

Computer Science, M.S.C.S.

Curriculum in Masters of Science in Computer Science

A candidate for the M.S. degree in computer science must comply with the rules and regulations as outlined in the WVU Graduate Catalog and the specific requirements of the Statler College and the Lane Department of Computer Science and Electrical Engineering.

Program Requirements

All M.S. degree candidates are required to perform research and follow a planned program of study. The student's research advisor, in conjunction with the student's Advising and Examining Committee (AEC) will be responsible for determining the plan of study appropriate to the student's needs. The underlying principle of the planned program is to provide the students with the necessary support to complete their degree and prepare them for their career.

Curriculum Requirements

Code	Title	Hours
A minimum cumulative GPA of 3.0 is required		
At least 9 credit hours of coursework must have a CS subject code *		
No more than 9 credit hours may be at the 400 level		
Course Requirements **		
Plan of Study		
CS 796	Graduate Seminar	1
Core Course Requirements +		
CPE 553	Advanced Networking Concepts	3
CS 520	Advanced Analysis of Algorithms	3
Select one of the following:		3
CPE 520	Application of Neural Networks	
CS 630	Empirical Methods in Software Engineering and Computer Science	
CS 677	Pattern Recognition	
Elective Courses		6
Select two of the following:		
CPE 620	Deep Learning	
CS 560	Big Data Engineering	
CS 569	Cybersecurity and Big Data Analytics	
CS 573	Advanced Data Mining	
CS 623	String Algorithms	
CS 676	Machine Learning	
CS 678	Computer Vision	
EE 513	Stochastic Systems Theory	
EE 565	Advanced Image Processing	
Area of Emphasis or Additional Electives		9
Select one of the following options:		
Area of Emphasis ++		
Departmental and STEM Electives (see table below for courses)		
Complete 1 of the following options:		6-7
Thesis Option - 7 hours		
CS 796	Graduate Seminar (1 hour)	
CS 697	Research (6 hours)	
Final Oral or Written Examination		
Thesis		
Problem Report Option - 6 hours		
Select an additional 3 credit hours of coursework from CPE, CS, EE, CYBE, MATH, PHYS, or STAT courses 400-795, as approved by the AEC		
CS 697	Research (3 hours)	

Final Oral or Written Examination	
Formal written report or professional report/paper	
Coursework Option - 6 hours	
Select an additional 6 credit hours of coursework from CPE, CS, EE, CYBE, MATH, PHYS, or STAT courses 400-795, as approved by the AEC	

Total Hours	31-32
-------------	-------

Code	Title	Hours
------	-------	-------

Additional Electives List

Departmental Electives (3 hours)		
----------------------------------	--	--

Any EE, CPE, CS, or CYBE courses 400-795, as approved by the student's AEC

STEM Electives (6 hours)		
--------------------------	--	--

Any EE, CpE, CS, CYBE, ASTR, BMEG, CE, CHE, CHEM, IENG, MAE, MATH, MINE, PHYS, PNGE, or STAT courses 400-795, as approved by the student's AEC

*

Excluding CS 796 and CS 697/797

**

Students who do not hold a baccalaureate degree in computer science are required to take a set of undergraduate computer science courses above and beyond the minimum coursework requirements.

+

Courses in this block not used to complete the Core Courses requirements can be used as Electives or Additional Departmental Electives

++

Courses completed for the Area of Emphasis cannot fulfill other degree requirements.

Final Examination

All students following the thesis or problem report option are required to pass a final oral or written examination, administered by their AEC, covering the thesis or problem report and/or related course material.

A student who fails the research defense may repeat the defense at most once, at a time determined by the AEC but not necessarily during the same semester.

Areas of Emphasis Offered

- Artificial Intelligence and Computational Data Science (p. 2)
- Cyber-Physical and Complex Systems (p. 2)
- Cybersecurity and Networked Systems (p. 3)

ARTIFICIAL INTELLIGENCE AND COMPUTATIONAL DATA SCIENCE AREA OF EMPHASIS

Code	Title	Hours
Select one of the following:		3
CPE 520	Application of Neural Networks	
CPE 620	Deep Learning	
Select two of the following:		6
CS 573	Advanced Data Mining	
CS 677	Pattern Recognition	
CS 676	Machine Learning	
Total Hours		9

CYBER-PHYSICAL AND COMPLEX SYSTEMS AREA OF EMPHASIS

Code	Title	Hours
Select three of the following:		9
CPE 530	Hardware Security and Trust	
EE 513	Stochastic Systems Theory	

EE 532	Power Distribution Systems	
EE 540	Data Analytics for Secure Cyber-Power Systems	
EE 561	Communication Theory	
Total Hours		9

CYBERSECURITY AND NETWORKED SYSTEMS AREA OF EMPHASIS

Code	Title	Hours
Select three of the following:		9
CPE 530	Hardware Security and Trust	
CPE 538	Intro Computer Security Management	
CPE 553	Advanced Networking Concepts	
CYBE 510	Advanced Cybersecurity Principles	
CYBE 520	Ethics in Cybersecurity	
Total Hours		9

Major Learning Outcomes

COMPUTER SCIENCE

Upon graduation, Computer Science MS students will be able to:

1. Identify, design and implement solutions to real-world challenges using expertise across key areas of computer science
2. Effectively disseminate innovative research and projects through written and oral formats as demonstrated through presentations, papers, and other publications
3. Develop skills in teamwork, life-long learning, and professionalism as related to the field of computer science.