CENTRAL TEXAS COLLEGE
HMSY 1338 OER
Homeland Security Emergency Communications Management

Semester Hours Credit: 3

INSTRUCTOR: _____

OFFICE HOURS: _____

I.   INTRODUCTION

A. This course is a study of public safety communication system interactions and technologies. Topics include political and policy basis of emergency management, technology, and how technology is used to support decision making, planning, response, recovery, and mitigation. It also includes an overview of incident command systems, emergency management, and individual and community disaster education.

B. This course is a required course in the Homeland Security – Emergency Management Associate of Applied Science Degree.

C. This course is occupationally related and serves as preparation for careers in: Homeland Security, Emergency Management, Law Enforcement, Criminal Justice, and Corrections.

D. Prerequisite(s): None

II.   LEARNING OUTCOMES

Upon successful completion of the Homeland Security Emergency Communications Management, the student will be able to:

A.   Demonstrate emergency communication procedures for public safety agencies.
B.   Coordinate emergency traffic
C.   Demonstrate techniques for conducting a technology needs assessment for a local, state, or federal government emergency management or homeland security organization.
D.   Coordinate the implementation and use of information systems to facilitate decision-making during the planning, response, recovery, and mitigation phases of a disaster.
E.   Leverage the advantages of social media to communicate with the public during an emergency while avoiding the common pitfalls.
F.   Activate communication alert systems.
G.   Prepare a report on communication infrastructure security and maintenance.
H.   Demonstrate knowledge of the technologies applicable to each phase of homeland security and emergency management.
I.   Identify the key elements that must be in place for technology to enhance the

emergency management process.

J. Discuss the applications and tools available to Emergency Managers including Internet, telecommunications, networks, warning systems, radio systems, GIS software, and GPS tools.

K. Review the elements of a hazard model and demonstrate knowledge of the limitations of modeling programs.

L. Prepare a report on communication infrastructure security and maintenance.

III. INSTRUCTIONAL MATERIALS

No book is required for this course. However, you MUST be able to access relevant websites, documents, videos, and PowerPoint presentations contained in the lessons and at the Resources link in the course menu.

These are some of the resources used in this course.

- Federal Emergency Management Agency content and select Independent Study materials.
- U.S. Dept. of Homeland Security.
- National Weather Services.
- National Aeronautical Space Administration.
- United States Geological Survey.
- YouTube videos relevant to identified topics.

In many instances, information is provided in different formats, such as PDF and a website link. Use your discretion to determine your comprehension of each topic. Sufficient resources are provided if you need them. If a link doesn't work, or you want to find more details about certain topics, search the Internet using key words.

We have done our best to ensure that all links are active. However, the Internet is constantly changing. Please help us maintain the course content by reporting any broken links to your instructor or to Distance Education and Educational Technology (DEET) course support at course.support@ctcd.edu. Provide as much information as you can to allow us to find the broken links and fix them. You can document broken links at the course discussion board to notify other students, or share helpful resources that you have found. Thank you.

IV. COURSE REQUIREMENTS:

A. Learning Assignments:
Students shall read and/or watch the assigned articles, instructional videos, and other informational materials for each lesson.

B. Research Paper: Students must apply concepts learned throughout the course to prepare a final paper that demonstrates knowledge of how to apply the information learned to an emergency management or homeland security scenario.

C.	Class Participation/Discussion Exercises:
Students must participate in eight discussion exercises and interact with at least one other student by providing constructive criticism or a positive observation about the other student's discussion post.

D.	Exams: Students must demonstrate understanding of terms and concepts by passing two 40 question exams. Exams include multiple choice, multiple answer, and true/false questions.

## V.	EXAMINATIONS

Exam 1 will cover topics from lessons 1-4, and exam 2 will cover topics from lessons 4-8. Each exam has 40 questions. Questions formats include multiple choice, multiple answer, and true/false questions. Students are provided 210 minutes to complete the exam.

## VI.	SEMESTER GRADE COMPUTATIONS

Component	Possible Points
Discussion Boards	130 points
Lesson Assignments	150 points
Quizzes	90 points
Final Paper	150 points
Midterm: Exam 1	240 points
Final: Exam 2	240 points
Total	1000 points

This is how our grade will be determined:

Grade	A	B	C	D	F
Points	900-1000	800-899	700-799	600-699	0-599

## VII.	NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A.	**Course Withdrawal:** (Consistent with CTC policy)

B.	**Administrative Withdrawal:**	(Consistent with CTC policy)

C.	**Incomplete Grade:**	(Consistent with CTC policy)

D.	**American's with Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students

requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

E. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements.

F. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

VIII. COURSE OUTLINE

A. **Lesson 1**

Technology functions as a tool to help Emergency Managers better plan for, respond to, recover from, and mitigate disasters. Modern technology enables us to communicate text, voice, images, and video from anywhere at any time. Therefore, those engaged in emergency management can connect with the public, as well as local, state, and federal organizations. Decision makers and managers must know the mission areas identified by Federal Emergency Management Agency (FEMA) and understand how various technologies supports the core capabilities of each mission in order to apply technological tools appropriately and be effective.

a. **Learning Objectives**
   i.   Describe the FEMA mission areas and related core capabilities.
   ii. Examine why and how technology is used in Emergency Management.
   iii. Examine how technology and data support the decision-making process for Emergency Managers.
   iv. Determine how focusing events can be used to gain community support for improved emergency management solutions.
   v.   Explain the importance of conducting a Threat and Hazard Identification and Risk Assessment (THIRA) to determine priority technologies.
   vi. Demonstrate how to perform a Technology Needs Assessment.

b. **Learning Activities**
   i.   Read the following FEMA materials to learn about mission areas and core capabilities:
   - *Mission Areas - Overview of the 5 Mission Areas* (PDF)
   - *Core Capabilities* (PDF)
   - Excerpt from Federal Emergency Management Agency (FEMA) Independent Study (IS) course IS-235.C: *Emergency Planning* (PDF) (website; full FEMA course NOT required- see PDF version)
   ii. Read the following article about the use of technology in Emergency Management:
   - *Technology Plays an Increasing Role in Emergency Management*, by Eric Holdeman (PDF)

   iii. View the following video about how technology supports decision-making and response for Emergency Managers:
- *Innovations in Disaster Relief*, by NATO (https://youtu.be/j5n3BPhI2Mc)

   iv. Read the article to learn about focusing events:
- *Focusing events, risk, and regulation*, by Thomas A. Birkland, et. al. (PDF)

   v. Read the FEMA website to learn about THIRA:
- *Threat and Hazard Identification and Risk Assessment* (PDF)

   vi. Review the Technology Needs Assessment process.
- *Technology Needs Assessment Process* (PDF)

   vii. Complete Lesson 1 Assignment.

   viii. Complete Lesson 1 Discussion.

B. **Lesson 2|**

You likely use networks every day. In computing, a network is a group of two or more devices that can communicate. Typically, a network is comprised of a number of different computer systems connected by physical and/or wireless connections (Techopedia). Networks allow for internal and external communication of information more easily and faster. Governments, businesses, and the public depend upon computer networks for daily life. Therefore, an attack or natural disaster that hampers network operations can threaten the economy, security, and puts lives at risk. Consequently, all users play a role in protecting networks, devices, and data from unauthorized access or damage by implementing cyber security measures.

  a. **Learning Objectives**

   i. List and define network types.

   ii. Examine the pros and cons between wired and wireless networks.

   iii. Discuss how network communications can fail during an emergency.

   iv. Explain why some communication technologies are more robust than others.

   v. Describe the "Attack Vectors" that threaten the security of networks.

   vi. Explain why the implementation of the Internet of Things (IoT) concept has increased the risk of cyber-attacks.

   vii. Discuss the importance of cyber security and key measures to minimize cyber security risk.

  b. **Learning Activities**

   i. View the following video to learn about different Network Types:
- *Network Types*, by PowerCert Animated (https://www.youtube.com/watch?v=4_zSIXb7tLQ)

   ii. Review the list of Network Types and definitions:
- *11 Types of Networks Explained*, by Stéphane Bourgeois (PDF)

   iii. Read the following article to gain insight to the advantages and disadvantages of wired and wireless networks:
- *WiFi vs Ethernet & Wired vs Wireless*, by Clay Ostlund (PDF)

   iv. View the video about Cybersecurity:
- View *Vulnerabilities, Threat Vectors, and Probability*, by Professor Messer (https://www.youtube.com/watch?v=VO7u_kol__s)
- View *Emergency Preparedness Cyber Security Segment*, by KCLV-TV Las Vegas City of Las Vegas Television (https://www.youtube.com/watch?v=qyfgGDIBgHU)

      v.   Read the article about Cybersecurity Attack types:
- *10 Most Common Types of Cyber Attacks*, by Jeff Melnick (PDF)

     vi.   Read the Homeland Security guidance on Cybersecurity Best Practices:
- *Emergency Services Sector Cybersecurity Best Practices*, by the US Department of Homeland Security (PDF)

