


# Air Force Institute of Technology

# Center for Cyberspace Research

# AF Cyberspace Technical Center of Excellence

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U.S. AIR FORCE
CAREERS
ENLISTED
CYBER SYSTEMS OPERATIONS

NATIONAL INITIATIVE FOR CYBERSECURITY EDUCATION (NICE)

## THE NATIONAL CYBERSECURITY WORKFORCE FRAMEWORK






## U.S. AIR FORCE CYBERSECURITY WORKFORCE

| Officer | Enlisted | Civilian |
|---|---|---|

- Knowledge Management
- Cyber Systems Operations
- Cyber Surety
- Client Systems
- Cyber Transport Systems
- Intelligence Analyst
- Cyberspace Operations Officer
- Intelligence Officer

# USAF Cyber Force Development

*The AFIT of Today is the Air Force of Tomorrow.*



**Enlisted**

Retrain-in → Cyber Def Ops → INWT → Cyber 200 → Cyber 300 → Cyber Def Ops Superintendent → Chief Enlisted Mgr

Level 1 | Level 2 | Level 3



**Officer/Civ**

ROTC
ACE

Initial Skills Training

Initial Qualification Training (IQT)

Cyber 200

Unit-level Cyberspace Operations
Tactical to Operational
Planning & Integration

Cyber 300

Professional Continuing Education

Leadership & Staff
Operational to Strategic
Strategic Planning
Resources & Policy

Cyber 400

Senior Leadership

Mission Qualification Training (MQT)

Joint Duty Courses (Strategy & Planning)

Re-qualification Training

Advanced Academic Degree (MS/PhD)

# Training and Education Timeline

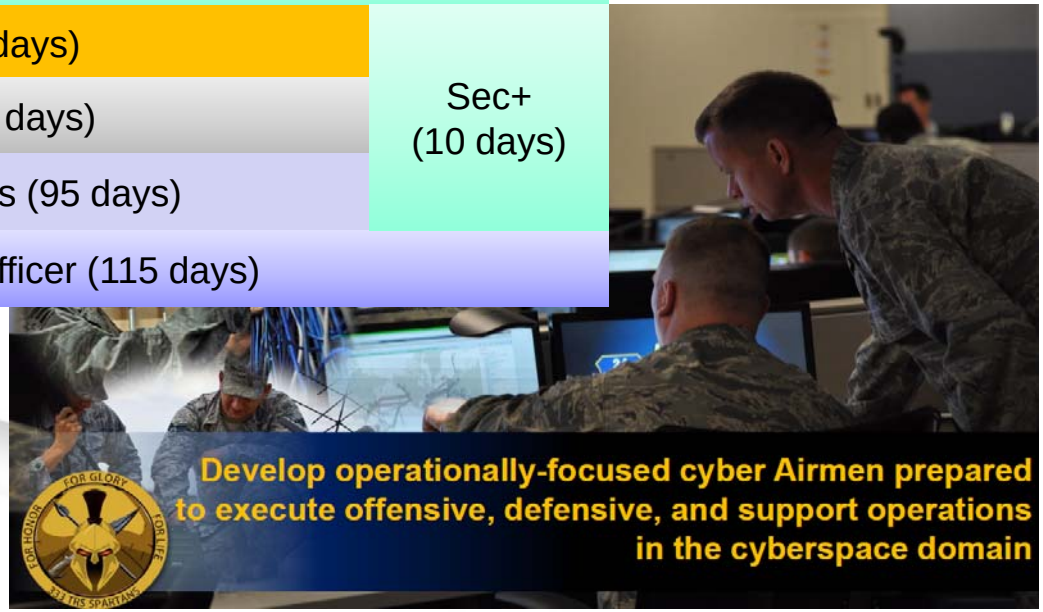
*The AFIT of Today is the Air Force of Tomorrow.*

ITF Basic (10 days)

- Knowledge Management (22 days)
- Cyber Systems Operations (46 days)
- Cyber Surety (20 days)
- Client Systems (36 days)
- Cyber Transport Systems (95 days)

Sec+ (10 days)

