

Transforming Cyber Education thru Open to All Accessible Pathways

Cyber Operations & Resilience (CORe)

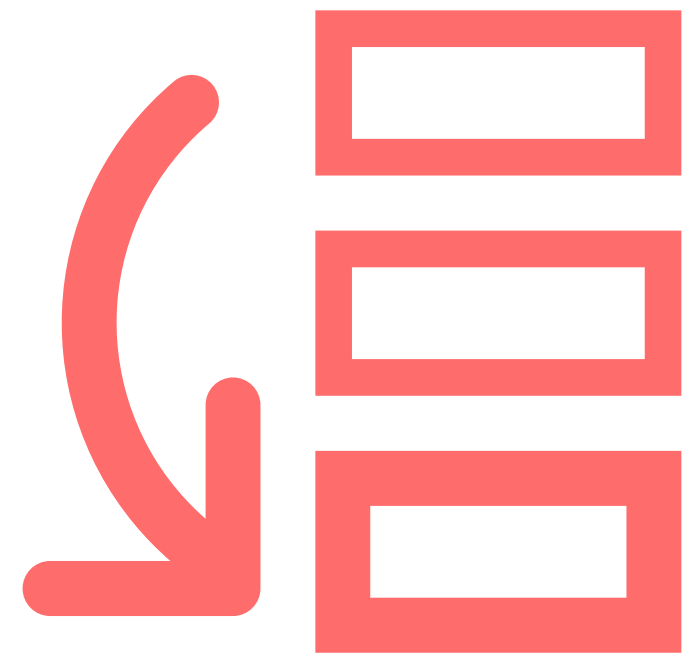
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BOISE STATE UNIVERSITY

Cyber Operations and Resilience (COPRe)

The Boise State University (BSU) Cyber Operations and Resilience (COPRe) program is a comprehensive curriculum spanning multiple standalone and stackable certificates all the way to undergraduate and graduate degrees.



Cyber Operations and Resilience (COPRe)



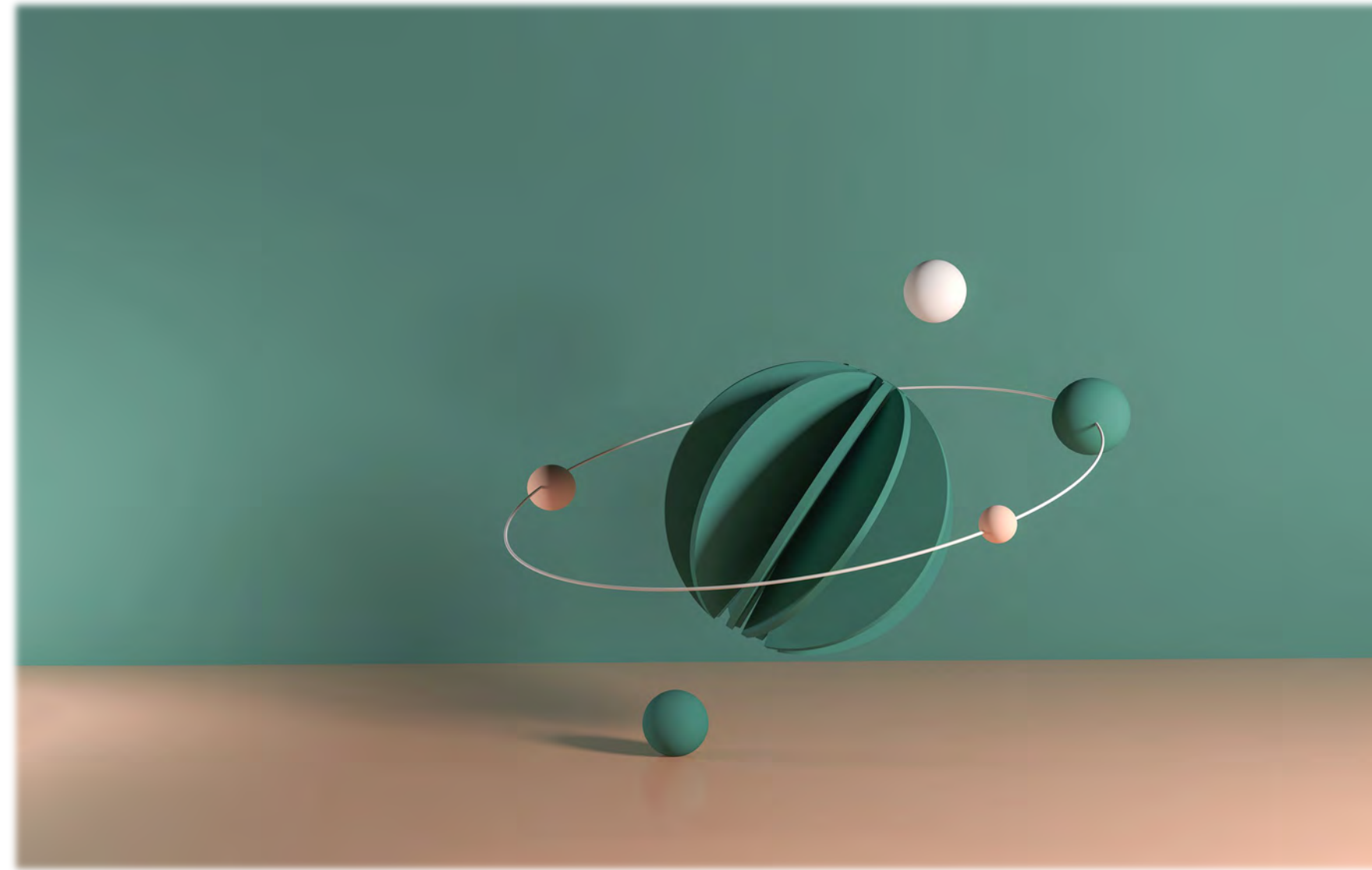
Designed to address the emergent demand for cybersecurity professionals across disciplines, the COPRe program offers flexible online and asynchronous accessible education, empowering students from diverse backgrounds to acquire vital cybersecurity skills.