C. Lesson 3

a. Learning Objectives

      i.   Examine the importance of using technology to facilitate communication.

     ii.   Discuss how day-to-day communication differs from communication during an incident.

   iii.   Identify strategies for communicating effectively in an emergency situation.

   iv.   Select the most appropriate form of communication for a given situation.

     v.   Articulate how social media and other communication technologies can be used to communicate with members of the community.

   vi.   Know importance of communicating with the whole community including different cultures and special needs populations.

  vii.   Summarize the importance of radio interoperability.

 viii.   Identify different types of social media used in disasters.

   ix.   Discuss how social media usage patterns during events have changed over time.

     x.   Explain how the model of interaction between emergency officials and the public has changed over time.

b. Learning Activities

      i.   Review the list of Communication Technology Examples.

     ii.   Complete Lesson 3 of the FEMA Independent Study (IS) Course: IS-242.B: Effective Communication:
- Lesson 3 - *Communicating in an Emergency* (Note: Only complete Lesson 3 of the course) (PDF)

   iii.   Read the following excerpts to learn more about communicating with special populations:
- *Special Populations Plan by the East Central District Health Department* (PDF)

   iv.   Read the highlighted titles of the DHS Radio Interoperability FEMA training material (PDF):
- Radio Terminology
- Why Use Radios?
- Real-World Application
- Operability/Interoperability
- Obstacles to Interoperability
- Interoperability Channels
- Alternate Forms of Communications

     v.   View the following videos:
- *Mobile Command Vehicle*, by the El Paso County, CO Sheriff's Office (https://youtu.be/zp4cADFJwFk)
- *Social Media and Emergency Management*, by Former FEMA Administrator Craig Fugate (https://youtu.be/jlw5wtrU14w)

   vi.   Read the overview on social media as it relates to Emergency Management in the FEMA course:

- *Social Media in Emergency Management* (PDF)

D. **Lesson 4**

The goal of warning systems is to alert the public of impending danger. Warning the public is one of your most critical functions as an emergency manager. Nonetheless, warning is a complex function. In this lesson, you will examine the qualities of warning systems. You will then examine the way disasters are detected and managed. Lastly, you will deal with the myths of public response to warnings and how to ensure that the public has all of the information it needs to respond appropriately to a warning.

a. **Learning Objectives**
   i. Examine the composition of warning systems and their subsystems.
   ii. Analyze different ways to detect and manage disasters.
   iii. Examine the role of the National Weather Service in issuing public warnings.
   iv. Assess how organizational issues affect the process of issuing warnings.
   v. Examine the advantages and disadvantages of each type of warning system.
   vi. Analyze the factors of public response to warning systems.

b. **Learning Activities**
   i. Read about the composition of warning systems:
      - *Early Warning Systems* (PDF), by the Red Cross
   ii. Read or complete the FEMA course IS 247 to examine different ways to detect and manage disasters using warning systems:
      - *Integrated Public Alert and Warning System* (IPAWS) (PDF)
   iii. Watch these videos that demonstrate the role of the National Weather Service:
      - *We are the National Weather Service* https://www.youtube.com/watch?v=lqgtk4ozgsg
      - *National Weather Service: Weather Warning Process*, by NWS Paducah, KY - https://www.youtube.com/watch?v=bWcU_IPnXgY
   iv. View the video by FEMA that discusses the IPAWS process of issuing warnings:
      - *FEMA's Integrated Public Alert and Warning System (IPAWS) -* https://www.youtube.com/watch?v=ptk5Oi3P2to
   v. View this video by Jessamine County Emergency Management to gain perspective on the advantages and disadvantages of a siren warning system:
      - *Tornado Siren Protocol -* https://www.youtube.com/watch?v=CtwxL91UQZo
   vi. Read the article by Martin Lea to understand the factors of public response to warning systems:
      - *Public Response to Disaster Warnings* (PDF)

E. **Lesson 5**

Geospatial technologies and mapping focuses on the capabilities of Geographic Information Systems (GIS), GIS in Emergency Management, Implementing GIS, data representation, geocoding, and Global Positioning Systems (GPS). The ability to find out where the flooding is and how deep the floodwaters are, where can we land helicopters, and how many people are affected are the types of questions that need answered during disasters. Some of these questions are dealt with on a daily basis, such as those regarding planning/preparedness and mitigation activities while others are infrequent. In either case, these questions can often be answered using the geospatial technology.

