UTRGV Cyberspace Programs

Last Updated: April 2026

Student Mentoring Plan

- **General advising sessions**
  - One in March for Spring semester
  - One in October for Fall semester
- **One-to-one advising**
  - In-person or through email or Zoom *(mostly initiated by a student and handled by the Undergraduate Program Coordinator)*
  - *Contact email (on website):*
    - *Program Coordinator: liyu.zhang@utrgv.edu (preferred)*
    - *Departmental Email: cyberspace@utrgv.edu*

What is Cybersecurity

Technology, Measure, or Practice that

Protects (Prevents or Mitigates the Impact on)

Systems, networks, programs, devices, data, …

From Cyber (Digital) Attacks (virus, spyware, ransomware, …)

Cybersecurity Jobs – Entry-level

An **information security analyst** helps protect an organization's computer networks and systems in various aspects of day-to-day operations.

An **information security specialist** is the company's point person for security, ensuring that data remains secure against unauthorized access and cyberattacks.

A **digital forensic examiner** retrieves information from computers and other digital devices to discover how an unauthorized person accessed a system or to gather evidence for legal purposes.

Cybersecurity Jobs – Middle Level

A **penetration tester** helps businesses identify their security weaknesses before malicious hackers can do the same.

A **security engineer** designs the systems to keep a company's computers, networks, and data safe from cyberattacks to natural disasters.

Cybersecurity Job Requirements

- Most entry-level cybersecurity jobs offers an average salary of more than 100k (Texas and National, ZipRecruiter).
- These jobs typically require a BS in cybersecurity or a related field and certifications.
- The UTRGV cybersecurity program can help both!

Informatics and Cyber Security

About: Informatics is a study of disciplines such as Cyber Security, Information Technology, Information Sciences, Information Engineering, and related areas.

Degree Programs: BS in Cyber Security and MS in Informatics are offered. A minor in Cyber Security is available for non-majors. Fast-track 4+1 program enabling completion of BS in Cyber Security and MS in Informatics in 5 years is available.

Certificates: Three undergraduate certificates *stackable* toward earning a BS in Cyber Security and two graduate certificates *stackable* toward earning an MS in Informatics are available. Certification courses including advanced electives to *convert* industry certifications to college credit are offered as well.

Focus: Cyber security is a multidisciplinary program integrating technical, legal, business, and policy skills by combining technical Cyber Security courses with courses from Criminal Justice, Business Law, Information Security and Computing.

Delivery Mode: All CYBI classes are delivered via *hybrid* mode (face-to-face and online synchronous) with exams administered on campus.

Job Market Growth and Demand: Cybersecurity area has the fastest job *growth rate of 33%* for 2023-2033 (Bureau of Labor Statistics). As of September 2025, per https://www.cyberseek.org/heatmap.html, there are more than 41*,000 vacancies* in Texas alone.

Areas of Specialization: App & network security, forensics & malware analysis, data & cloud security, system & hardware security, IoT & mobile security, information assurance, intrusion detection, incident response, reverse engineering, and other related areas.

Website: https://www.utrgv.edu/cyberspace

Email: cyberspace@utrgv.edu

Worlds of Cyber Security vs. Computer Science

World of *Cyber Security*

- Study of the *security aspects* of computing in *cyberspace*
- Central to the rapidly expanding *security concerns*
- Traditionally: Securing big firms and businesses
- Now: Securing all *cyber devices*
- Profound impact on *societal confidence*
- Math: Precalculus + Health Statistics
- Focus: Multidisciplinary
  {Cyber Security + Criminal Justice + Business Law + Information Security + Computing}

World of Computer Science

- Study of the *structure* and *function* of computing
- Central to the rapidly expanding use of *computers*
- Traditionally: Computing for Business, engineering and scientific fields
- Now: Most *Human activities*
- Profound impact on the *quality of life & society*
- Math: Calculus I + Calculus II + Matrix Algebra + Statistics
- Focus: Computer Science

Why?

Why cyber security?

- Addresses the critical national shortage of cyber security professionals.
- Graduates are needed in all industries including government, military, corporate, financial, healthcare and medical institutions/organizations.
- Graduates of the degree have solid earning potential.
- Cybersecurity area has the fastest job *growth rate of 33%* for 2020-2030 (Bureau of Labor Statistics). As of 2025, there are more than 500*,000 vacancies* nationwide with Texas leading the nation at more than 40,000 vacancies.

Why our program?

