COMPUTER AND INFORMATION SECURITY, B.S.

Contact: Dr. Haroon Malik, Chair malikh@marshall.edu

The Bachelor of Science in Computer and Information Security program prepares students for careers in computer and information security fields through a strong foundation in the theory and practice and the broad education gained by core curriculum. Computer and information security is an evolving discipline that involves the study of technology, strategy, policy, and standards regarding the security of and operations in cyberspace. The program introduces students to a variety of topics in computer and information security such as computer and network protection, penetration testing and prevention, security in mobile devices and Internet of Things (IoT), and more by using the state-of-the-art security tools and technologies.

Admission and Transfer Criteria

Minimum requirements for admission into the Computer Science major for first-time freshmen are

- an ACT composite score of 21 (SAT 1060) and
- an ACT mathematics score of 24 (SAT math section score of 570).

Minimum requirements for admission into the Computer and Information Security major for transfer students, whether from within Marshall University or from another institution, are:

- · 15 earned semester credit hours of college-level coursework,
- an overall Grade Point Average of at least 2.0 in all college-level coursework,
- · completion of ENG 101 Beginning Composition (or equivalent) with a grade of C, and
- completion of MTH 132 Precalculus with Sci Applica or MTH 127 College Algebra-Expanded/MTH 130 College Algebra and MTH 132 Precalculus with Sci Applica (or equivalent) with a minimum grade of C.

For those desiring to major in computer and information security who do not meet the admission or transfer criteria listed above:

• Students may be admitted to "Pre-Computer Science" with a minimum ACT composite of 19 and an ACT mathematics score of 19-23 (composite SAT of 990; Math SAT of 510-560). Transfer students must be eligible for MTH 127 College Algebra-Expanded/MTH 130 College Algebra and MTH 132 Precalculus with Sci Applica.

Pre-Computer and Information Security students must complete the criteria for transfer students to Computer and Information Security. Registration for Computer Science courses will be limited until transfer criteria are met.

Course Requirements

- General Education Course

➢ - Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

The Core Curriculum is designed to foster critical thinking skills and introduce students to basic domains of thinking that transcend disciplines. The Core applies to all majors. Information on specific classes in the Core can be found at https://www.marshall.edu/gened/.

| Code | Title | Credit Hours |
|--------------------------------|--|-----------------|
| Core Curriculu | m | |
| Core 1: Critical T | hinking | |
| FYS 100 | First Yr Sem Critical Thinking | 3 |
| MTH 229 💎 | Calculus/Analytic Geom I (CT) | 5 |
| Critical Thinking | g Course | 3 |
| Core 2 | | |
| ENG 101 🔫 | Beginning Composition | 3 |
| ENG 201 💎 | Advanced Composition | 3 |
| CMM 103 💎 | Fund Speech-Communication | 3 |
| MTH 229 💎 | Calculus/Analytic Geom I (CT) | 5 |
| BSC 120 🗬 | Principles of Biology I | 3 |
| BSC 120L 💎 | Principles of Biology I Lab | 1 |
| Core II Humani | ties | 3 |
| Core II Social So | tience | 3 |
| Core II Fine Arts | 5 | 3 |
| Additional Unive | ersity Requirements | |
| Writing Intensiv | ve (ENG 354 recommended) | 3 |
| Writing Intensiv | ve | 3 |
| Multicultural or | International | 3 |
| CYBR 490 💎 | Senior Project | 3 |
| Major-Specific | | |
| MTH 220 💎 7 | Discrete Structures | 3 |
| MTH 229 💎 1 | Calculus/Analytic Geom I (CT) | 5 |
| STA 225 💎 | Introductory Statistics (CT) | 3 |
| Science: Any twareas: | o courses with labs from the following science | |
| BSC 120, Prir Biology I Lab | nciples of Biology I, and BSC 120L, Principles of , or above | |

CHM 211, Principles of Chemistry I, and CHM 217, Principles of Chemistry I Lab, or above

GLY 200, Physical Geology, and GLY 210L, Earth Materials Lab, or

PHY 201, College Physics I, and PHY 202, General Physics Laboratory, or above

| ENG 354 | Scientific & Tech Writing | 3 |
|----------|--------------------------------|---|
| CS 105 💎 | Expl World with Computing (CT) | 3 |
| CS 110 庵 | Computer Science I | 3 |
| CS 120 🞓 | Computer Science II | 3 |
| CS 210 庵 | Data Structures and Algorithms | 3 |
| CS 215 | Adv Data Struct and Algorithms | 3 |
| CS 305 | Software Engineering | 3 |
| CS 320 庵 | Internetworking | 3 |
| CS 330 | Operating Systems | 3 |

| CS 402 | Computer Architecture | 3 |
|-----------------|---------------------------------|---|
| CS 410 | Database Engineering | 3 |
| CYBR 210 🞓 | Comp and Info Sec Principle | 3 |
| CYBR 240 | Information Security Policies | 3 |
| CYBR 310 | Introduction to Cryptography | 3 |
| CYBR 330 | Cyber Security | 3 |
| CYBR 350 | Cyber System Administration | 3 |
| CYBR 360 | Cyber Infrastructure Security | 3 |
| CYBR 400 | Compter Security Design | 3 |
| CYBR 435 | Cyber Risk | 3 |
| CYBR 442 | Cyber Operations | 3 |
| CYBR 475 | Internship | 3 |
| CYBR 490 💎 | Senior Project (C) | 3 |
| Free Elective | | 3 |
| Free Elective | | 2 |
| Computer and In | formation Security Elective | 3 |
| Select one of t | he following: | |
| CYBR 480 | Special Topics | |
| CYBR 481 | Special Topics | |
| CYBR 483 | Special Topics | |
| CYBR 484 | Special Topics | |
| CYBR 485 | Special Topics | |
| CYBR 486 | Independent Study | |
| CYBR 487 | Independent Study | |
| CYBR 488 | Independent Study | |
| CYBR 489 | Independent Study | |
| Any 400-level | Cs course except CS 430, CS 435 | |
| Any 300- or 40 | 00-level CFS course | |
| | | |

Major Information

- Other science with lab courses may replace the courses listed above with the approval of the program chair.
- Students are required to know and track their degree requirements for graduation or for entrance to a professional school.
- Coursework listed as "free elective" may vary for each student. Students are encouraged to use elective hours toward a minor or toward prerequisites.
- Course offerings and course attributes are subject to change each semester. Please consult each semester's schedule of courses for availability and attributes.