  a. **Learning Objectives**
    i. Recognize the elements of geospatial and mapping technologies.
    ii. Analyze how emergency managers use geospatial technology and mapping in all phases of emergency management.
    iii. Specify the importance of TIGER files.
    iv. Justify the importance of geocoding
    v. Compare the applications of GPS technology.
  b. **Learning Activities**
    i. Read the article to learn the elements of geospatial technologies:
      • *What is Geospatial Ecosystem?* by Jyotsana Chuchra (PDF)
    ii. Understand how GIS, a form of geospatial technology, is used by emergency managers.
      • Read *How GIS Can Aid Emergency Management* by Eric Holdeman (PDF)
      • View *Emerging GIS Series: Emergency Response*, by NYS GIS Association (https://www.youtube.com/watch?v=VSCT6sGUROA)
    iii. Read an excerpt from Chapter 4: *TIGER, Topology, and Geocoding* to understand the TIGER spatial database.
      • Excerpt from *Chapter 4: TIGER, Topology, and Geocoding*, by Penn State Online Geospatial Education Program (PDF) (full website)
    iv. Read to learn more about geocoding:
      • *What is Geocoding?*, by ArcGIS Pro (PDF)
    v. Read the case study:
      • *Rockland County, New York, Activates an Interactive Mapping System to Plan Against Disaster*
    vi. Watch this video to learn various applications of GPS:
      • *GPS: Some New Applications*, by Krista Lili Knaus, Space & Missile Defense Center, Los Angeles AFB (https://www.youtube.com/watch?v=lMWlj5wFgCM)

F. **Lesson 6**
In order to mitigate a hazard or issue warnings, emergency officials must know that disaster is about to strike. Sensors monitor environmental conditions including land, air, water, and weather. Both direct and remote sensors provide data that help with emergency management tasks. The key is to understand the type of information remote and direct sensors provide so that you can collect the data needed and use the information for improved decision-making throughout all phases of emergency management.
  a. **Learning Objectives**
    i. Examine difference between direct and remote sensing technologies.
    ii. Compare the direct and remote sensor technologies and the data they provide that helps with emergency management tasks.
    iii. Evaluate the use of weather stations and their role in the various phases of emergency management.
    iv. Assess the use of air sensors for detection of air quality, chemicals, and bio-hazards.
    v. Examine how radar and satellite imaging work.
    vi. Evaluate the resources available from the National Oceanic and Atmospheric Administration.
    vii. Analyze the trends with sensor technologies and their impact on emergency

management

 b. Learning Activities

   i. Read *Meteorological Sensor Types*, by Jeff Haby (PDF) to understand the difference between direct and remote sensing.

   ii. Read *What is a weather station?* by AcuRite.com (PDF) for an explanation of the types of sensors and data captured by weather stations (direct sensing):

   iii. Watch the YouTube video on how a weather station aids Cape Coral Emergency Management:
- *New weather station aids Cape Coral Emergency Management* (https://www.youtube.com/watch?v=AiWKOsKKfOI)

   iv. Tools such as the WV Flood Tool are designed to help business owners, average citizens, government officials, and emergency managers make informed decisions. Read about the "Features" and "Data Layers" available with the WV Flood Tool.
- *WV Flood Tool Home* by the Government of West Virginia (PDF)

   v. Read an overview of BioWatch:
- *Detecting Bioterrorism by Dept. of Homeland Security* (PDF)

   vi. Watch the YouTube video about the implementation of BioWatch in Austin, TX:
- *Sensors throughout Austin monitoring for bioterrorism agents* by KXAN (https://www.youtube.com/watch?v=P0xax9ZPDi4)

   vii. Read about remote sensing:
- *What is remote sensing and what is it used for?* by USGS (PDF)

   viii. Watch the YouTube video about Geostationary Operational Environment Satellite
- *What is GOES-R?* by NASA Goddard (https://www.youtube.com/watch?v=ttOHhnBwukU)

   ix. Watch the YouTube video about the application of remote sensing and how it helps us understand the impact of environmental change
- *An Idea that Worked*, by USGS (https://www.youtube.com/watch?v=LP3FIi4NCNY&list=PLIxlFow AfHBAzSIeg7wszuUVsLzVkspQN_