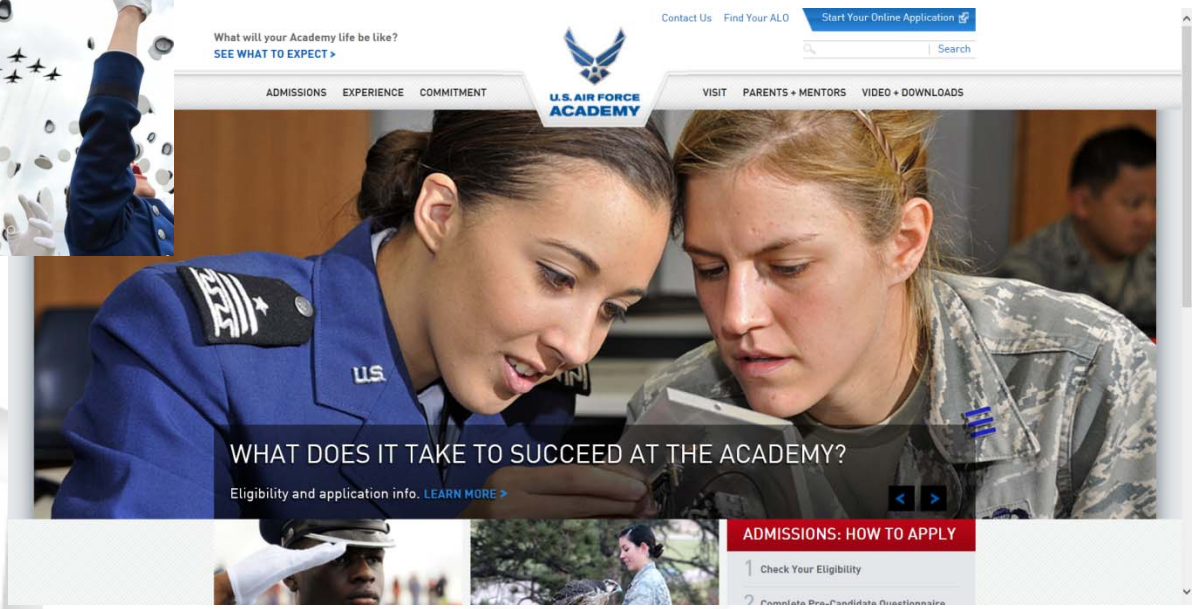
Cyberspace Operations Officer (115 days)



# Education Opportunities

*The AFIT of Today is the Air Force of Tomorrow.*



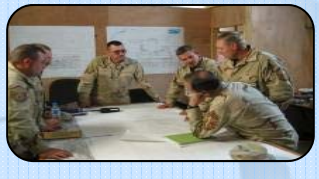




*Air University: The Intellectual and Leadership Center of the Air Force*
*Aim High ... Fly-Fight-Win*

# AFIT Overview



**Civil Engineer School**

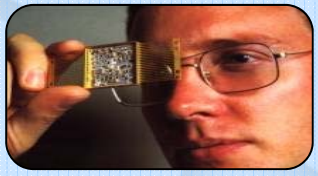


***Civil Engineering and Acquisition Professional Continuing Education (PCE)***

**School of Systems & Logistics**



**Graduate School of Engineering & Management**



***MS and Ph.D. Degree-Granting Cyber 200/300 PCE***

**Civilian Institution Programs**



***Non-resident Program Management***

# Supporting the Mission

*The AFIT of Today is the Air Force of Tomorrow.*




Developing the Cyber Warrior Through Education and Research

# Backup Slides

# Cyber-Related Graduate Degree Programs



- Electrical Engineering, Computer Engineering, Computer Science
  - Master of Science (18 months) and PhD (36 months)
- Cyber Operations
  - Master of Science (18 months)
  - Courses overlap with computer engineering and computer science
- Other degree programs
  - Systems Engineering and Operations Research – MS and PhD
- For more information on all programs, see AFIT Graduate School Catalog available at http://www.afit.edu/ENER/

# MS Electrical Engineering

*The AFIT of Today is the Air Force of Tomorrow.*

- 18-month MS program
- Coursework (28 hours), Math (8 hours), Thesis (12 hours)
- Specialty areas:
  - Electromagnetic Engineering
  - Software Engineering
  - Communications
  - Radar
  - Electro-Optics
  - Signal Processing
  - Electronic Circuits and Devices
  - Digital Engineering
  - Digital Communications Networks
  - Guidance, Navigation, & Control
  - Observables Reduction
- Specific courses are based on student's area of specialization – can emphasize cyber in one of these areas

# MS Computer Engineering

*The AFIT of Today is the Air Force of Tomorrow.*

- 18-month MS program
- Core Courses (16 hours), Mathematics (4 hours), Theory (4 hours), Application Sequence (12 hours), Thesis (12 hours)

- Application Sequences include:
  - Artificial Intelligence
  - Computer Networks
  - High Performance Computing
  - *Cyber Security*
  - Software Engineering
  - VLSI/VHSIC Systems

# MS Computer Science

*The AFIT of Today is the Air Force of Tomorrow.*

- 18-month MS program
- Core Courses (16 hours), Math/Theory (8 hours), Application Sequence (12 hours), Thesis (12 hours)

