



**Calhoun: The NPS Institutional Archive**  
**DSpace Repository**

---

Department of Applied Mathematics

Applied Mathematics Department Publications

---

2013

## Secure Communications

Monterey, California, Naval Postgraduate School

---

<https://hdl.handle.net/10945/39146>

---

This publication is a work of the U.S. Government as defined in Title 17, United States Code, Section 101. Copyright protection is not available for this work in the United States.

*Downloaded from NPS Archive: Calhoun*



Calhoun is the Naval Postgraduate School's public access digital repository for research materials and institutional publications created by the NPS community. Calhoun is named for Professor of Mathematics Guy K. Calhoun, NPS's first appointed -- and published -- scholarly author.

**Dudley Knox Library / Naval Postgraduate School**  
**411 Dyer Road / 1 University Circle**  
**Monterey, California USA 93943**

<http://www.nps.edu/library>

## ABOUT THIS PROGRAM

### WHAT ARE THE PREREQUISITES?

- A Bachelor's Degree
- Completion of Discrete Mathematics – MA 1025 or MA 2025
- GPA of 3.0 or higher

### WHO IS ELIGIBLE TO PARTICIPATE?

- All NPS students

### ARE COURSES TAUGHT ONLINE?

- No. All courses for this program are resident.

### HOW LONG DOES IT TAKE TO COMPLETE?

- Usually 4 quarters (1 course/qrt)

### WHEN DOES THE PROGRAM START?

- Annually in the fall quarter

## CONTACT INFORMATION

Secure Communications Certificate Program  
Naval Postgraduate School  
Department of Applied Mathematics  
Spanagel Hall, Room 250  
833 Dyer Road  
Monterey, CA 93943-5216

Web Address: <http://eddy.nps.edu/sc>  
(831) 656-2695 | DSN: 756-2695 | Fax: (831) 656-2355



In the intelligence community, nearly everything is encrypted ... defending vital information from those who should not have access.

PRODUCED BY



Naval Postgraduate School  
Center of Educational Design, Development, and Distribution (CED3)  
411 Dyer Road, Knox 154  
Monterey, CA 93943



NAVAL POSTGRADUATE SCHOOL

A program focused on fundamentals of cryptography  
and other aspects of cyber-security

**SECURE COMMUNICATIONS**  
MATHEMATICS OF SECURE COMMUNICATIONS CERTIFICATE PROGRAM



**IMPROVE YOUR UNDERSTANDING!**

*"The Certificate Program gave me a great foundational understanding of why we need cryptography and how it actually works." - NPS Student*

Cryptology has evolved from a means to protect military communications to helping secure systems for everyone across the globe. The Mathematics of Secure Communications Certificate Program offered at NPS will cover topics such as Cryptography, Cryptanalysis, and Coding Theory.



**ADVANCE YOUR SKILLS**

- Gain cryptologic skills to protect military and civilian communications
- Improve technical expertise for policy and decision makers in cyber-security and secure communications
- Learn about historical cryptosystems and codes
- Understand modern cryptosystems and codes and their computational challenges

**CERTIFICATE COURSES**

Upon successful completion of the coursework, students will be awarded a certificate of accomplishment.

**MA3025 - LOGIC & DISCRETE MATHEMATICS**

Provides a rigorous foundation in logic and elementary discrete mathematics to students of mathematics and computer science.

**MA3560 - APPLIED MODERN ALGEBRA & NUMBER THEORY**

This course is devoted to aspects of modern algebra and number theory that directly support applications, principally in communication.

**MA4560 - CODING & INFORMATION THEORY**

Mathematical analysis of codes used over communication channels is made. Techniques developed for efficient, reliable, and secure communication are stressed.

**MA4570 - CRYPTOGRAPHY**

The methods of secret communication are examined, including both classical cryptographic techniques, e.g. substitution and transposition, and also current methods, e.g. public-key cryptosystems, RSA, Discrete Logarithm and other schemes.

**MA4550 – Optional – COMBINATORIAL & CRYPTOGRAPHIC PROPERTIES OF BOOLEAN FUNCTIONS**

Boolean functions as primitives in cryptosystems and their combinatorial properties to counter attacks are discussed.

**THE MISSION**

The Secure Communications Certificate Program at NPS provides graduate level mathematics education to military and DoD civilian personnel. This program satisfies the Knowledge, Skills, and Abilities (KSA) requirement in the Applied Technology field of Fundamentals of Cryptography, Cryptanalysis and Coding Theory for Professional Military Education.



**RELEVANCE TO YOUR JOB!**

*"In the Department of Defense, cryptography plays a huge role because our communications have to be secure. The Certificate Program lays that foundation and explains it in a way relevant to all DoD fields which makes it very powerful." - NPS Student*