G. Lesson 7

Computer modeling programs allow the emergency management community to better predict, simulate, and plan how a hazard will impact a community. Modeling software examines the impact of wind, floods, earthquakes, fires, chemicals, and many other types of hazards. Also, models can analyze evacuation routes and the financial impact of disasters. Emergency Management personnel must understand the information provided by each type of modeling software and how to use the information to mitigate, prepare for, and enhance response to disasters.

 a. Learning Objectives

   i. Examine why and how modeling software is used to support the decision-making process for Emergency Management officials.

   ii. Explain the uses of HAZUS-MH, as well as its strengths and limitations.

   iii. Analyze the uses of SLOSH modeling software.

   iv. Examine the application of the CAMEO suite software and its various components.

   v. Analyze evacuation modeling software and understand its role in emergency

planning and response.
b. **Learning Activities**
    i. Read the article to understand how hazard modeling and mapping supports emergency management functions.
        - *How GIS can Aid Emergency Management*, by Susan Cutter (PDF)
    ii. Read an overview on the uses of the Hazards United States
        - *Multi Hazard (HAZUS-MH) modeling software HAZUS-MH*, by U.S. Climate Resilience Toolkit (PDF)
    iii. Read the FEMA website that explains the three HAZUS models.
        - *Multi Hazard Models*, by FEMA (PDF)
    iv. Watch the YouTube video explaining the use of HAZUS-MH software that models potential losses from earthquakes, floods, wind and hurricanes.
        - *FEMA – HAZUS,* by HSFAmerica
    v. Read an overview of using a hurricane model known as SLOSH.
        - *Sea, Land, and Overland Surges from Hurricanes (SLOSH) Model,* by NOAA National Hurricane Center (PDF).
    vi. Watch two different SLOSH Models in action on YouTube. Notice which areas flood first, and consider how this would be helpful in planning evacuation routes, as well as decision-making for other hazards in the area such as nuclear plants or hazardous material storage.
        - *Texas coast Port O'Connor in Victoria, TX*, by Michael Buchanan
        - *New York City during a category 2 hurricane*, by ASA Inundation & Flood Modeling
    vii. Read about the Computer Aided Management of Emergency Operations (CAMEO) software suite.
        - *CAMEO Software*, by US Environmental Protection Agency (PDF)
    viii. Watch the YouTube video discussing MARPLOT mapping component within the CAMEO suite, as well as how other components, such as ALOHA, integrate within CAMEO.
        - *MARPLOT: Building a Desktop GIS for Emergency Response,* by Michael Katz with NOAA
    ix. Read about a Real time evacuation Planning Model (Rte-PM).
        - *Real time evacuation Planning Model,* by Virginia Modeling, Analysis, and Simulation Center, Old Dominion University (PDF)

H. **Lesson 8**
Technology remains crucial for emergency management teams. It supports fast communication with internal and external stakeholders. Technology systems maintain and track data that facilitates improved decision-making. Mapping and modeling tools improve planning, response, and recovery efforts mitigate damages and the loss of life. Unfortunately, barriers exist to implementation, and all technologies have limitations. Emergency management professionals must understand the capabilities and the barriers to maximize the benefits technology offer.
a. **Learning Objectives**
    i. Analyze the barriers to implementing technology in emergency management agencies.
    ii. Examine the pitfalls of technology.
    iii. Compare and contrast the benefits provided by technology versus its limitations.

    iv.   Appraise the technology trends emerging within the emergency management and homeland security field.

b. Learning Activities

    i.   Read the article about barriers that impede the use of technology
- *Top 15 Barriers to Adopting New Technology,* by Robert Treumann, President eSCRIBE Software Ltd. (PDF)

    ii.   Despite the benefits of technologies, one must remain aware of the pitfalls. Read the following articles about these four pitfalls:
- *Information overload-Information Overload, Stress, and Emergency Management Thinking*, by Shalini Miesra, Matthew Rhodes, and Patrick Roberts. Virginia Polytechnic Institute and State University (PDF)
- *Lack of integration and interoperability-Unlocking Interoperability: What it Means for Next-Generation Public Safety Communications,* by Robert Stack (PDF)
- *Obsolescence- Top Five Risk of Using Outdated Technology,* by Juliana Lee (PDF)
- *Security risk - Emergency Services Sector Cybersecurity Initiative,* by US Dept. of Homeland Security (PDF)

    iii.   Read about technology trends in emergency management:
- *Technology Trends in Emergency Management,* by Micheal Kemp, PhD, Capella University (PDF)

    iv.   Read about the advancement of technology and its capabilities:
- *Preparing for the Future of Emergency Management,* by Mitch Lortz (PDF)