# Department of Computer and Information Sciences

Dr. Suman Kalia, *Chairperson*

The Department of Computer and Information Sciences offers four programs leading towards the Bachelor of Science degree in Computer Science. Students may concentrate in Computer Information Systems, Cyber Security, Artificial Intelligence and Machine Learning or Computer Science. Transfer students who major in CS must complete a minimum of six CS and/or IS courses at the University for the Bachelor of Science degree. For students not majoring in Computer Science, we offer Minors in Computer Science, CIS, Artificial Intelligence and Cyber Security. For students majoring in Criminal Justice, the Department offers a concentration in Cyber Security and Computer Forensics.

## Requirements for Computer Science Major/Computer Information Systems Option

### Degree of Bachelor of Science

This option is designed for those who wish to become programmers or systems analysts. Application programming and business information
systems are studied. Six of the required credits for the major count towards the Core Curriculum Requirements.

| | | |
|---|---|---|
| MA-123 | Elementary Calculus I (Core Math) | 3 |
| MA-124 | Elementary Calculus II (Core Math) | 3 |
| CS-177 | Intr to Computer Science & Cybersecurity | 3 |
| CS-180 | Introduction to Programming | 3 |
| CS-231 | Software Engineering | 3 |
| CS-298 | Cyber Security Virtual Internship | 3 |
| CS-332 | Advanced Computing | 3 |
| IS-410 | Total Business Info Systems | 3 |
| CS-370 | Data Structures | 3 |
| Choose four of the following: | | 12 |
| MA-212 | Elementary Statistics | |
| MA-214 | Mathematics of Finance | |
| MA-216 | Computer Mathematics | |
| MA-218 | Quantitative Methods for Business | |
| MA-222 | Intermediate Statistics | |
| MA-247 | Introductory Linear Algebra | |
| MA-250 | Transition to Advanced Mathematics | |
| MA-316 | Intermediate Discrete Mathematics | |
| MA-347 | Topics in Linear Algebra | |
| CS-499 | Capstone for Computer Science | |
| CS/IS- | CS or IS Electives (IS-230 or higher OR CS-300 or higher) [1] | |
| Total Credits | | 39 |

[1]    IS-295 Co-op may be counted as only one Information Science elective.

### Special Note on Core Curriculum Requirements for Computer Science Major/Computer Information Systems Option

[1]    Majors in CS/CIS may not use CS or IS courses for the Core Natural Science Requirement.

**Special Notes on Major Requirements for Computer Science Major/Computer Information Systems Option**

[1]    A student must maintain a 2.0 average in the CS-231 and CS-332 sequence to continue as a computer science major.

[2]    CS/CIS majors may be eligible for a minor in mathematics.

[3]    CS/CIS majors are encouraged to study a commercially popular programming language such as Python and/or Java.

## Requirements for Computer Science Major/Cyber Security Option

## Degree of Bachelor of Science

This option is designed for those who wish to learn the technology and security architecture that is necessary to help protect and defend information systems from cyber-attacks.

| | | |
|---|---|---|
| MA-123 | Elementary Calculus I (Core Math) | 3 |
| MA-124 | Elementary Calculus II (Core Math) | 3 |
| MA-212 | Elementary Statistics | 3 |
| CS-177 | Intr to Computer Science & Cybersecurity | 3 |
| CS-190 | Secure Software Development | 3 |
| CS-231 | Software Engineering | 3 |
| CS-332 | Advanced Computing | 3 |
| CS-260 | Information Technology Ethics | 3 |
| CS-339 | Computer Architecture & Operating System | 3 |
| IS-380 | Database and Data Administration | 3 |
| IS-381 | Cyber Security Planning and Risk Mgmt | 3 |
| IS-425 | Disaster Recovery/Business Continuity | 3 |
| CS-489 | Network Technology Protocols & Defense | 3 |
| CS-495 | Cryptology | 3 |
| CS-496 | Cybersecurity and Digital Forensics Lab | 3 |
| CS-499 | Capstone for Computer Science | 3 |
| Total Credits | | 48 |

**Special Notes on Core Curriculum Requirements for Computer Science Major/Cyber Security Option**

[1]    Majors in CS/Cyber Security may not use CS or IS courses for the Core Natural Science Requirement.

**Special Note on Major Requirements for Computer Science Major/Cyber Security Option**

[1]    A student must maintain a 2.0 average in the CS-231 and CS-332 sequence to continue as a computer science major.

## Requirements for Computer Science Major/Artificial Intelligence and Machine Learning

## Degree of Bachelor of Science

This option is designed for those who wish to learn the technology and architecture that is necessary to use Artificial Intelligence and Machine Learning methods in the computing disciplines.

| | | |
|---|---|---|
| MA-123 | Elementary Calculus I (Core Math) | 3 |
| MA-124 | Elementary Calculus II (Core Math) | 3 |
| MA-212 | Elementary Statistics | 3 |
| CS-177 | Intr to Computer Science & Cybersecurity | 3 |

| | | |
|---|---|---|
| CS-180 | Introduction to Programming | 3 |
| CS-231 | Software Engineering | 3 |
| CS-241 | Python Programming for Comp Scientists | 3 |
| CS-332 | Advanced Computing | 3 |
| CS-346 | Machine Learning I | 3 |
| CS-370 | Data Structures | 3 |
| CS/MA-337 | Statistical Computing With R | 3 |
| CS-415 | Robotics Fundamentals and Programming | 3 |
| CS-446 | Machine Learning II | 3 |
| CS-470 | Introduction to Artificial Intelligence | 3 |
| CS or IS Elective | | 3 |
| CS-499 | Capstone for Computer Science | 3 |
| Total Credits | | 48 |

### Special Notes on Core Curriculum Requirements for Computer Science Major/Artificial Intelligence and Machine Learning Option

[1]     Majors in CS/Artificial Intelligence and Machine Learning may not use CS or IS courses for the Core Natural Science Requirement.