- UTRGV offers Bachelor of Science (as preferred by the industry) rather than a Bachelor of Arts.
- Students can start taking cyber security courses right after Precalculus.
- Available in hybrid mode (HYBRD) to students of campuses other than Brownsville where it is available face-to-face. Exams are administered on the Brownsville campus.
- Aiming for ABET accreditation.
- Immersive, hands-on and project-based learning with certification components.
- Diverse and intellectually challenging community of caring staff, teachers, and scholars.
- Strong research in cyber security with funding from agencies such as NASA, NSF, DoE, and DoD.
- Providing opportunities to involve in undergraduate research.

Cybersecurity Job Prospects

Source: cyberseek.org, 2025

	US	Texas
Supply and Demand Ratio	74%	76%
Job Openings	514, 359	42,599
Employed Workforce	1, 337, 400	112, 279

UTRGV Cybersecurity Curriculum

Introduction:

- CYBI1101 Introduction to Cyberspace and Informatics :
  - An introduction to the breadth of the field of cyber security.
  - Impact of cybersecurity in business, social and economic aspects of daily life.
  - Core security terminology and hands-on labs.

UTRGV Cybersecurity Curriculum

Foundations of secure computer and network systems:

- CYBI2322 Foundations of Systems I (Discrete Math)
- CYBI2324 Foundations of Systems II (Linux systems, intro to networking and databases)
- CYBI2326 Programming of Cyber Systems & Reverse Engineering (advanced programming)

UTRGV Cybersecurity Curriculum

Core Required Courses

- CYBI3101 Certifications (require to obtain industry recognized certifications)
- CYBI3318 Cryptography (prerequisite of CYBI3335)
- CYBI3331 Software Engineering…
- CYBI3335 Data Communications (prerequisite of several other advanced courses)
- CYBI3343 Intrusion Detection
- CYBI3345 Operating Systems and Security
- CYBI3346 Distributed and Cloud Computing Security

UTRGV Cybersecurity Curriculum

Core Required Courses, continued

- CYBI4319 Digital Forensics
- CYBI4347 Mobile and Wireless Security
- CYBI4365 Network Security

UTRGV Cybersecurity Curriculum

Core Required Courses, continued

- CYBI 4340 Capstone Projects
  - Prerequisites: Grade of C of better in CYBI3335, and two additional CYBI33XX courses
  - Needs special approval
  - Requires a team, a project proposal and a faculty advisor to enroll.
  - Brightspace: CYBI Advising → Content → CYBI4340 Capstone Project Information

UTRGV Cybersecurity Curriculum

Advanced Elective Courses

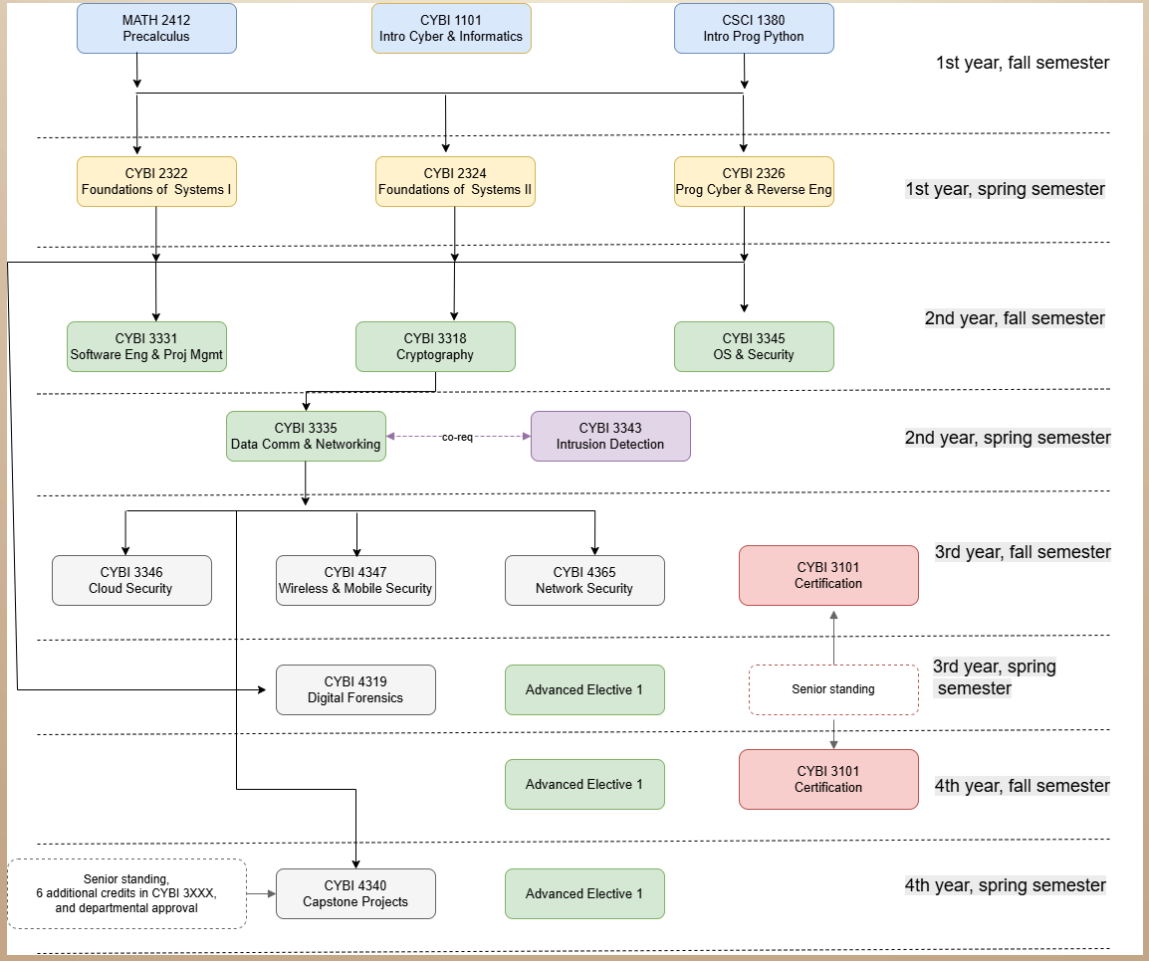
- CYBI 3300 Cybersecurity Internship
  - Must be preapproved by the program coordinator
  - Must involve substantive work that applies knowledge and skills from the BS Cybersecurity curriculum.
  - Internships consisting primarily of routine, clerical, or non-technical tasks will not be approved.
  - Requires a supervisor at the internship site and faculty co-supervisor at UTRGV

