Fall 2021

MS Degree
Technology Management
[Formerly: Applied Engineering & Technology Management (AETM)]

Concentration in
Cyber Systems Tech Security
[Formerly: Network Security Management (NSM)]

EKU Graduate Catalog 2020-21
Refer to page 61-62 of the graduate catalog for the existing MS degree requirements in Technology Management.

For undergraduate students interested in the 3+2 BS (CST) degree, wherein 9-credit hours of graduate coursework can also be applied for meeting undergraduate degree requirements, complete the following 3+2 Program Enrollment Approval Form
https://gradschool.eku.edu/sites/gradschool.eku.edu/files/files/3+2%20Enrollment%20Approval%20Form.pdf

For undergraduate students interested in "concurrent" enrollment – taking both undergrad and up to 9-credit hours of graduate coursework; however, grad course credit cannot be applied for meeting undergrad requirements -- complete the following Undergraduate/Graduate Concurrent Enrollment Approval Form
Undergraduate students within 30 credit hours of completion of a Bachelor's degree, with a minimum 3.0 GPA, taking no more than 15 hours undergrad/grad courses combined in semester, can enroll in graduate courses after approval by the graduate program advisor (Dr. Dennis Field), the college dean, and dean of the EKU grad school.
https://gradschool.eku.edu/sites/gradschool.eku.edu/files/files/Concurrent%20Enrollment%20Form(3).pdf
Note: Graduate credit earned during concurrent enrollment may not be used to fulfill any undergraduate requirements

Grad school forms: https://gradschool.eku.edu/graduate-school-forms

MASTER OF SCIENCE (M.S.)
Technology Management
CIP Code: 15.1501
Dr. Dennis Field, Graduate Director/Advisor
Whalin Technology Complex 307
www.technology.eku.edu
(859) 622-3232

I. GENERAL INFORMATION
The Master of Science degree in Technology Management has been planned for those individuals who are interested in careers in industrial, technical, construction, agriculture operations, or cyber systems technology security management. Courses in the program have been designed to cause students to examine principles, concepts, attitudes, and methods for dealing with many of the challenges that confront business and industry. The program will be of value to those who are currently employed in business, industry, or agriculture sectors and have professional growth aspirations. It will also be of value to those who have recently completed undergraduate study and want additional preparation before embarking upon their career.

Upon completion of a degree in Technology Management, graduates will be able to:
1) plan, implement, and analyze technical projects;
2) demonstrate ability to formulate and apply advanced technical problem solving and managerial concepts; and
3) accurately synthesize their total program experience.

II. ADMISSION REQUIREMENTS

Applicants are expected to present proper prerequisite preparation or technical management experience. For the Construction Management and the Engineering Operations concentrations, applicants should have an understanding of materials and processes, the principles of production control, and the economics of industry; computer literacy; the ability to communicate graphically; and the ability to apply statistics to the solution of industrial problems. For the Agriculture Operations concentration, applicants should possess an undergraduate degree in an agriculturally-related field and have an understanding of and experience in agricultural production practices.

For the Cyber Systems Tech Security concentration, applicants should have an understanding of wired and wireless computer network communications, prior educational or work experience related to managing computer network software and hardware; effective communication skills; and the ability to identify, analyze and solve computer network related problems.

To be considered for admission, applicants must meet the general admission requirements of the Graduate School. Applicants who do not meet the GPA requirement for admission must submit official GRE scores to be considered for Probationary Admission. Expected target scores on the GRE for Probationary Admission are 144 on the Verbal and Quantitative sections.

International Students — Applications from international students are encouraged. Refer to the University admission guidelines for admitting international students.

III. PROGRAM REQUIREMENTS

Individual plans of study will include work from the following

Core Courses .....15 hours
AEM 801, 804, TEC 830, and six-credits of synthesis experience: TEC 860 and AEM 821 or 839.

Agriculture Operations Concentration.....9 hours AGR 720, 850, and three credit hours from the following with advisor approval: AGR 701, 709, 770, or 807.

