VICEROY DECREE VI: Program Overview

DoD Electromagnetic and Cyber Research and Experiential Education

May 25th 2022
Informational Session

VICEROY DECREE VI: Our Consortium

Northeastern University –

- CAE-CD , CAE-CO, CAE-R
- Army and Navi ROTC
- BS, Minor, MS and Ph.D

Northern Arizona University

- Hispanic Serving Institution (HSI)
- Army and Air Force ROTC
- BS, Minor, MS and Graduate Certificate in Cyber

University of Houston

- Hispanic Serving Institution (HSI)
- Asian American Native American Pacific Islander – Serving Institute (AANAPISI)
- Army and Air Force ROTC
- Certificate and MS in Cyber

University of South Carolina

- Army, Navy, and Air Force ROTC
- BS in Cyber Intelligence, Concentration and Graduate Certificate in Cyber Operations

VICEROY DECREE VI: Existing Collaborators

DOD Agencies:

Air Force, AFRL, Army Futures Command, and ONR.

DIB sector:

Lockheed Martin, SSCI, AMT, Elemental Coatings, Splunk, Telos, and Raytheon

VICEROY DECREE VI: Program Overview

Goal: Provide robust experiential research and education opportunities to build knowledge, skills, and abilities in DoD-relevant cybersecurity, EMS, data science, cryptography, and strategic foreign languages

Scholarship Program and Curricula

Scholarship Program and Curricula

- Each partner university selects 12 scholars (2yr): 60 Scholars
- Based on major fields of study
  - Curricular achievements
  - ROTC achievements
  - Marginalized, and/or historically underrepresented students
- Up to $10,000 scholarships
- Each scholar is required to complete 8-10 credits
  - One course taken at different institution
- Coursework must be completed by Spring 2024

Scholarship Program and Curricula

- **Application process**
  - based on VI common criteria & complemented by other criteria at home institution
- **Transcript recognition**
  - Institutional recognition after completing VI credits
- **Graduate student mentors**
  - Support on VI curriculum courses
  - Career mentorship

Scholarship Program and Curricula

- Multi-institution curriculum for all VI students
- Students earn course credits toward their “home degree”
- Courses will follow a virtual instructional method for *Visiting VI students*
- Course curriculum offer will be based on breadth and depth:

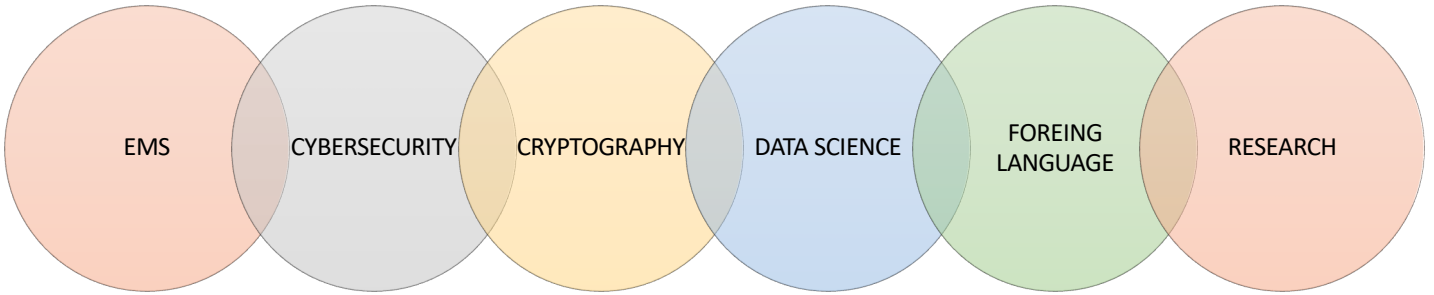
Breadth

- Courses complement student’s background or skills

Depth

- Courses amplifying and extending existing student’s focus/background

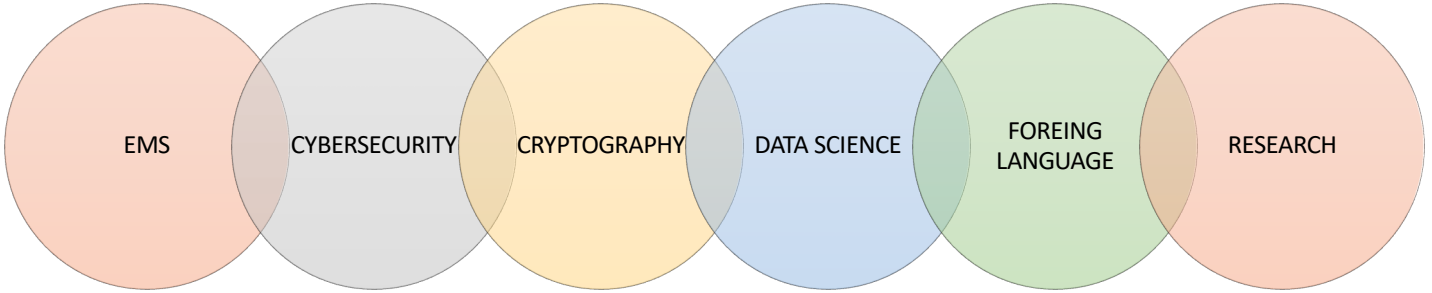
Scholarship Program and Curricula



Junior in Electrical Engineering Program

Introduction to Cybersecurity → Advanced Networking → Beginning Arabic →

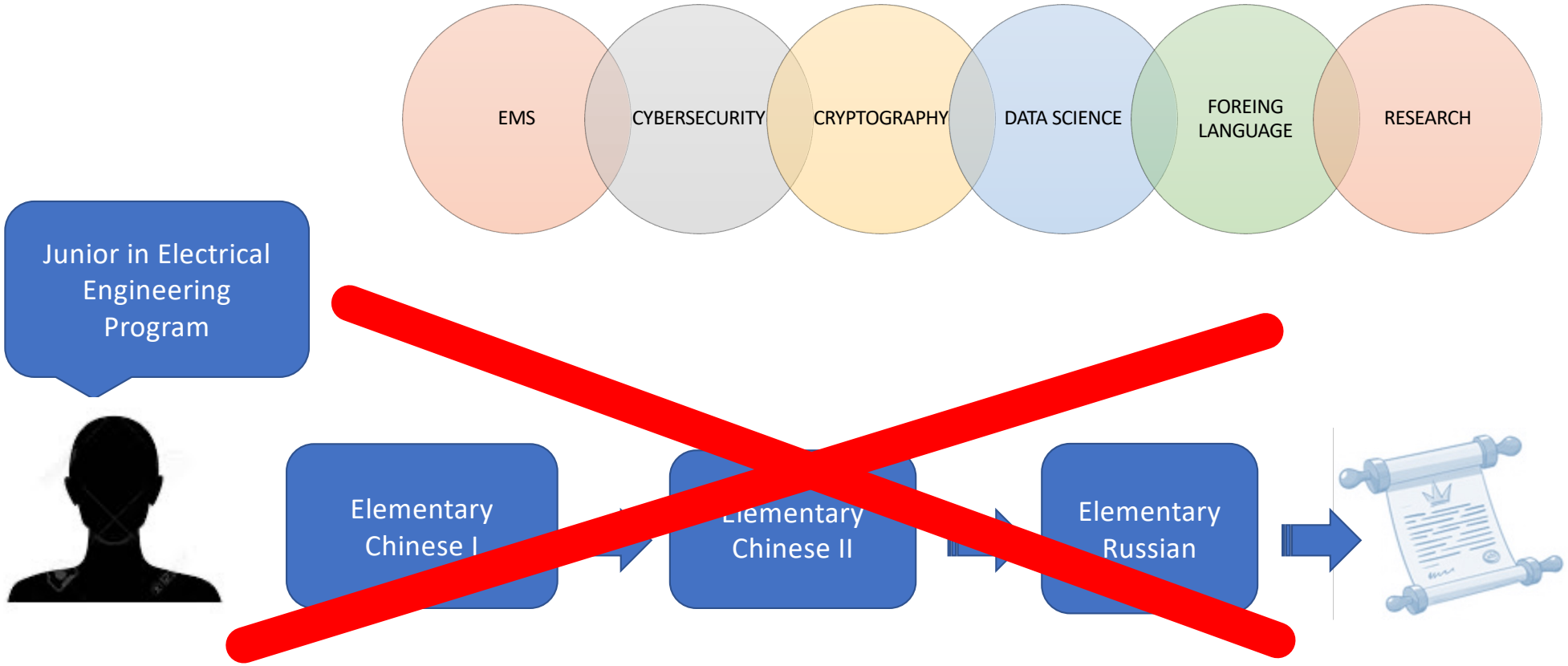
Scholarship Program and Curricula



Sophomore in Computer Science Program

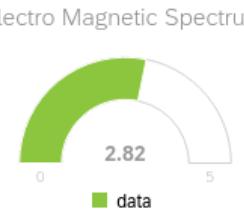
Security of Wireless and Mobile Systems → Independent research studies → Elementary Russian →

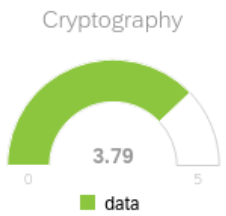
Objective #1: Scholarship Program and Curricula

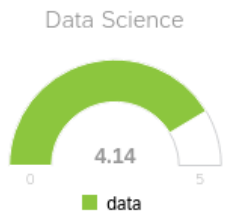


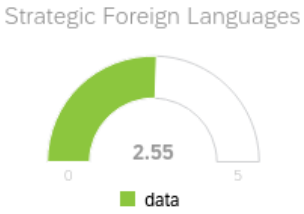
Scholarship Program and Curricula

Candidates' interest in DECREE Topics









Scholarship Program and Curricula

- VI curricula (Offer may vary over semesters)

	NAU	NU	UofSC	University Houston
EMS	PHY 331 Electricity and Magnetism PHY 332 Electricity and Magnetism II		ITEC 445 – Advanced Networking	ECE 3317 Applied Electromagnetic Waves ECE 3318 Applied Electricity and Magnetism
Cyber	CYB 310 Malware Analysis CYB 410 Secure Software	CY 4930: Cybersecurity Capstone CY 3740/CY 5130: Systems Security	ITEC 564 Capstone Information Technology	ECE 5357 Introduction to Cybersecurity
Crypto	INF 638 Cryptography and PKI CYB 402 Applied Cryptography			
Science		DS 3000 Found. Of Data Science DS3500 Advanced Programming with Data		
Strategic Language		CHNS 1101/1102 Elementary Chinese 1&2	RUSS 121/122 Elementary/Basic Prof. Russian	