UTRGV Cybersecurity Curriculum

Advanced Elective Courses

- CYBI 4300 Topics in Cyberspace and Informatics
  - Typically for new courses before they are officially offered
- CYBI 4301 Independent Certification
  - For advanced certificates

The Degree Flow Chart for CYBI Courses



Advanced Tech Electives for Cyber Security

Technical Electives		
CYBI 3300 Internship	3	☐
CYBI 4320 Heterogenous Data Storage & Retr Sys	3	☐
CYBI 4326 Secure Software Development	3	☐
CYBI 4328 Hardware-Oriented Cyber Security	3	☐
CYBI 4330 Malware Hacking	3	☐
CYBI 4332 Blockchain	3	☐
CYBI 4334 IoT Principles & Hacking	3	☐
CYBI 4336 Cyber Security Engineering w/ AI/ML	3	☐
CYBI 4301 Independent Certification[9]	3	☐
CYBI 4300 Topics in Cyberspace and Informatics[8]	3	☐

Technical Electives (… continued)		
INFS 4312 E-Commerce Design	3	☐
INFS 4330 Business Intelligence	3	☐
INFS 4391 Information Security	3	☐
INFS 4397 Health Computer Information Systems	3	☐
CSCI 3370 Intro to Game Development	3	☐
CSCI 4301 Digital Image Processing	3	☐
CSCI 4303 Computer Vision	3	☐
CSCI 4343 Data Mining	3	☐
CSCI 4344 Bioinformatics	3	☐
CSCI 4352 Machine Learning	3	☐

Technical Electives listed in blue are recommended options. Note that some of the CSCI technical electives require CSCI courses that are not part of the Cyber Security major or core requirement. For example, CSCI 3333 is a prerequisite for some of the electives. And CSCI 3333 has CSCI 3310 as a prerequisite which itself requires MATH 2413 Calculus I (not required by Cyber Security).

[8]Not every CYBI 4300 Topics in Cyberspace and Informatics is eligible as a Technical Elective. Therefore, prior approval must be secured from the IES department before taking CYBI 4300 as a Technical Elective. Some advanced level prescribed electives may require consent of instructor to enroll.

[9]Requires departmental approval for mapping a suite of non-credit certifications to CYBI 4301.

