

**CENTRAL TEXAS COLLEGE**  
**HMSY 1341**  
**Critical Infrastructure Protection**

**Semester Hours Credit: 3**

**INSTRUCTOR:** \_\_\_\_\_

**OFFICE HOURS:** \_\_\_\_\_

**I. INTRODUCTION**

- A. Identification and analysis of critical infrastructure systems including security and threat assessments. Includes mitigation of threats as well as evaluation and revision of security measures in order to protect critical infrastructures.
- B. This course is a required course for use 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 and Emergency Management.
- D. Prerequisite(s): None

**II. LEARNING OUTCOMES**

Upon successful completion of this course, Critical Infrastructure Protection, the student will be able to:

- A. Identify the various infrastructure sectors that have evolved into today's critical infrastructures. (C1, C5, C6, C8, C14, F1, F2, F9)
- B. List several quantitative procedures for evaluating their vulnerability and establish optimal policies for reducing these vulnerabilities. (C1, C5, C6, C8, C16, F1, F2, F6, F7, F10)
- C. Use the internet and library resources to conduct information collection. (C1, C5, C6, C8, C15, C17, C18, F7, F11)
- D. Demonstrate the basic knowledge of critical infrastructure protection by presenting written and oral reports.(C1, C5, C6, C8, C9, C14, C 15, F1, F2, F5, F6, F9, F11)

**III. INSTRUCTIONAL MATERIALS**

The instructional materials identified for this course are viewable through [www.ctcd.edu/books](http://www.ctcd.edu/books)

#### IV. COURSE REQUIREMENTS:

A. Reading Assignments:

You will be required to read the text book and answer the questions for each chapter listed in the assignments section. There will also be additional assignments given where you will be required to obtain other information from outside sources (mainly the internet). The test and additional assignments will all be turned into the instructor as directed. This class requires the average amount of studying to achieve a high grade.

B. Projects, Oral Reports, Case Studies, Book Reports, and Research Papers:

There will be one paper, chapter assignments, and other additional assignments presented to be completed and turned in by the student. Each item will have clearly listed requirements and deadlines. All material must be in Word format, 12 point type, and New Times Roman script. Points will be deducted for misspelled words and obvious grammatical mistakes. All points will be added up to obtain the final grade. There is no curve and no extra credit given. It is understood that sometimes situations arise and material cannot be turned in by the deadline. Clearly discuss these issues with the instructor before the deadline and agreements can be made. Remember that we are here to assist you in learning all that you can and will assist this process in any way that is acceptable by CTC policy.

C. Class Performance:

All students are required and expected to maintain the highest standards of scholastic honesty in the preparation of all course work and during examinations. For a description and consequences of scholastic dishonesty see the CTC Catalog.

D. Class Participation:

The Student is expected to be on time to class, to have read the assigned materials, and be prepared to discuss the assignment in class. All persons must be present on exam day unless properly excused in advance. Students who are late for or absent from class have the absolute responsibility for obtaining the missed information. Students will be expected to take all scheduled examinations in the class period in which they are assigned. Students are expected to observe the Central Texas College policy for attendance as explained in the current catalog.

E. Each student is expected to act in a manner consistent with the College's functions and goals as an institution of higher education. The Board of Trustees of Central Texas College states the following examples of misconduct constitute an interference with the lawful and orderly use of college premises, facilities, and activities for which students may be

subject to disciplinary action. This is not an all-inclusive list of prohibited behavior.

- a. Interference with teaching, research, administration or CTC's other responsibilities through disorderly conduct or disruptive behavior. This includes the use of or ringing of cell phones in the classroom. The instructor has the right to ask the student to leave the classroom and if the incident is repeated, the instructor has the right to ask the student to leave the class.
- b. Refusing to depart from any property or facility of the College upon direction by College officials.

For more information on Non-Academic Misconduct please see the Student Handbook.