- Application Sequences include:
  - Artificial Intelligence
  - Computer Networks
  - Database Systems
  - High Performance Computing
  - *Cyber Security*
  - Software Engineering

# MS Cyber Operations

*The AFIT of Today is the Air Force of Tomorrow.*

- 18-month MS program
- Core Courses (24 hours), Breadth/Electives (8 hours), Math (4 hours), Thesis (12 hours)

- Technically focused in offensive/defensive network operations
- Broad coverage of cyber-related topics … multidisciplinary
- More application oriented than theory (compared to traditional MS programs)

# PhD Electrical Engineering

*The AFIT of Today is the Air Force of Tomorrow.*

- Electrical Engineering, Computer Engineering, Computer Science
- Coursework: 36+ hours (post-MS) consisting of 28 hours of integrated coursework and 8 hours of mathematics
- Dissertation: 48 hours

- Research Specialties in Electrical Engineering

| | |
|---|---|
| Analog & Digital Communications | Digital Systems |
| Electromagnetics & Low Observables | Electro-Optics |
| Guidance & Control Systems | Integrated Navigation Sys |
| Microelectronic and Photonic Devices | Nanotechnology |
| Micro-Electro-Mechanical Systems | Radar and Electronic Warfare |
| Signal Processing | Pattern Recognition |
| VLSI | Physical layer cyber security |

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- Research Specialties in Computer Engineering

| | |
|---|---|
| Artificial Intelligence | Adv Computer Architectures |
| Computer Networks | Cryptography |
| Computer/Network Attack | Computer/Network Defense |
| Computer/Network Forensics | Digital Design – FPGAs |
| High Performance Computing | Software Engineering |
| Robotics & Autonomous Systems | Wireless Sensor Networks |
| Internet of Things / Cyber Physical | SCADA/Critical Infrastructure |
| Rev Engineering / Code Protections | Human-Machine Interface |

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| High Performance Computing | Robotics & Autonomous Systems |
| Rev Engineering & S/W Protection | SCADA/Critical Infrastructure |
| Software Engineering | Wireless Sensor Networks |
| Data Analytics | Human-Machine Interface |

# How to Get to AFIT

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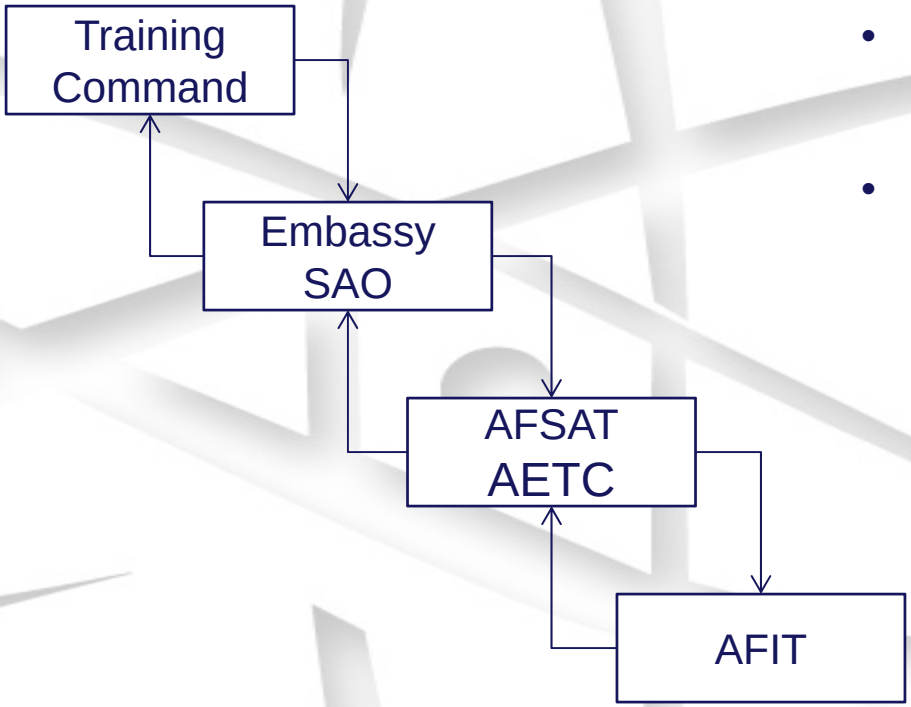


- For US Graduated Programs
  - https://www.afit.edu
- For International Graduate Programs:
  - Country X Training Command requests education and training through Embassy Security Assistance Office
  - AF Security Assistance Training office validates requirement & requests AFIT review
  - AFIT determines academic eligibility and number of available seats
  - More info at https://www.afit.edu/IMSO/