[5] Qualifies for Fast-Track 4+1 Program

Mapping: Industry Certifications Conversion

CYBI Course	Industry Certifications	eLearning Source
CYBI 3101 Certification: Security+	Security+	Top Talent
CYBI 3101 Certification: Network+	Network+	Top Talent
CYBI 3101 Certification: Linux+	Linux+	Top Talent
CYBI 4301 Independent Cert: OsNetSec	Security+, Network+, and Linux+	Top Talent
CYBI 4301 Independent Cert: CybEss	NDE, EHE, and DFE	Blockchain EC-Council
CYBI 4301 Independent Cert: InfoPriv	CIPP, and (CIPT or CIPM)	IAPP
CYBI 4301 Independent Cert: EthHacker	CEH	Blockchain EC-Council
CYBI 4301 Independent Cert: PenTest	CPTE	Top Talent
CYBI 4301 Independent Cert: InfoAuditor	CISA	Top Talent
CYBI 4301 Independent Cert: InfoMngr	CISM	Top Talent
CYBI 4301 Independent Cert: InfoAnalyst	CISSP	Top Talent
CYBI 4301 Independent Cert: CiscoNetAssoc	CCNA	Top Talent
CYBI 4301 Independent Cert: CiscoNetProf	CCNP	Top Talent

- College credit for an industry certification earned previously may not be convertible through CYBI 3101 or CYBI 4301. **Industry certifications must be passed while taking the respective CYBI 3101 and/or CYBI 4301 course.**
- The *department will fund the "first" attempt for certification exam(s)* required for CYBI 3101 and/or CYBI 4301.
- A student taking CYBI 3101 and/or CYBI 4301 must pass the required certification exam(s) in order to pass the course.
- A student will receive a link in an email to the training portal from the respective *eLearning Source* (indicated in the table above) to access online training material. *The course instructor must be contacted if a student does not receive an email with the link to the training material in the beginning of the course*. The training material is accessible for one year from the time of enrollment.
- Regarding CYBI 4301 Independent Certification, a student must request the department to offer the specific course so that it can appear appropriately on the transcript. This must be done before the semester starts.

Minor in Cyber Security

Pre-requisite → ***Co-requisite*** ▪▪▶ *Course requires a grade of **C** or better

[1]*Any approved 3000 or higher technical elective; Pre-reqs vary, but often include CYBI 2322, 2324, 2326, and/or 3335.*

[2] *Since, CYBI 3335 needs to be taken as a prerequisite for most Adv electives, it will be counted as an advanced Cyber Security elective.*

[3] *A minimum of 18 hours of courses not applied towards other degree programs are required for earning a minor in Cyber Security. Additional approved CYBI 3XXX/4XXX courses need to be taken if some of the required courses are overlapping with other degree programs.*

[4] *Course is part of admission requirement.*

Learn more at: utrgv.edu/ies

Minor in Cyber Security Admission Requirements:

1 – The student has completed MATH 2412 and CSCI 1380 (or CSCI 1370/1470) with a grade of C or better.

2 – The student is enrolled in a major other than Cyber Security.

3 – Students must complete an application (available on web or via cyberspace@utrgv.edu) to be accepted into the program.

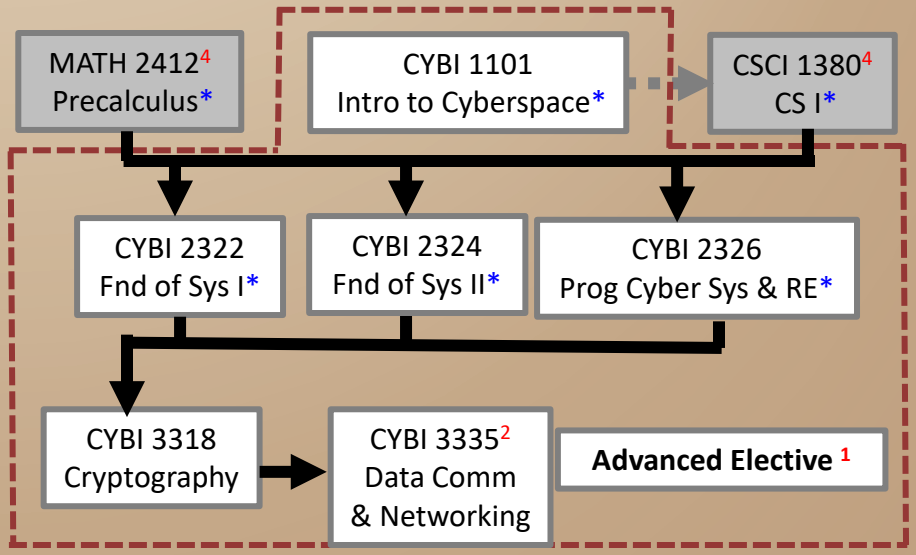
Minor in *Cyber Security* Requirements – 19 hrs[3] (9 advanced[1])