Research	CYB 499: Contemporary Developments	CY 2991. Research in Cybersecurity		

Scholarship Program and Curricula

- Courses included in the VI curricula provide
  - Syllabus
  - Content
  - Required background
  - Academic prerequisites
  - Intended skills

Scholarship Program and Curricula

Northeastern University

Detailed Course Information

Select the desired Level or Schedule Type

CY 3740 - Systems Security

Introduces the fundamental principles o
programs and systems. Presents and ar
systems. Discusses techniques for ident
system design and implementation, pre
completion of attacks, limiting the dam
recovering from system compromises. (
real-world attack and defense in severa
the Web, and mobile devices. Presents
research and practice.
4.000 Credit hours
4.000 Lecture hours

Levels: Undergraduate
Schedule Types: Lecture

Cybersecurity Department

CS 3650 - Computer Systems

Introduces the basic design of computing systems, computer operating systems, and assembly language using a RISC architecture. Describes caches and virtual memory. Covers the interface between assembly language and high-level languages, including call frames and pointers. Covers the use systems programming to show the interaction with the operat basic structures of an operating system, including application threads, synchronization, interprocess communication, deadlo

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MENU

Workforce Development » Workforce Framework for Cybersecurity (NICE Framework) »
NICE Cybersecurity Framework Workforce Knowledge

Knowledge ID: K0290

Knowledge Description: Knowledge of systems security testing and evaluation methods.

