, FIN, MGT, or MIS prefixes or MAT course at 2000 level or above.

**Emphasis . . . . . 10 cr**

Select from Cybersecurity, Developer, and Networking. Requirements are listed below.

**Cybersecurity Emphasis (10 cr)**

COS3381	Data Communications I . . . . .	4
MAT3225	Discrete Mathematics . . . . .	2
MIS3185	Server Administration . . . . .	2
MIS4369	Introduction to Cryptography . . . . .	2

**Developer Emphasis (10 cr)**

COS2071	Programming I - Java . . . . .	4
COS2201	C Programming Language . . . . .	2
COS3272	Programming II - Mobile App Development . . . . .	4

**Networking Emphasis (10 cr)**

COS3381	Data Communications I . . . . .	4
MIS3185	Server Administration . . . . .	2
MIS3382	Data Communications II . . . . .	2
MIS4369	Introduction to Cryptography . . . . .	2

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## Information Systems Minor . . . . . 20 cr

**Required Courses: COS1011, 2071, 2112, 3369; MIS3265, 3361.**

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## Mathematics Education Major Bachelor of Science

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

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