1 – *Cyber Security* Core – 10 hours

- CYBI 1101 Intro to Cyberspace*
- CYBI 2322 Foundations of Systems I*
- CYBI 2324 Foundations of Systems II*
- CYBI 2326 Prog of Cyber Systems & Reverse Engineering *

2 – Advanced *Cyber Security* Electives – 9 hours (9 advanced[1])

Choose 6 hours of advanced *CYBI* courses (*not INFS or CSCI*) in addition to CYBI 3335. *The electives are restricted to CYBI because a student pursuing a minor needs to have as much exposure to cyber security within the limited 19 SCHs of the minor program.*



4+1 Program (BS Cyber Security *plus* MS Informatics)

Basic Idea: Once admitted into the 4+1 program, students can take up to four graduate courses (12 SCHs) from the specified courses to replace the corresponding undergraduate courses while they are pursuing their BS in Cyber Security. After completing their BS in Cyber Security (4 years), they would only need 18 more hours (1 Year) to complete the MS in Informatics.

Admission Requirements for *BS in Cyber Security 4+1* Program:

- Must be working toward BS in Cyber Security
- Must be Gen Ed core complete
- Must have completed 90 hrs toward BS Cyber Security (be classified as a senior), with at least 30 hrs completed at UTRGV.
- Faculty review must determine that candidate is qualified to enter graduate program based on department standards for graduate applicants.
- Must have minimum university GPA of 3.5
- Must have minimum GPA of 3.25 in the five (5) benchmark specified courses (CYBI 3101, 3335, 3343, 3345, and 3346)

Learn more at: utrgv.edu/ies

Secure admission into *BS in Cyber Security 4+1* program

↓

Secure admission into *MS Informatics* program

↓

*While pursuing BS in Cyber Security 4+1 program, take a **maximum of 12 SCHs from the following graduate courses** to be applied to BS in Cyber Security at the same time.*

Graduate Course (MS in Informatics)	Applied to BS in Cyber Security
~~CYBI 6312 - Elective~~	~~CYBI 4316 – Elective~~ (Course deleted)
CYBI 6318 - Elective	CYBI 3318 – Required
CYBI 6364 - Elective	CYBI 4319 – Required
~~CYBI 6378 - Elective~~	~~CYBI 4322 – Elective~~ (Course deleted)
CYBI 6365 - Elective	CYBI 4365 - Required

The University of Texas Rio Grande Valley

Undergraduate Stackable Certificates

Applicants must meet all the requirements for undergraduate admission to UTRGV and, in addition, the requirements listed below:

- Students are expected to have the following background at the undergraduate level to pursue certificates:
  - Precalculus (MATH 2412*)
- Progression Requirements: A student must maintain his/her GPA as required by the undergraduate rules/regulations and must abide by other progression rules & regulations of the undergraduate status such as the maximum allocated time to complete a certificate.

Three Stackable Certificates

Consult course descriptions for details & prerequisites.

Leveling courses, such as MATH 2412, are not counted towards completion of an undergraduate certificate.

*Course requires a grade of **C** or better

[1]*3000-level or higher course*

Learn more at: utrgv.edu/ies

1. Undergraduate Certificate: *Cyber Security Basics* (13 Hrs)

Overview: The *Cyber Security Basics Certificate* introduces a student to the foundational content necessary for understanding cyber security concepts. All the courses from this undergraduate certificate program are fully transferable into the *Bachelor of Science in Cyber Security*. The three certificates may not share hours.

CSCI 1380 Computer Science I - Python*
CYBI 1101 Intro to Cyberspace & Informatics*
CYBI 2322 Foundations of Systems I*
CYBI 2324 Foundations of Systems II*
CYBI 2326 Prog of Cyber Systems & Reverse Engg*

2. Undergraduate Certificate: *Cyber Security Systems* (16 Hrs)

Overview: The *Cyber Security Systems Certificate* makes a student familiar with the systems at the core of most of the cyber security operations. All the courses from this undergraduate certificate program are fully transferable into the *Bachelor of Science in Cyber Security*. The three certificates may not share hours.

CYBI 3318 Cryptography
CYBI 3331 Software Eng & Project Management
CYBI 3335 Data Communications & Networking
CYBI 3343 Intrusion Detection, IR & IA
CYBI 3346 Distributed & Cloud Computing Security
CYBI 3101 Certification

3. Undergraduate Certificate: *Cyber Security Advanced* (16 Hrs)

Overview: The *Cyber Security Advanced Certificate* makes a student well-versed in advanced concepts in cyber security relevant to real-world systems. All the courses from this undergraduate certificate program are fully transferable into the *Bachelor of Science in Cyber Security*. The three certificates may not share hours.

