Department of Computing, Analytics, & Mathematics

Mission Statement

The mission of the Department of Computing, Analytics, & Mathematics 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 48–49 (40 credits must be successfully completed in 3000- or 4000-level courses).

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

Required Courses . . . . . 48 cr

BUS3835	Professional Skills Seminar	2
EGR2206	MATLAB	2
EGR4339	Numerical Analysis	3
MAT2122	Calculus and Analytic Geometry II	4
MAT2221	Foundations of Mathematics I	2
MAT2222	Foundations of Mathematics II	2
MAT3211	Linear and Abstract Algebra	4
MAT3223	Calculus and Analytic Geometry III	4
MAT3225	Discrete Mathematics	2
MAT3245	Geometry	4
MAT3257	Statistics for Data Analysis	4
MAT3335	Differential Equations with Applied Linear Algebra	4
MAT4845	Senior Project **[OCE, WCE]**	2
MAT4995	Mathematics Internship	1

Select one of the following:

MAT2055	Statistics	4
MAT3252	Calculus-based Statistics	4

Select one of the following:

MAT4337	Mathematical Models and Applications	4
DAL-prefix course 3000 level or above		4

WCE = WRITTEN COMMUNICATION EMPHASIS.
OCE = ORAL COMMUNICATION EMPHASIS.
SEE PAGE 50 FOR EXPLANATION AND PREREQUISITES.

Applied Mathematics Minor . . . . . 18 cr

The applied 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 48–49 (40 credits must be successfully completed 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, CYS, and MIS required courses. Courses with grades below C- must be repeated.

Core Requirements . . . . . 12 cr

COS2005	Python Programming	4
COS2015	Principles of Computing **or**	
COS1011	Principles of Computing I **and**	
COS2112	Principles of Computing II	4
MIS2062	Database Management I	4

Computer Science Requirements. . . . . 37 cr

COS3001	C Programming Language	2
COS3267	Operating Systems Concepts	4
COS3271	Programming I – Java	4
COS3272	Programming II – Mobile Application Development	4
COS4855	Senior Capstone **[OCE, WCE]**	2
COS4995	Computer Science Internship	1
CYS2081	Data Communications I	4
CYS2269	Computer Security Fundamentals	4
CYS3065	Systems Analysis and Design	4
CYS3265	Tools and Techniques in Computer Science and Cybersecurity	4
MAT3225	Discrete Mathematics	2
MAT3226	Applications of Digital Logic	2

WCE = WRITTEN COMMUNICATION EMPHASIS
OCE = ORAL COMMUNICATION EMPHASIS
SEE PAGE 50 FOR EXPLANATION AND PREREQUISITES

Computer Science Minor . . . . . 16 cr

The computer science minor is designed to introduce students to applications of computer-based systems, the development of computer algorithms, and writing code in various computer languages.

Required Courses: COS2005, 3271, 3272; select 4 credits from COS courses numbered 2000 or higher.

Associate of Science in Computer Science (61–63 cr)

The Associate of Science in Computer Science is a two-year program designed to give students the knowledge to develop and use computer algorithms and computer software. In addition, students will learn computing and mathematical principles that are used in the design of such systems. Students are provided with the fundamentals of the mathematics of computers and computer programming. Students completing this program are prepared to function effectively as software developers and information technology consultants. The degree is granted upon completion of 61 credits as specified here.

- **Scientific & Quantitative Literacy** mathematics course in core curriculum must be either MAT2055 or MAT2121.

Core Curriculum . . . . . 33-35 cr

Biblical Thinking & Living . . . . . 8 cr
BIA1007 Christian Thinking & Living (or BIB1826 honors) . . . 2
BIA1015 Interpreting Scripture (or BIA1827 honors) **or**
MIN2016 Biblical Interpretation for Study 2
Theological Philosophy (select from list on page 43) 4

Effective Communication . . . . . 3 cr
COM1075 Public Speaking (or COM1825 Honors) 3

Critical Thinking & Information Literacy . . . . . 4–5 cr
(reinforces Effective Communication outcomes)
ENG1107 College Writing & Research **and, if required,**
ENG1105L English Composition Lab **or**
LAN1105L English Composition Lab. 4-5

Cultural & Global Engagement. . . . . 6-7 cr
HIS1005 Historical Perspectives on Culture, Belief, & Civilization (**or** HIS1825 Honors **or** HIS1826 Honors) **and**, if required,
HIS1005L Historical Perspectives Lab 4-5
Approved Cultural & Global Engagement course or Modern World Language course (select from list on page 43). 2

Creative Expression . . . . . 4 cr
Art, Music, Theater, Film, Literature (select from list on page 43)
A MAXIMUM OF 2 CREDITS IN MUSIC ENSEMBLES OR THE1045 MAY APPLY

Scientific & Quantitative Literacy . . . . . 8 cr
Mathematics, Natural Science, Social Science (select from list on page 44)
MUST INCLUDE AT LEAST ONE MATHEMATICS AND ONE NATURAL SCIENCE COURSE. EXCLUDES BIO1025.