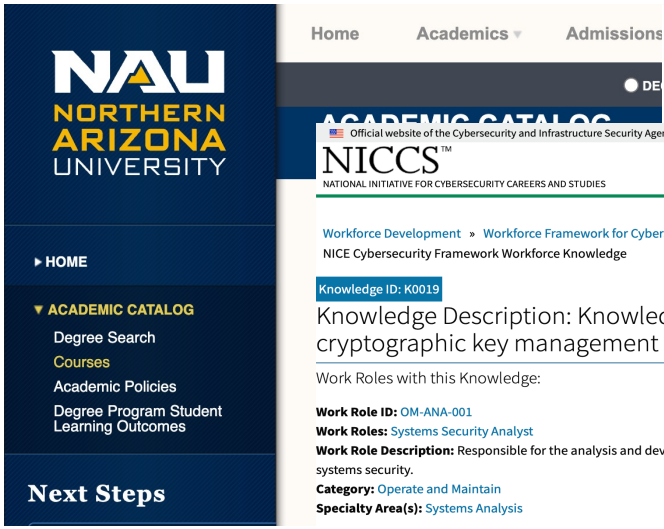
Work Roles with this Knowledge:

Work Role ID: OM-ANA-001
Work Roles: Systems Security Analyst
Work Role Description: Responsible for the analysis and development of the integration, testing, operations, and maintenance of systems security.
Category: Operate and Maintain
Specialty Area(s): Systems Analysis

Work Role ID: PR-CDA-001
Work Roles: Cyber Defense Analyst
Work Role Description: Uses data collected from a variety of cyber defense tools (e.g., IDS alerts, firewalls, network traffic logs) to analyze events that occur within their environments for the purposes of mitigating threats.
Category: Protect and Defend
Specialty Area(s): Cyber Defense Analysis

Slides	Projects
Welcome and Introduction	
Threat Modeling	
Buffer Overflow	Proj1. Buffer Overflow
Enterprise Authentication	Proj2. Enterprise Auth
Access Control Models	
SELinux and Root-kits	Proj3. Access Control
Audit and Logging	
Midterm	Proj4. Audit & Logging
Secure Coding	
Compliance and Automation	Proj5. Secure Coding
Security Assessment	

Scholarship Program and Curricula



If prerequisites, list each pre-requisite and provide a clear description of how each pre-requisite supports the learning in the course.

CYB 136: Course assume programming experience at least at the 136 level.

perience with computing tools covered in 205.

vanced content that assumes discrete mathematics experience, which

Course Student Learning Outcomes

Upon successful completion of this course, students will be able to demonstrate the following competencies:

- **LO1.** Describe and explain foundational concepts in cryptography (**evaluation**);
- **LO2.** Compare and contrast different cryptographic algorithms and their contexts (**analysis**);
- **LO3.** Appropriately use cryptographic algorithms in a veriaty of contexts (**application**); and
- **LO4.** Discuss the implications of quantum computing in the context of complexity classes and cryptography (**comprehension**).

Program Student Outcomes supported by this class

This course directly supports the following program student outcomes in the CYB program assessment and improvement plan:

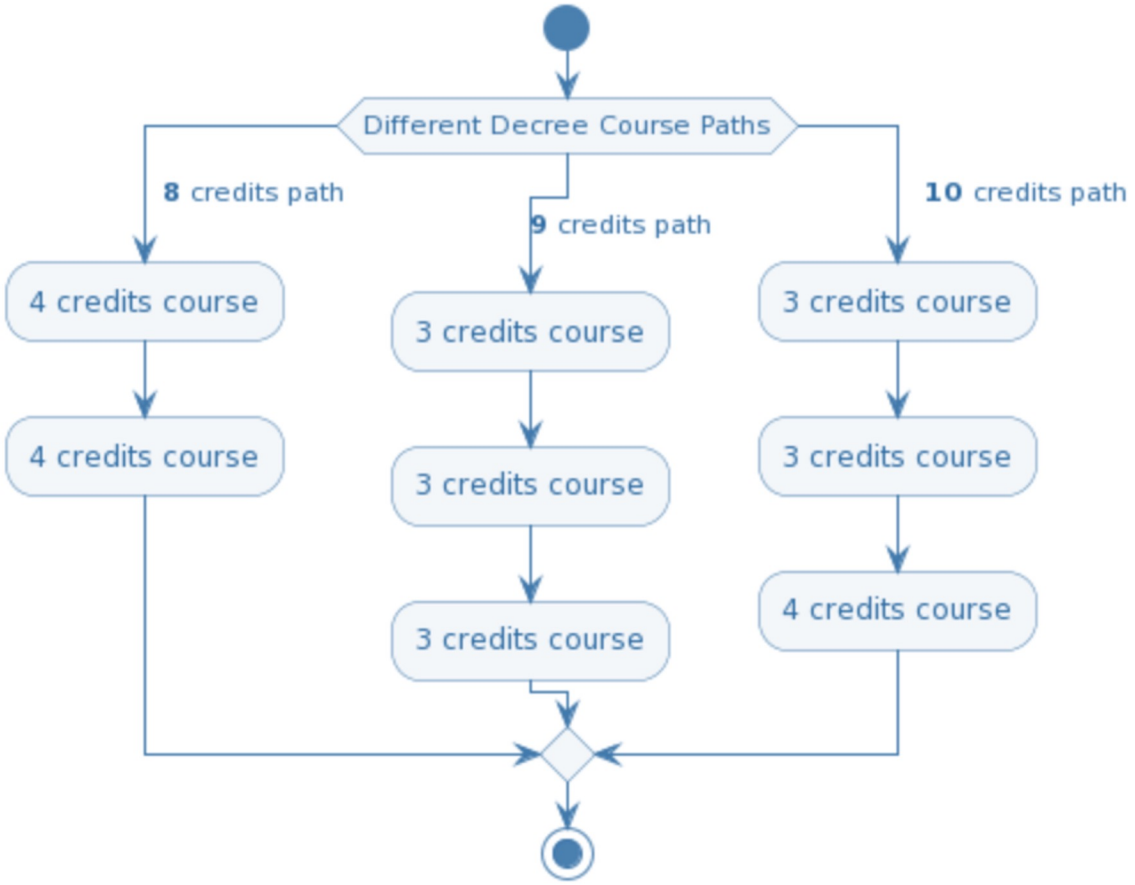
- **SO1.** Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- **SO2.** Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- **SO6.** Apply security principles and practices to maintain operations in the presence of risks and threats.