CYBI 3318 Cryptography
CYBI 3345 Operating Systems & Security
CYBI 4319 Digital Forensics
CYBI 4347 Wireless & Mobile Security
CYBI 4365 Computer & Network Security
CYBI 3101 Certification

Note #1: After completing the three undergraduate certificates, one only has a semester worth of remaining hours in the core of the Bachelor of Science in Cyber Security degree: *CYBI 4340 Capstone Project*, *Adv Technical Elective II*, and *Adv Technical Elective III*.

Note #2: Certificates may be pursued independent of each other. However, courses listed in the *Basic* certificate are prerequisites to most of the courses in the other two certificates. The *Advanced* certificate has CYBI 3335 as a prerequisite for some of its courses besides the courses listed in the *Basic* certificate.

MS in Informatics

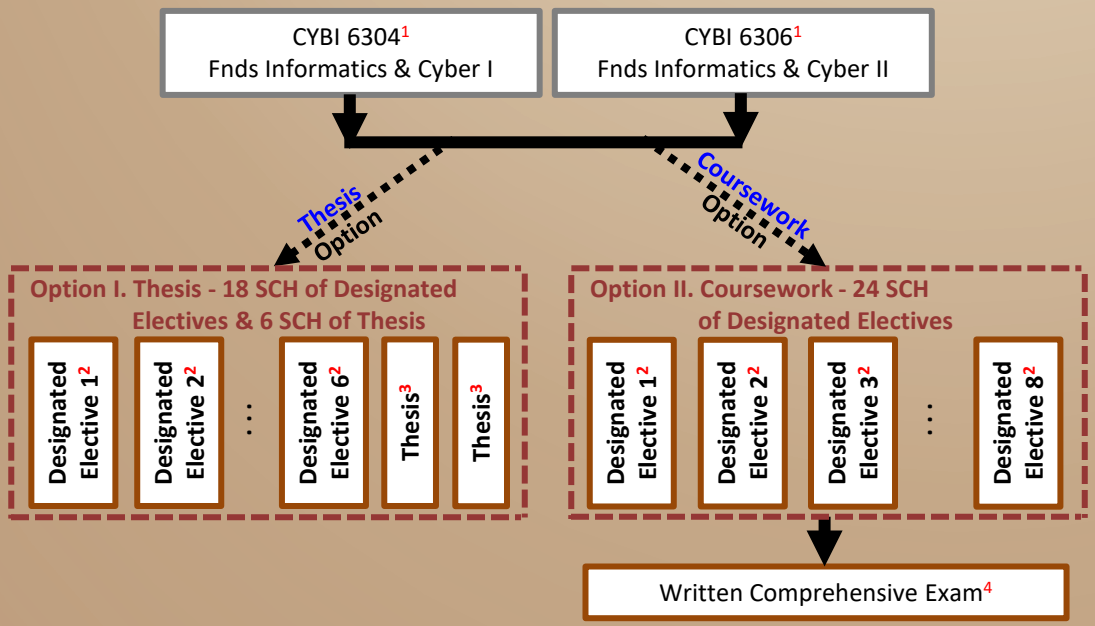
Learn more at: utrgv.edu/ies

To be admitted to the graduate program in informatics, prospective candidates must first meet all the requirements for graduate admission to UT Rio Grande Valley, as well as the other requirements listed below:

1. Bachelor's degree in Cyber Security or a bachelor's degree in another field. Students admitted with a non-cyber security degree may be required to complete leveling coursework.
2. Undergraduate GPA of at least 3.0 in the last 60 semester credit hours (waived for applicants having a graduate degree in a related area)
3. Letter of intent detailing professional goals & reasons for pursuing the graduate degree
4. Resume

- Students are expected to have the following background at the undergraduate level to pursue the graduate degree:
  - Precalculus,
  - Programming using arrays, structures, linked lists, files, and object-oriented programming, and
  - Linux OS, scripts, automating tasks, architecture, security infrastructure, networking, scheduling, resource allocation, and signals & systems.

  Students with insufficient background, may be assessed to complete one or more courses at the undergraduate level before securing unconditional admission.
- Students with less than 3.0 GPA in the last 60 SCH of undergraduate degree, may be conditionally admitted by requiring them to complete 9 SCH of specified graduate courses with at least a grade of B in each one.



MS in *Informatics* (30 Hrs)

Prerequisite → ***Varying Prerequisites*** ⋯▶

Consult course descriptions for details and prerequisites

Leveling courses are not counted towards completion of the degree.