Workforce Development

- Focused on Cyber Operations & Resilience
- Enables non-traditional, non-technical students to enter the cybersecurity workforce.
- Teaches students to design, apply, and improve the cybersecurity of *people, processes & technology*.
- Fosters *systems thinking* to holistically identify cyber risks and develop resilient systems.

Cyber Operations and Resilience (COPRe)



The core foundational course, Systems Thinking introduces students to resilience as defined by Robustness, Resourcefulness, Rapidity, and Rapidity.

This definition focuses students to think beyond traditional robustness techniques that are part of every cybersecurity curriculum and to include business continuity & recovery techniques.

How the program evolved



Core evolved out of a multi-year journey of discovery and learning from cybersecurity professionals.

Incepted in 2017/2018 with the design of cyber-physical systems security courses for engineering students.

Soon, non-engineering students were enquiring about training options.





Cyber Certificate Foundation

- This growing interest led to the development of a brand-new cyber certificate. A grant was submitted to Idaho Workforce Development Council for a 12-credit certificate.
- The approved funding for this certificate allowed BSU to launch the cyber operations and cyber for all certificates which became the steppingstone to what is now fully fledged BAS/BS & MS degrees.

Degree Program

Boise State BAS/BS CORE Degree Requirements

40
Credits



40
Credits



40
Credits

Elective Credits

- 39-47
- Can be transferred from previous institutions
- Can be lower or upper division credits, industry certification for credit

Upper Division Electives

- 36-43 CORE required credits
- Customize degree plan with minors and certificates

Foundational/ General Electives

- 36-38 General Electives and 2-4 Electives Credits
- Can be completed at a regionally accredited community college

120
Credits

Total to Graduate



Undergraduate Cyber CORE Degree Required Credits

Electives (39 - 47 cr)

Chart your own path (What do you want to be?)

What do you want to learn about: People (e.g. anthropology, psychology, etc.), Process (management, supply chains, etc), or Technology (programming, electrical engineering, etc.)?

Required CORE Courses (21 cr)

Cyber Systems Thinking (3 cr)

Cyber Project Management (3 cr)

Information Assurance (3 cr)

CompTIA Network+ (3 cr)

CompTIA Security+ (3 cr)

Capstone Course (3 cr)

Cyber Risk Management (3 cr) or Cybersecurity Risk Quantification (3)

Depth (13 - 16 cr)

ICS Cyber (3 cr), Incident Response (3 cr) , Applied Cybersecurity Programming (1 cr), AI/ML (1 cr), IoT Architectures (1 cr), SOC (1 cr), Cyber Business and Regulatory (1 cr), Red and Blue Teams (1 cr), Cyber Threat Intelligence (3 cr), Cyber Resilience Design (3 cr), Defensive (3 cr), Offensive (3 cr), Forensics (3 cr)

Applied Learning (2 – 6 cr)