Engineering Operations Concentration..... 9 hours AEM 706, 802, and 805.

Construction Management Concentration.....9 hours CON 827, 828, and 829.

Cyber Systems Tech Security Concentration .....9 hours NSM 815, 845, and 895.

Supporting Courses .....6 hours
Courses for one concentration may serve as supporting courses for the other three concentrations. For example, AEM 706, 802, and 805 are valid supporting courses for the Construction Management concentration and the Cyber Systems Tech Security concentration. NSM 815, 845, and 895 are valid supporting courses for the Engineering Operations concentration and the Construction Management concentration. Students may also consider ACC 820; AEM 730, or STA 785; ~~CIS 850, 860,~~ CON 824, 825, 826, CSC 720, 730, ~~738~~, 744, 747, 748, 815, 825, 834, ~~860~~, CTE 800, 801, 888, GBU 850, HLS 830, ~~MGT 850, MKT 850~~, NSM 865, PSY 804, 872, 873, 874, 875, QMB ~~850,~~ 854, SSE 827, 828, 832, STA 700, 770, 775, TEC 860, 867, UNP 700, and other courses by advisement. Please check the prerequisite requirements for these courses before enrolling.

Exit Requirement GRD 867c or 868b
Total Requirements..... 30 hours

IV. EXIT REQUIREMENTS

Thesis – The thesis is not required in the Master of Science in Technology Management.

Comprehensive Examinations – The candidate will have an opportunity to show professional growth through a written and/or oral examination (GRD 867c or **868b**) covering the various program components during the term in which graduation is scheduled.

NSM related Core and supporting Course Descriptions

CORE COURSES

AEM 801 Economics for Lean Operations. (3) A. Cost management, budgeting, accounting, capital planning, and other topics necessary for making effective economic decisions from a lean perspective. Quantitative methods and computer applications used to formulate decisions relating to operations.

AEM 804 Project Management. (3) A. Elements of managing projects including the use of modern project management software.

TEC 830 Creative Problem Solving. (3) A. A review and analysis of basic and applied research in the development of creative behavior with emphasis on its application to teaching/training and industrial problem solving. Students will be expected to complete a term project showing their creative abilities.

NSM 815 Foundations of Network Security (3) A. Advanced network security auditing, defense techniques and countermeasures. Network security issues related to hardware and software, for small-to-medium business (SMB) and enterprise-level networks. 2 Lec/2 Lab.

NSM 845 Advanced Server Security (3) A..: Pre-requisites: Departmental Approval. Security management, planning, designing, performance tuning and troubleshooting servers for small-to-medium businesses (SMBs) and enterprises. Hardening services such as web, DNS, file, Directory, and Terminal access. 2 Lec/2 Lab.

NSM 895 Special Topics in NSM (3) A.: Pre-requisites: Departmental Approval. Emerging technologies in the area of advanced computer networking or telecommunications security, including LAN/WAN/SAN system administration, hardware, software, virtualization, operating systems, scripting, and related industry certifications. 2 Lec/2 Lab.

AEM 820 Industrial Technology Proposal. (3) A.
A. Prerequisite: Departmental approval. An individually developed proposal related to a project typically encountered by a manager in a technical environment. The project proposal is to be approved by the student's graduate advisor. Credit will not be awarded for both AEM and INT 820

AEM 821 Industrial Technology Project. (3) A. Prerequisite: AEM 820 or departmental approval. An individually developed project related to the solution of a typical problem encountered by a manager in a technical environment. The problem is to be approved by the student's graduate advisor and the results presented in open forum. Credit will not be awarded for both AEM and INT 821.

AEM 822 Industrial Internship. (3-6) A. Prerequisite: Departmental approval. Planned and supervised experience in industry in which the student will have the opportunity to observe and participate in manufacturing management activities. The experience must be for at least one semester and the plan of activities should be approved by the student's graduate committee. Credit will not be awarded for both AEM and INT 822.