[1]*Required course*

[2]*Designated Elective - check course descriptions for prerequisites*

[3]*Thesis over two semesters culminating in thesis submission/defense*

[4]*Written comp exam in the graduating Fall/Spring semester over the required courses (must be passed) & two non-6381 electives (at least one pass & one marginal-pass); make-up usually in the next Fall/Spring semester in the failed courses;*

[5]*Qualifies for Fast-Track 4+1 Program*

Required:

CYBI 6304 Foundations of Informatics & Cyberspace I (Fall)
CYBI 6306 Foundations of Informatics & Cyberspace II (Spring)

Designated Electives: Normally offered in Fall

CYBI 6312 Advanced Internet App Prog[5]
CYBI 6314 E-Commerce Systems & Implementation
CYBI 6375 Data Science for Business Intelligence
CYBI 6378 Statistics & Data Analysis - Python[5]

Designated Electives: Normally offered in Spring

CYBI 6315 Applied Database Systems
CYBI 6318 Security & Forensics[5]
CYBI 6364 Advanced Digital Forensics[5]
CYBI 6365 Network Management & Security[5]

Designated Electives: Offered per instructor's availability

CYBI 6300 Special Topics
CYBI 6381 Independent Research

Thesis: Offered in Fall and Spring:

CYBI 7301 Research and Thesis I
CYBI 7302 Research and Thesis II

The University of Texas Rio Grande Valley

Graduate Stackable Certificates

Learn more at: utrgv.edu/ies

Applicants must meet all the requirements for graduate admission to UTRGV and, in addition, the requirements listed below:

1. Bachelor's degree in Cyber Security or a bachelor's degree in another field. Students admitted with a non-cyber security degree may be required to complete leveling coursework.
2. Undergraduate GPA of at least 3.0 in the last 60 semester credit hours (waived for applicants having a graduate degree in a related area)
3. A letter of intent detailing professional goals & reasons for pursuing a graduate certificate
4. Resume

- Students are expected to have the following background at the undergraduate level to pursue a graduate certificate:
  - Precalculus,
  - Programming using arrays, structures, linked lists, files, and object-oriented programming, and
  - Linux OS, scripts, automating tasks, architecture, security infrastructure, networking, scheduling, resource allocation, and signals & systems.

  Students with insufficient background, may be assessed to complete one or more courses at the undergraduate level before securing unconditional admission.
- Progression Requirements: A student must maintain his/her GPA as required by the graduate college and must abide by other progression rules & regulations of the graduate school such as the maximum allocated time to complete a graduate certificate.

Two Graduate Certificates (12 Hrs each)

Consult course descriptions for details and prerequisites.

Leveling courses are not counted towards a certificate.

Designated Electives: Normally offered in

Fall: CYBI 6312 Advanced Internet App Prog
CYBI 6314 E-Commerce Systems & Implementation
CYBI 6375 Data Science for Business Intelligence
CYBI 6378 Statistics & Data Analysis - Python

Spring: CYBI 6315 Applied Database Systems
CYBI 6318 Security & Forensics
CYBI 6364 Advanced Digital Forensics
CYBI 6365 Network Management & Security

1. Graduate Certificate in *Informatics* (12 Hrs)

Overview: The Graduate Certificate in Informatics is a graduate level non-degree program for accelerating credentials of post-baccalaureate professionals in the area of informatics. The students will become proficient in programming for interfacing real-world systems involving networking, databases, and cloud platforms. All the courses from this graduate certificate program are fully transferable into the *Master of Science in Informatics*. The two certificates may not share hours.

3 hrs from: CYBI 6304 Foundations of Informatics and Cyberspace I
CYBI 6306 Foundations of Informatics and Cyberspace II

6 to 9 hrs from: CYBI 6314 E-Commerce Systems & Implementation
CYBI 6375 Data Science for Business Intelligence
CYBI 6378 Statistics & Data Analysis - Python

