COMPUTING, ANALYTICS, & MATHEMATICS

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,**
    ENG1107L   English Composition Lab **or**
    LAN1107L   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

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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.

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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.