### Special Note of Major Requirements for Computer Science Major/Artificial Intelligence and Machine Learning Option

[1]     A student must maintain a 2.0 average in the CS-231 and CS-332 sequence to continue as a computer science major.

## Requirements for Computer Science Major/Computer Science Option
## Degree of Bachelor of Science

This option is designed for those who wish to study the theory of programming. Any student who wishes to go to graduate school in Computer Science should consider taking this option.

Six or eight of the required credits for the major count towards the Core Curriculum Requirements.

| | | |
|---|---|---|
| MA-143 | Differential Calculus (Core Math) | 4 |
| MA-144 | Integral Calculus (Core Math) | 4 |
| CS-177 | Intr to Computer Science & Cybersecurity | 3 |
| CS-180 | Introduction to Programming | 3 |
| CS-231 | Software Engineering | 3 |
| CS-332 | Advanced Computing | 3 |
| CS-339 | Computer Architecture & Operating System | 3 |
| CS-355 | Found of Programming Systems | 3 |
| CS-370 | Data Structures | 3 |
| MA-247 | Introductory Linear Algebra | 3 |
| MA-250 | Transition to Advanced Mathematics | 3 |
| MA-273 | Multivariable Calculus I | 4 |
| **Choose one of the following** | | **3** |
| MA-212 | Elementary Statistics | |
| MA-222 | Intermediate Statistics | |
| MA-316 | Intermediate Discrete Mathematics | |
| MA-335 | Probability Theory | |
| MA-336 | Mathematical Statistics | |
| MA-347 | Topics in Linear Algebra | |

| | | |
|---|---|---|
| MA-389 | Topics in Statistics | |
| Two Natural Science Laboratories [1] | | 2 |
| CS-499 | Capstone for Computer Science | 3 |
| CS- | CS Electives: choose 2 courses from CS-237 or CS-300-level | 6 |
| CS/IS- | CS/IS Electives: choose 2 courses from CS-300-level or IS-400-level | 6 |
| Total Credits | | 59 |

[1]     Taken with Natural Science courses for Core Requirements.

## Special Notes on Core Curriculum Requirements for Computer Science Major/Computer Science Option

[1]     Students who have taken MA-123 Elementary Calculus I/MA-124 Elementary Calculus II, may fulfill the requirement by taking MA-125 Intermediate Calculus. These courses may not be taken on a Pass/Fail basis.

[2]     Majors in CS/CS may not use CS or IS courses for the Core Natural Science Requirement. Laboratories must be taken with the two courses chosen to satisfy the Core Natural Science Requirement.

## Special Notes on Major Requirements for Computer Science Major/Computer Science Option

[1]     A student must maintain a 2.0 average in the CS-231 and CS-232 sequence in order to continue as a computer science major.

[2]     CS/CS majors may be eligible for a minor in mathematics.

[3]     CS/CS  majors are encouraged to study a commercially popular programming language such as Visual BASIC and/or JAVA.

# Requirements for Criminal Justice Major with a Concentration in Cyber Security and Computer Forensics

For details about this program see the Criminal Justice Department.

## Requirements for Minor in Computer Science

Students majoring in Computer Science are not eligible for this minor

| | | |
|---|---|---|
| CS-180 | Introduction to Programming | 3 |
| CS-231 | Software Engineering | 3 |
| CS-332 | Advanced Computing | 3 |
| CS-339 | Computer Architecture & Operating System | 3 |
| CS-355 | Found of Programming Systems | 3 |
| CS-370 | Data Structures | 3 |
| Total Credits | | 18 |

## Requirements for Minor in Information Systems

Students majoring in Computer Science are not eligible for this minor

| | | |
|---|---|---|
| CS-180 | Introduction to Programming | 3 |
| CS-231 | Software Engineering | 3 |
| CS-260 | Information Technology Ethics | 3 |
| CS-332 | Advanced Computing | 3 |
| CS-370 | Data Structures | 3 |
| IS-410 | Total Business Info Systems | 3 |
| Total Credits | | 18 |

## Requirements for Minor in Cyber Security

Students Majoring in Computer Science are not eligible for this minor

| | | |
|---|---|---|
| CS-177 | Intr to Computer Science & Cybersecurity | 3 |
| or CS-190 | Secure Software Development | |
| IS-381 | Cyber Security Planning and Risk Mgmt | 3 |
| IS-425 | Disaster Recovery/Business Continuity | 3 |
| CS-495 | Cryptology | 3 |
| CS-489 | Network Technology Protocols & Defense | 3 |
| CS-496 | Cybersecurity and Digital Forensics Lab | 3 |
| Total Credits | | 18 |