0 to 3 hrs from: Any CYBI designated elective other than CYBI 6381

2. Graduate Certificate in *Cyber Security* (12 Hrs)

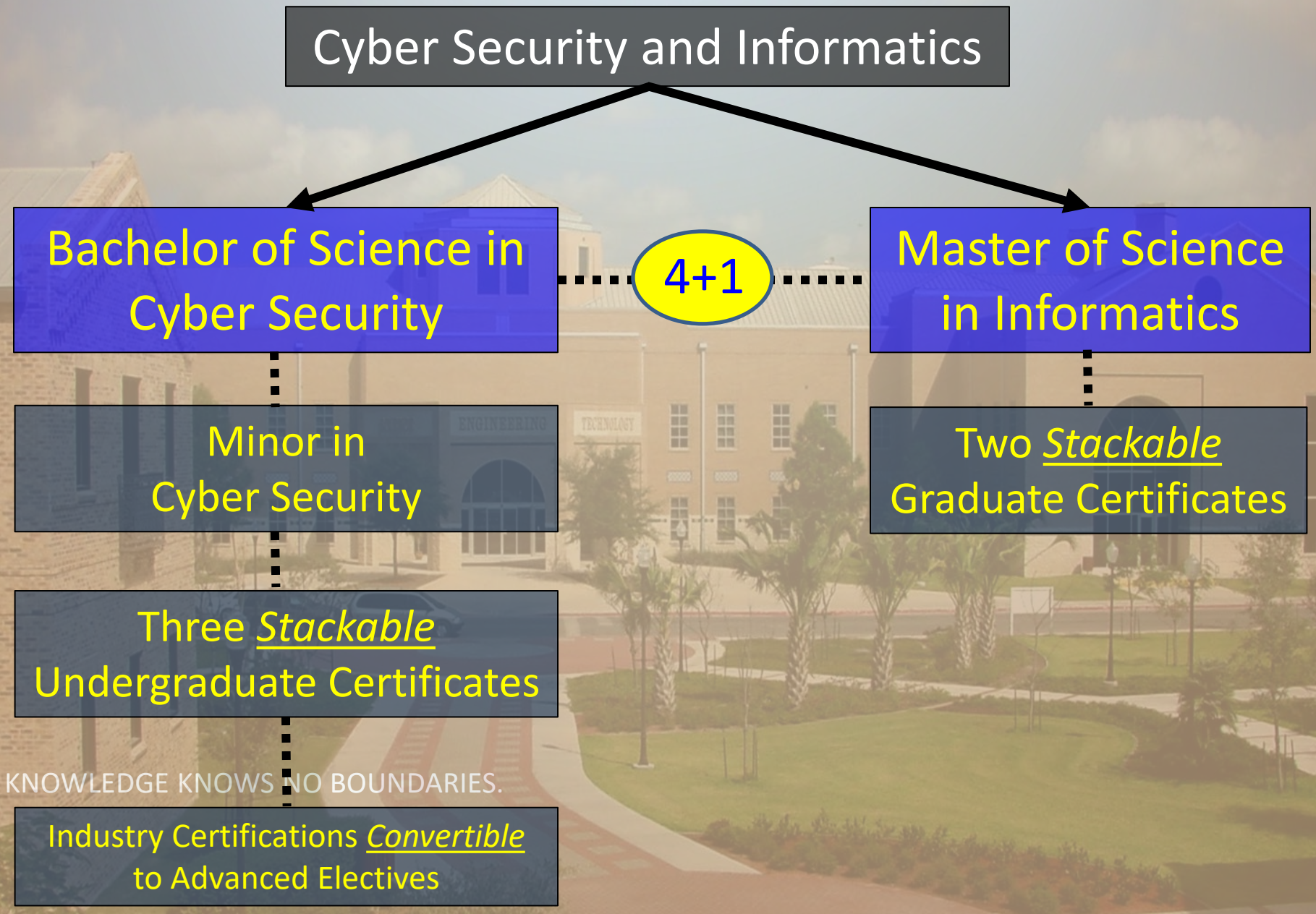
Overview: The Graduate Certificate in Cyber Security is a graduate level non-degree program for accelerating credentials of post-baccalaureate professionals in the area of cyber security. The students will become proficient in the underlying security platforms and secure programming for interfacing real-world systems involving networking, databases, and cloud platforms. All the courses from this graduate certificate program are fully transferable into the *Master of Science in Informatics*. The two certificates may not share hours.

3 hrs from: CYBI 6304 Foundations of Informatics and Cyberspace I
CYBI 6306 Foundations of Informatics and Cyberspace II

6 to 9 hrs from: CYBI 6318 Security & Forensics
CYBI 6364 Advanced Digital Forensics
CYBI 6365 Network Management & Security

0 to 3 hrs from: Any CYBI designated elective other than CYBI 6381

Note: After completing the two graduate certificates, one only has 6 hours remaining to complete the Master of Science in Informatics degree: Either 6 hours of Thesis (for thesis option) or 6 hours of Designated Electives (coursework option).


Cyber Security and Informatics
Bachelor of Science in Cyber Security
4+1
Master of Science in Informatics
Minor in Cyber Security
Two Stackable Graduate Certificates
Three Stackable Undergraduate Certificates
KNOWLEDGE KNOWS NO BOUNDARIES.
Industry Certifications Convertible to Advanced Electives