- F. Academic Dishonesty: The College and its official representatives may initiate disciplinary proceedings against any student accused of any form of academic dishonesty. Academic dishonesty includes, but is not limited to, cheating on academic work, plagiarism and collusion.
  - a. Cheating on academic work includes:
    - 1. Copying another student's test paper, research paper or term paper.
    - 2. Using materials during a test that are not authorized by the test administrator.
    - 3. Collaborating with another student during a test or in academic preparation without permission.
    - 4. Using, buying, selling, stealing, transporting, or soliciting the contents of an unadministered test.
  - b. Plagiarism is defined as presentation for credit as one's own idea or product derived from an existing source.
  - c. Collusion is defined as the unauthorized collaboration with another person in preparing written work for credit. All questions of academic dishonesty are reviewed by the faculty member. If the student does not accept the decision of the faculty member, the student may appeal to the department chairperson. If the student disagrees with the decision of the department head, the student's case will be referred to the Dean of the Central Campus. The student will be allowed to remain in class until the process is exhausted except when immediate suspension or expulsion is deemed necessary for the continuance of the educational mission or when the safety of persons or property is in jeopardy. (See Student Handbook for more details.)

- G. Feedback is the return of data about the result of a process. Feedback will be provided via test scores, graded assignments, and/or instructor evaluation of the students' progress. Each student is encouraged to take advantage of the many avenues for feedback available to them. For example, office hours are established primarily to provide students access to their instructors to discuss their academic performance, to answer their substantive questions, and in some cases, to give them other academic guidance. While adjunct faculties do not normally have office hours, they are generally available before or after class to meet with you. E-mail is another easily available medium to obtain feedback. Additional feedback may be provided at the discretion of the instructor or upon the request of the student.

## V. EXAMINATIONS

There will be at least two exams given in this course. Both exams will be non-proctored and will be essay style questions. There will be no study guide provided. Each test covers the material covered in class before the exam (the final is non-cumulative from the start of class). If a student is unable to make an exam, there will be no make-up unless previously approved by the instructor.

## VI. SEMESTER GRADE COMPUTATIONS

It is the student's responsibility to complete the course requirements as defined within the syllabus. There will be two exams, one paper, classroom discussions, and weekly assignments that will be added up to make the final total of 500 points.

Mid-term exam	50 points
Final exam	50 points
Research Paper	100 points
Class discussion	160 points
Weekly assignments	140 points

Grading will be done on a straight scale:

Grade	Percentage	Points
A	90-100%	450-500
B	80-89%	400-449
C	70-79%	350-399
D	60-69%	300-349
F	0-59%	0-299

The points are added up to give a final total. There will be no rounding or curve provided for this course. Failure to complete any of the projects (paper, class discussion, and internet project) may result in a grade F for the course.

## VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

- A. Course Withdrawal: There are occasions when it may be necessary to drop a course. In order to be officially withdrawn from the course, a student must obtain and complete a withdrawal form and have it signed thereon. The student's transcript will show "W" or "F", depending on whether the student is passing or failing in his/her course at the time of withdrawal.
- |                                     |                 |
|-------------------------------------|-----------------|
| Friday of 3 <sup>rd</sup> week for  | 5-week courses  |
| Friday of 4 <sup>th</sup> week for  | 6-week courses  |
| Friday of 6 <sup>th</sup> week for  | 8-week courses  |
| Friday of 7 <sup>th</sup> week for  | 10-week courses |
| Friday of 9 <sup>th</sup> week for  | 12-week courses |
| Friday of 12 <sup>th</sup> week for | 16-week courses |
- B. Administrative Withdrawal: See website for official policies. Failure to communicate with the instructor or complete listed projects may result in the instructor administratively withdrawing you from the course.
- C. Incomplete Grade: See website for official policies. Incompletes will only be issued with prior arrangements between the student and instructor. A time frame will be given and must be followed. Failure to meet the arrangements will result in a failing grade being issued.
- D. Cellular Phones and Beepers: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.
- E. 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](http://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.
- F. Instructor Discretion: The instructor reserves the right of final decision in course requirements.

- G. 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 One: Origins and Strategies

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:
  - a. Discuss why protection of critical infrastructures is vital.
  - b. Natural Disaster Recovery.
  - c. Public-Private Cooperation.
  - d. Federalism: Whole of the Government.
  - e. Infrastructure Protection within the DHS.
  - f. Implementing a Risk Strategy.
  - g. Identify the types of risk strategies
2. Learning Activities:
  - a. Read chapters 1 and 2. (C5-C6, C15,F1,F11)
  - b. Learn key terms present by instructor. (C5-C6, C15,F1,F11)
  - c. Assignment: Answer questions presented by the instructor. (C5-C6, C15,F1,F11)

### B. Lesson Two: Theories and CIKR Systems

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:
  - a. The vastness of the problem of critical infrastructure protection.
  - b. The underlying technologies behind various critical infrastructures So that effective strategies and policies can be enacted.
  - c. The formal theory of networks that provides the basis for Comprehending the big picture.
  - d. The fact that the most surprising property of most infrastructure Sectors is that assets are highly concentrated.
  - e. Simple critical node testing.
  - f. The concept of cascade failure and how to prevent it.
  - g. The value of modeling and simulation in the study of networks.