Specialization in Computer Science. . . . . 28 cr

Required Courses. . . . . 22 cr
COS2005 Python Programming 4
COS2015 Principles of Computing **or**
COS1011 Principles of Computing I **and**
COS2112 Principles of Computing II 4
COS3271 Programming I – Java 4
CYS2081 Data Communications I **or**
CYS2269 Computer Security Fundamentals 4
CYS3065 Systems Analysis and Design 4
MAT3226 Applications of Digital Logic 2

Selectives. 6
Select from COS- or CYS-prefix courses.

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 48–49 (40 credits must be successfully completed 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, CYS, and MIS required courses. Courses with grades below C- must be repeated.

Core Requirements . . . . . 12 cr

COS2005 Python Programming 4
COS2015 Principles of Computing **or**
COS1011 Principles of Computing I **and**
COS2112 Principles of Computing II 4
MIS2062 Database Management I 4

Cybersecurity & Information Systems Requirements. 39 cr

COS3267 Operating Systems Concepts 4
CYS2081 Data Communications I 4
CYS2269 Computer Security Fundamentals 4
CYS3065 Systems Analysis and Design 4
CYS3265 Tools and Techniques in Computer Science and Cybersecurity 4
CYS4245 Cybersecurity: Current Practices and Trends 4
CYS4369 Introduction to Cryptography. 2
CYS4465 Computer Firewalls and Penetration Testing 2
CYS4466 Digital Forensics 2
CYS4855 Senior Capstone **[OCE, WCE]**. 2
CYS4995 Cybersecurity & Information Systems Internship . . . 1
MAT3226 Applications of Digital Logic 2
MIS3185 Server Administration. 4

WCE = WRITTEN COMMUNICATION EMPHASIS.
OCE = ORAL COMMUNICATION EMPHASIS.
SEE PAGE 50 FOR EXPLANATION AND PREREQUISITES.

Cybersecurity Minor . . . . . 18 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: CYS2081, 2269, 4369, 4465, 4466; MIS3185.

Data Analytics Major

Bachelor of Science

The Data Analytics major is a four-year program designed to teach students to manage and analyze large datasets to solve critical business problems. Students are provided with data analysis, data management and storage, programming, and predictive analytics fundamentals. The program provides students the option of two tracks: Data Analytics or Business Analytics. Both tracks incorporate training in techniques and software for researching and analyzing large data sets (big data) to further the understanding of organization and industry data. Business analytics focus will be on forecasting and building propensity models. The program is designed to provide students with immediate employment upon graduation or sufficient preparation for a master's-level data analytics or data science program. The degree is granted upon completion of credits specified on pages 48–49 (40 credits must be successfully completed in 3000- or 4000-level courses).

Data Analytics Track (49 cr)

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

Core Requirements . . . . . 12 cr

COS2005	Python Programming	4
COS2015	Principles of Computing **or**	
COS1011	Principles of Computing I **and**	
COS2112	Principles of Computing II	4
MIS2062	Database Management I	4

Data Analytics Requirements . . . . . 37 cr

BUS2011	Introduction to Business Analysis	2
DAL2012	Introduction to Data Analysis	2
DAL2235	Principles of Data Analytics.	4
DAL3025	Data Visualization	2
DAL3255	Data Mining	4
DAL4235	Big Data Analytics and Applications	4
DAL4275	Business and Economic Forecasting	4
DAL4855	Senior Capstone **[OCE, WCE]**	2
DAL4995	Data Analytics Internship	1
MAT3257	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.

WCE = WRITTEN COMMUNICATION EMPHASIS
OCE = ORAL COMMUNICATION EMPHASIS.
SEE PAGE 50 FOR EXPLANATION AND PREREQUISITES.

Business Analytics Track (49 cr)

- **Scientific & Quantitative Literacy** social science course in core curriculum: C- or better in ECO2211/2212 or 2101 and C- or better in mathematics course MAT2055 (MAT1035 does not satisfy requirement).

Business Requirements. . . . . 25 cr

ACC2101	Principles of Financial Accounting	4
ACC2102	Principles of Managerial Accounting	4
BUS3835	Professional Skills Seminar	2
BUS4435	Business Ethics **[OCE, WCE]**	4
FIN2221	Finance I	2
FIN3222	Finance II	2
MGT2271	Management	4
MGT3276	Operations Management.	2
BUS4995	Business Administration Internship **or**	
DAL4995	Data Analytics Internship	1

Data Analytics Requirements . . . . . 24 cr

BUS2011	Introduction to Business Analysis	2
COS1011	Principles of Computing I	2
DAL2012	Introduction to Data Analysis	2
DAL2235	Principles of Data Analytics.	4
DAL3025	Data Visualization	2
DAL3255	Data Mining	4
DAL4235	Big Data Analytics and Applications	4
DAL4275	Business and Economic Forecasting	4

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.

Mathematics Education Major

Bachelor of Science

Full details are given under School of Education programs. See pages 101–105 and 111.