Experiential Learning, Prior Learning, Certification, Internship

General Education (37 - 38 cr)

MS CORe Degree Requirements

2
Credits

+

18
Credits

+

10
Credits

Experiential

- Teach a course
- Obtain a certification
- Complete and present a project

Concentration Certificates

- Pick 2 from 3 certifications
- Governance Policy, Threat Intelligence, Resilience Engineering

Cyber Essentials

- 1 to 3 credit hours courses
- Bridge the gap from non-cyber to cyber OR
- Explore other areas of cyber

30
Credits

Total to MS CORe Degree

M.S. Cyber CORe Degree Required Credits

Experiential (pick two, 2 credit hours)

teach a course, complete and present a project, obtain a certification

Pick Two (total 18 credit hours)

Resilience Engineering Certificate (9 credit hours)

CORE 460/560 Cyber Resilience
Systems Design

CORE 561 Network Design and
Exploitation Techniques

CORE 562 Resilience Coding
and Architecture of Devices

Analyst and Threat Intelligence Certificate (9 credit hours)

CORE 450/550 Cyber Threat
Intelligence

CORE 551 Cyber Warfare and
Conflicts

CORE 552 Cyber Digital and
Signal Intelligence

Governance Policy Administration Certificate (9 credit hours)

CORE 470/570 Cyber Risk
Management

CORE 571 Cyberlaw, Ethics, and
Policy

CORE 572 Cybersecurity
Governance and Compliance

Cyber Essentials (total 10 credit hours)

Cyber Systems Thinking (3 cr), Risk Assessment (1 cr), Artificial Intelligence & Machine Learning (1 cr), Cyber Security Operations Center (1 cr), Cyber-Informed Engineering (1 cr), Introduction to Deep Learning (1 cr), Cyber Red and Blue Teams (1 cr), Cyber Threat Modeling (1 cr), Information Assurance (1 cr), Internet of Things Architecture (1 cr), Applied Cybersecurity Programming (1 cr), Cyber Business and Regulatory Operations (1 cr)



M.S. Cyber CORE Degree Required Credits

Experiential (pick two, 2 credit hours)

teach a course, complete and present a project, obtain a certification

CORE Concentration (total 24 credit hours)

Pick 24 credits from CORE courses, with 6 credit hours of non-CORE courses.

Cyber Essentials (total 4 credit hours)

Cyber Systems Thinking (3 cr), Risk Assessment (1 cr)



Program Success

- The CORE program has created a bridge for non-traditional students to bridge to the workforce.
- The accessible design of the CORE program has transformed cyber education with accessible pathways that foster diversity.
- CORE program has been operating successfully for two years and is entirely self sufficient funded only by student fees.
- Enrollment numbers have tripled exceeding all projections.





SUPPORTIVE

- Industry professionals as instructors.
- Subject Matter Experts to develop courses.
- Career advisors.



STRUGGLES

- Student success
- Adjuncts
- Worries about \$\$\$
- Bureaucracy

Table 3: CORE Program Enrollment Trends

Program	Fall 21	Spring 22	Summer 22	Fall 22	Spring 23	Summer 23	Fall 23
Undergraduate <u>CORE</u> (<u>uCORE</u>)	56	99	95	170	203	174	244
<u>uCORE</u> Graduation	0	0	0	11	11	0	25
Graduate <u>CORE</u> (<u>gCORE</u>)	30	38	40	43	62	59	75
<u>gCORE</u> Graduation	0	0	2	2	6	5	9

Table 4: CORE Race/Ethnicity Breakdown

Race/Ethnicity	<u>uCORE</u> Student	<u>uCORE</u> Percentage	<u>gCORE</u> Student	<u>gCORE</u> Percentage
American Indian/Alaskan Native	2	1.0%	0	0.0%
Asian	4	2.0%	4	6.5%
Black/African American	20	9.9%	5	8.1%
Hispanic/Latino	44	21.7%	6	9.7%
Native Hawaiian/ <u>Other</u> Pacific Islander	1	0.5%	0	0.0%
No Race/Ethnicity Reported	8	3.9%	1	1.6%
Two or More Races	10	4.9%	1	1.6%
White	114	56.2%	45	72.6%
Total	203	100%	62	100%

Table 5: CORE Gender Breakdown

Gender	<u>uCORE</u> Student	<u>uCORE</u> Percentage	<u>gCORE</u> Student	<u>gCORE</u> Percentage
Female	40	19.7%	20	32.3%
Male	163	80.3%	42	67.7%
Total	203	100%	62	100%





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