AEM 839 Applied Learning in Tech Management. (3-6) A. Prerequisite: Departmental approval. Planned and supervised experience in industry. The experience must be for at least one semester and the plan of activities must be approved by the student's graduate committee. Minimum of eighty hours work required for each academic credit.

SUPPORTING COURSES related to NSM degree (other courses may be selected based on adviser approval)

AEM 730 Design of Experiments. (3) A. Formerly INT 730. Prerequisite: AEM 202. Principle and practices of efficient experiment design for industry. topics include the philosophy of experiment design, comparison of various designs, hypothesis testing, and the analysis of data. Credit will not be awarded for both AEM and INT 730.

CSC 720 Multimedia Systems and Forensics. (3) A. Prerequisite: admission to the master's degree program in computer science or to the master's degree program in math (computer science option) or departmental approval. Integration of multimedia technologies, signal processing and compression of images, audio, and video, multimedia forensics and message hiding.

CSC 730 Concepts of Programming Systems. (3) A. Prerequisite: three hours of a programming language or equivalent. the top-down design of algorithms, structured programming, control structures, subprograms, files and lists. Programs will be written in a high level language.

CSC 744 Database Admin and Security. (3) A. Prerequisite: CSC 730 or departmental approval. this course covers database management system concepts, database system architecture, installation and setup, data management, performance monitoring and tuning, backup and recovery, database security models and management, database auditing.

CSC 747 Network Forensics and Investigation (3) A. Prerequisite: CSC 730 or departmental approval. Introduction to Windows network forensics. topics include: Windows network structure; Windows password/authentication mechanisms; Windows ports and services; live-analysis techniques; Windows registry structure and evidence; Forensic analysis of events logs; Network forensics tools and reporting.

CSC 748 Personal Electronic Device Forensics. (3) A. Prerequisite: CSC730 or departmental approval. Introduction to personal electronic device forensics. topics include architecture, functionality, operating systems and implementation of PEds (cell phones, PDAs, iPod, MP3 music players, GPS devices), recovering evidence from PEds, and hostile forensic and boobytrapping techniques.

CSC 815 Computer Administration and Security. (3) A. Prerequisite: admission to the master's degree program in computer science, the master's degree program in math (computer science option) or departmental approval. operating system concepts, installation and setup. System administration, managing system services, program security, viruses and worms, encryption, information security, security policies, legal and ethical issues

CSC 825 Network Applications and Security. (3) A. Prerequisites: CSC 730 and CSC 815. local area Networks, tCP/IP, Internet Protocols, Client/Server applications. dynamic web pages, Internet security, firewalls, virtual private networks, network attacks, Web and E-commerce security, wireless networking and security.

CSC 834 Software Engineering and Project Management I. (3) A. Prerequisite: admission to the master's degree program in computer science, the master's degree program in math (computer science option) or departmental approval. Planning, organizing, monitoring, and controlling the implementation of a software project.

EDC 810 K-12 Ed/Tech: Critical Issues.
(3) Online. Introduction to research about integration of technology into K-12 school systems. Students will also investigate current and future technology advancements in hardware, software, networking, support, and training. Basic issues relating to legal and ethical issues relative to technology will also be introduced.

GBU 850 Legal, Ethical, and Social Environment of Business. (3) A. Examines what the responsible business-person must know about the Common law, the regulatory environment, standards of ethical conduct, and the social responsibilities of the modern enterprise.

HLS 830 Hazards & Threats to Homeland Security. (3) A. description and analysis of significant hazards and threats to national security, and community safety, such as disasters, catastrophes, accidents, epidemics, technological failures, and terrorism.

NSM 865 Wireless & Mobile Security (3) A. Prerequisite: Departmental approval. Advance wireless and mobile computing security consideration in small-to medium business (SMB) and enterprise level networks: Security auditing, standards, protocols, vulnerabilities, attacks, countermeasures, network planning, management and troubleshooting. 2 Lec/2 Lab.

SSE 827 Issues in Security Management. (3) A. Survey of salient issues and concerns confronting security managers. Examines the application and contribution of various management concepts and philosophies to assets protection issues such as information security, personnel protection, threat analysis, technological adaptation, and resource allocation.