Semester Plan

- General Education Course

➡ - Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

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CYBR 330

CYBR 360

Free Elective

CS 410

Cyber Security

Database Engineering

Cyber Infrastructure Security

security in mobile devices and Internet of Things (IoT), and more by using state-of-the-art security tools and technologies.

| First Year First Semester Computer Science I 3 MTH 229 | using state-of-the-art security tools and technologies. | | | |
|---|--|--------------------------------|-----------------------|---|
| First Semester Credit Hours CS 110 ★ Computer Science I 3 MTH 229 ★ Calculus/Analytic Geom I (CT) 5 ENG 101 ★ Beginning Composition 3 FYS 100 ★ First Yr Sem Critical Thinking 3 UNI 100 ★ Freshman First Class 1 Credit Hours 15 Second Semester 5 CS 105 ★ Expl World with Computing (CT) 3 CS 120 ★ Computer Science II 3 ENG 201 ★ Advanced Composition 3 MTH 220 ★ Discrete Structures 3 CMM 103 ★ Fund Speech-Communication 3 First Semester 7 Core II Fine Arts 3 CYBR 210 ★ Comp and Info Sec Principle 3 STA 225 ★ Introductory Statistics (CT) 3 CS 210 ★ Data Structures and Algorithms 3 BSC 120 ★ Principles of Biology I (w/ Lab) 3 BSC 120 ★ Principles of Biology I Lab 1 Credit Hours 16 Second Semester 1 Core II Humanities (CT, WI) 3 CYBR 240 Information Security Policies 3 | First Year | | | |
| CS 110 | | | Credit | |
| MTH 229 | | | Hours | |
| ENG 101 Beginning Composition 3 PYS 100 First Yr Sem Critical Thinking 3 UNI 100 Freshman First Class 1 Credit Hours 15 Second Semester CS 105 Expl World with Computing (CT) 3 CS 120 Computer Science II 3 ENG 201 Advanced Composition 3 MTH 220 Discrete Structures 3 CMM 103 Fund Speech-Communication 5 Credit Hours 15 Second Year First Semester Core II Fine Arts 3 CYBR 210 Comp and Info Sec Principle 3 STA 225 Introductory Statistics (CT) 3 SSC 225 Data Structures and Algorithms 3 BSC 120 Principles of Biology I (w/ Lab) 3 BSC 120 Principles of Biology I Lab 1 Credit Hours 16 Second Semester Core II Humanities (CT, WI) 3 CYBR 240 Information Security Policies 3 CS 215 Adv Data Struct and Algorithms 3 CYBR 240 Information Security Policies 3 CS 215 Adv Data Struct and Algorithms 3 CHM 211 Principles of Chem Lab I 2 Core II Social Science (MC/I, WI) 3 Credit Hours 17 Third Year First Semester ENG 354 Scientific & Tech Writing (WI) 3 CS 320 Principles of Systems 3 PHY 201 College Physics I 3 PHY 202 General Physics I Laboratory 1 Credit Hours 13 | CS 110 🞓 | Computer Science I | 3 | |
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| Second Semester Expl World with Computing (CT) 3 CS 120 | UNI 100 | Freshman First Class | 1 | |
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| CHM 217 Principles of Chem Lab I 2 Core II Social Science (MC/I, WI) 3 Credit Hours 17 Third Year First Semester ENG 354 Scientific & Tech Writing (WI) 3 CS 320 Internetworking 3 CS 330 Operating Systems 3 PHY 201 College Physics I 3 PHY 202 General Physics I Laboratory 1 Credit Hours 13 | | <u> </u> | | |
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| CS 330 Operating Systems 3 PHY 201 College Physics I 3 PHY 202 General Physics I Laboratory 1 Credit Hours 13 | CS 320 🞓 | <u> </u> | | |
| PHY 201 College Physics I 3 PHY 202 General Physics I Laboratory 1 Credit Hours 13 | | | | |
| PHY 202 General Physics I Laboratory 1 Credit Hours 13 | PHY 201 💎 | | 3 | |
| Credit Hours 13 | _ | | | |
| Second Semester | | Credit Hours | 13 | |
| | Second Semeste | er | | |
| CYBR 310 Introduction to Cryptography 3 | CYBR 310 | Introduction to Cryptography | 3 | |

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| Free Elective | | 2 |
|----------------|-----------------------------|-----|
| | Credit Hours | 17 |
| Fourth Year | | |
| First Semester | | |
| CS 305 | Software Engineering | 3 |
| CYBR 400 | Compter Security Design | 3 |
| CYBR 475 | Internship | 3 |
| CYBR 350 | Cyber System Administration | 3 |
| Free Elective | | 3 |
| | Credit Hours | 15 |
| Second Semest | er | |
| CS 402 | Computer Architecture | 3 |
| CYBR 490 💎 | Senior Project (C) | 3 |
| CYBR 435 | Cyber Risk | 3 |
| CYBR 442 | Cyber Operations | 3 |
| | Credit Hours | 12 |
| | Total Credit Hours | 120 |