2. Learning Activities:
  - a. Read chapters 3 and 4. (C5, C6, C15, F1, F11)
  - b. Learn key terms provided by instructor. (C5, C6, C15, F1, F11)
  - c. Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**C. Lesson Three: Communications, Internet, and Cyber Threats**

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:
  - a. The model-based vulnerability analysis.
  - b. The regulatory structure.
  - c. The architecture of the communications sector.
  - d. Risk analysis in communications.
  - e. Cellular network threats.
  - f. The internet as a disruptive technology.
  - g. The origins of TCP/IP.
  - h. Internet standards.
  - i. Internet governance.
  - j. Scripts, kiddies and black-hats.
  - k. The tools of the trade.
  - l. Cyber risk analysis.
  - m. Cyber infrastructure risk.
  
2. Learning Activities:
  - a. Read chapters 5, 6, and 7. (C5, C6, C15, F1, F11)
  - b. Learn key terms provided by the instructor. (C5, C6, C15, F1, F11)
  - c. Assignment: Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**D. Lesson Four: Information Technology and Cybersecurity Policy**

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:
  - a. Principles of IT security
  - b. Enterprise systems.
  - c. Cyber defense.
  - d. Basics of encryption.
  - e. PKI
  - f. Countermeasures.
  - g. National cybersecurity policy.

- h. The elements involved in rewriting the cybersecurity policy.
2. Learning Activities:
- a. Read chapters 8 and 9. (C5, C6, C15, F1, F11)
  - b. Learn key terms provided by the instructor. (C5, C6, C15, F1, F11)
  - c. Assignment: Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**E. Lesson Five: Control and Data, Water, and Energy**

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:

- a. SCADA.
- b. Common threats.
- c. Who is in charge.
- d. SCADA risk analysis.
- e. Foundations of SDWA.
- f. The Bioterrorism Act of 2002.
- g. The architecture of water systems.
- h. The Hetch Hetchy Network.
- i. Cascade analysis.
- j. Energy fundamentals.
- k. Regulatory structure of the energy sector.
- l. Independent coal.
- m. The rise of oil and the automobile.
- n. Energy supply chains.
- o. The critical Gulf of Mexico supply chain.

2. Learning Activities:
- a. Read chapters 10, 11 and 12. (C5, C6, C15, F1, F11)
  - b. Learn key terms provided by the instructor. (C5, C6, C15, F1, F11)
  - c. Assignment: Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**F. Lesson Six: Power, Healthcare and Transportation**

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:

- a. The grid
- b. Death rays and vertical integration.
- c. Orders 888 and 889.
- d. The North American grid.

- e. The anatomy of a blackout.
- f. Healthcare sector plan.
- g. Roemer's model.
- h. The complexity of public health.
- i. Risk analysis of HPH sector.
- j. Basics of epidemiology.
- k. How to predict an epidemic.
- l. Biosurveillance.
- m. Network pandemics.
- n. The world travel network.

2. Learning Activities:

- a. Read chapters 13, 14, and 15. (C5, C6, C15, F1, F11)
- b. Learn key terms provided by the instructor. (C5, C6, C15, F1, F11)
- c. Assignment: Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**G. Lesson Seven: Supply and Finance**

1. Learning Outcomes: When you successfully complete this lesson, you will be able to discuss or understand:

- a. supply chains.
- b. the WTF.
- c. risk assessment of supply chains.
- d. the financial system.
- e. virtual currency.
- g. hacking the financing networks.
- h. hot money.
- i. fractal markets.

2. Learning Activities:

- a. Read chapters 16 and 17. (C5, C6, C15, F1, F11)
- b. Learn key terms provided by the instructor. (C5, C6, C15, F1, F11)
- c. Assignment: Answer the questions provided by the instructor. (C5- C8, C9, C14, F1, F2, F7, F8, F9, F12, F15, F17)

**H. Lesson Eight: Final Exam and Final Project**