SSE 865 Auditing for Safety, Security, and Emergency Services. (3) A. Theory and application of auditing in safety, fire, and security. Comprehensive study of risk/threat exposure and assessment.

SSE 890 Topical Seminar: _____.
(1-3) A. Prerequisite: advisor/departmental approval. Designed to explore specific, contemporary aspects of safety, security, and emergency services. May be retaken to a maximum of six hours provided topic is different each time

STA 700 Applied Statistical Inference. (3) A. designed for students in all areas. a general background in statistical methods including normal distribution, point and interval estimation, hypothesis testing, regression, analysis of variance, and software packages. Credit does not apply toward the M.S. degree requirements.

TEC 860 Research in Technology. (3) A. A study of research and research methods as they apply in technological fields. Involves the development of a review of literature, a research proposal, and the use of descriptive and inferential statistics.

TEC 867 Independent Study in Technology:_____ (3) A. Student must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment. Independent research in technology supervised by the graduate advisor and other staff members. Topic must be approved before registration. May be retaken to a maximum of six hours.

Apply for Admission to EKU Graduate School

http://gradschool.eku.edu/apply

- Fill out as much of the application as possible. The application will be submitted to the EKU Graduate School and as part of the process they will contact the Coordinator of the Graduate Program within our department, Dr. Dennis Field.
- The deadlines for admission to the graduate school are available at: http://gradschool.eku.edu/graduate-application-deadlines
- EKU Grad school information: http://gradschool.eku.edu/

- The Degree you will be applying for admission to is: Master of Science (MS)
- The Degree Program is: Applied Engineering and Technology Management
- The Concentration is: Network Security Management (this option may not be available at present)
- Plan on taking the GRE* at an early date and have the scores reported to EKU. While filling out the application form you may indicate when you plan to take the GRE.

**** Note about the GRE*:**

Information regarding the GRE verbal portion:
http://www.ets.org/gre/revised_general/prepare/verbal_reasoning

Information regarding the GRE math portion and abbreviated review guide:
http://www.ets.org/gre/revised_general/prepare/quantitative_reasoning
http://www.ets.org/s/gre/pdf/gre_math_review.pdf

Begin your preparation of the GRE early. Refer to the following websites for information regarding the GRE: http://www.ets.org/gre , http://www.takethegre.com/.

The format for the GRE has changed recently so make sure you use the most recent guide available while preparing for it. Several GRE guides are available through Amazon or other online retailers.
https://www.amazon.com/Official-Super-Power-Pack-Second/dp/1260026396

Semester-by-Semester Schedule
(Part-time* Students taking 2 courses/semester)

1st semester (Fall)
- 3, NSM 815 – Foundations of Network Security
- 3, AEM 804 – Project Management

2nd semester (Spring)
- 3, NSM 845 – Advanced Server Security
- 3, Recommend selecting one of the following supporting courses related to the NSM concentration: AEM 730, CSC 720, 730, 744, 747, 748, 815, 825, 834, 860, EDC 810, GBU 850, HLS 830, QMB 850, SSE 827, SSE 890, STA 700, TEC 860, 867, and other courses by advisement

3rd semester (*Summer*)
- 3, TEC 830 – Creative Problem Solving

4th semester (Fall)
- 3, AEM 801 – Economics for Lean Operations
- 3, NSM 895 – Special Topics in NSM

5th semester (Spring)
- 3, Recommend selecting one of the following supporting courses related to the NSM concentration: AEM 730, CSC 720, 730, 744, 747, 748, 815, 825, 834, 860, EDC 810, GBU 850, HLS 830, QMB 850, SSE 827, SSE 890, STA 700, TEC 860, 867, and other courses by advisement
- 3, (AEM 820 and 821), or (AEM 822 and/or 839) – Project Proposal or Approved Co-operative education

6th semester (*Summer*)
- 3, (AEM 820 and 821), or (AEM 822 and/or 839) – Project Proposal or Approved Co-operative education
- 0, GRD 867c or 868b – Exit Exam (0 credit)

Course descriptions for the MS (TM-CSTS) program concentration are available at the link given below and these use the NSM prefix.
http://people.eku.edu/chandrav/NET/undergrad-net-eet--grad-nsm--courses--eku-2019.pdf
(The list also includes all BS (Cyber Systems Technology - Network Security & Electronics) courses, which use the NET and EET prefixes.)