Assignments / Assessments of Course Student Learning Outcomes

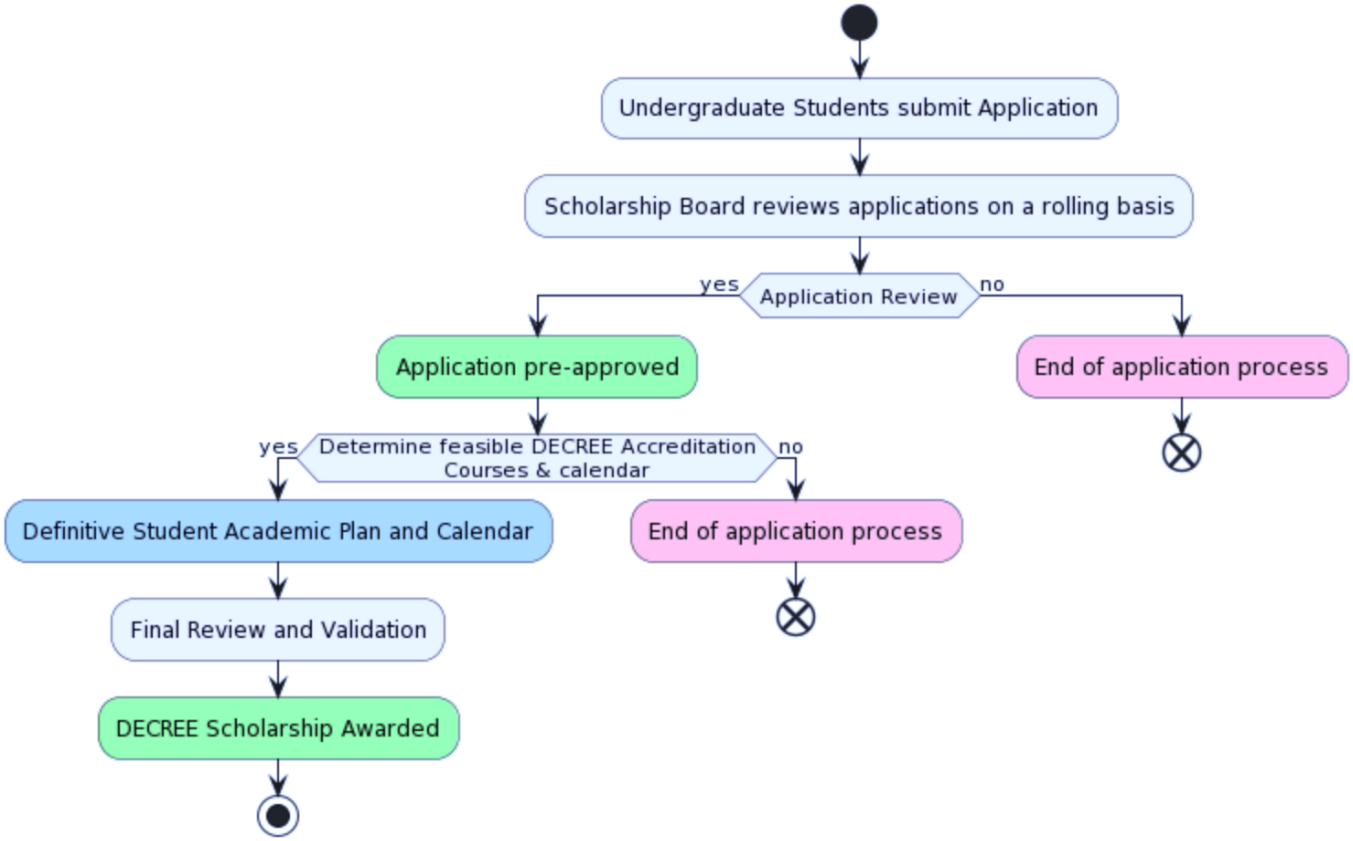
Learning outcomes are assessed through a variety of means:

- Quizzes and exams will assess student ability to describe and explain foundational concepts in cryptography (LO1).
- Homework will be used to assess student ability to compare, contrast, and analyze cryptographic algorithms (LO2 & LO3). Labs will require students to engage with networking tools and utilities used by software engineers, network scientists, and cybersecurity experts throughout industry. Some labs will also require students to implement basic secure network applications using network protocols and security mechanisms covered in this course.
- Discussions on Piazza will be used to assess student understanding of the implications of quantum computing in the context of complexity classes and cryptography (LO4).
- Exams are used to assess student attainment of LO1-LO4.

VI courses paths



Application Process



Decree Scholars Responsibilities

Scholars' responsibilities

- Complete VI courses
- Meet regularly with their DECREE VI mentors (bi-weekly)
- Participate in DECREE Seminars and Events (monthly)
- Participate in program evaluation activities (quarterly)
- Participate in the annual VI engagement symposia (annually)
- AND stay connected

Stay connected

- ✓ https://nu-decree.github.io
- ✓ https://nu-decree.github.io/#calendar-
- ✓ https://nu-decree.github.io/list.html

✉ viceroydecree@khoury.northeastern.edu

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