***Note regarding part-time students*:**
Typically, NSM graduate students are working professionals taking grad classes alongside their regular work schedule. Even 2 grad classes a semester may keep one quite busy, as these classes require a lot of self-study, writing, and analysis on a regular basis. At the graduate level 3 classes per semester is regarded as full-time load. You may complete your program sooner by taking 3 classes per semester, provided sufficient number of the classes are offered.

Semester-by-Semester Schedule
(Full-time* Students taking 3 courses/semester)

1st semester (Fall)
- 3, NSM 815 – Foundations of Network Security
- 3, NSM 895 – Special Topics in NSM
- 3, AEM 804 – Project Management

2nd semester (Spring)
- 3, NSM 845 – Advanced Server Security
- 6, Recommend selecting two of the following supporting courses related to the NSM concentration: AEM 730, CSC 720, 730, 744, 747, 748, 815, 825, 834, 860, EDC 810, GBU 850, HLS 830, QMB 850, SSE 827, SSE 890, STA 700, TEC 860, 867, and other courses by advisement

3rd semester (*Summer*)
- 3, TEC 830 – Creative Problem Solving

4th semester (Fall)
- 6, (AEM 820 and 821), or (AEM 822 and/or 839) – Project Proposal or Approved Co-operative education
- 0, GRD 867c or 868b – Exit Exam (0 credit)

Course descriptions for the MS (TM-CSTS) program concentration are available at the link given below and these use the NSM prefix.
http://people.eku.edu/chandrav/NET/undergrad-net-eet--grad-nsm--courses--eku-2019.pdf
(The list also includes all BS (Cyber Systems Technology - Network Security & Electronics) courses, which use the NET and EET prefixes.)

**** Note regarding full-time students*:**
Owing to low enrollment it is possible that not all courses listed above may be offered in the semester indicated.

EKU NET/NSM Twitter page:

https://twitter.com/net_eku

Note Regarding Departmental Financial Assistance

A minimal number of graduate student assistant positions are available for students enrolled in the Technology Management (TM) program. Therefore, students should plan to have independent funding for supporting their graduate tuition and living expenses.

Graduate studies require a considerable investment of time and effort. In the first semester of graduate study, it is crucial to focus on performing academically to the best of one's abilities. In subsequent semesters, and as you get closer to graduation, consider applying for co-operative education or internship (http://career-coop.eku.edu/) positions with local industries. The Student Employment Services (https://finaid.eku.edu/student-employment-services) office or, if applicable, the International Education Office (http://www.international.eku.edu/) on campus may know of student work opportunities on- or off-campus. These offices may be of assistance with the co-op process. International students need to check with for required work clearances to participate in such opportunities.

EKU students may consider exploring on-campus options through the following website: http://jobs.eku.edu/ (click on "Search Requisitions," then "Position type" as "Student"). Keep searching this site regularly. Student work positions may be easier to obtain after completing the first semester or so at the university. By performing well in the initial semesters, you will improve prospects for both on- or off-campus work related to IT.

Our MS degree program in Technology Management has limited research-based funding opportunities, unlike other research universities (UoK or UoL) with considerably more support for graduate student positions for advanced research projects. As a result, finding a grad student position in the department is somewhat challenging; when available, these are competitive. Other science/technology or management-based programs on campus may have options for grad employment, even for students in other majors.

Dr. Dennis Field (dennis.field@eku.edu) is the coordinator/advisor of the departmental graduate programs in Technology Management (TM). He is very knowledgeable about the MS degree process in TM, from enrollment through graduation.