



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## COMPUTER SCIENCE ENGINEERING COURSE INFORMATION SHEET

Course Title	<b>DISASTER MANAGEMENT</b>			
Course Code	ACE551			
Programme	B. Tech			
Semester	B.Tech V			
Course Type	Core			
Regulation	IARE -R16			
Course Structure	<b>Lectures</b>	<b>Tutorials</b>	<b>Practical</b>	<b>Credits</b>
	3	1	-	4
Course Coordinator	Mr. S. Varadarajan, Assistant Professor, Department of CE.			
Team of Instructors	Mr. S. Varadarajan, Assistant Professor, Department of CE.			

### I. COURSE OVERVIEW

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches. Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards. Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake. Emerging approaches in Disaster Management- Three Stages 1. Pre- disaster stage (preparedness) 2. Emergency Stage 3. Post Disaster stage- Rehabilitation.

### II. COURSE PRE REQUISITE(S)

Level	Course code	Semester	Prerequisites	Credits
UG	ACE551	V	Knowledge of disaster management and its mitigation	4

### III. MARKS DISTRIBUTION

Subject	SEE Examination	CIA Examination	Total Marks
Disaster Management	70 Marks	30 Marks	100 Marks

### SEMESTER END EXAMINATION (SEE):

The SEE conducted for 70 marks of 3 hours duration. The syllabus for the theory courses is divided into FIVE units and each unit carries equal weightage in terms of marks distribution. The question paper pattern is as follows: two full questions with 'either' 'or' choice will be drawn from each unit. Each question carries 14 marks.

**CONTINUOUS INTERNAL ASSESSMENT (CIA):**

CIA is conducted for a total of 30 marks, with 25 marks for continuous internal examination (CIE) and 05 marks for quiz / alternative assessment tool (AAT).

**Continues internal examination (CIE):**

The CIE exam is conducted for 25 marks of 2 hours duration consisting of two parts. Part-A shall have five compulsory questions of one mark each. In part-B, four out of five questions have to be answered where each question carries 5 marks. Marks are awarded by taking average of marks scored in two CIE exams.

**Quiz/ alternative Assessment tool (AAT):**

Two quiz exams shall be online examinations consisting of 20 multiple and are to be answered by choosing the correct answer for a given set of choices (commonly four). Marks shall be awarded considering the average of two quizzes for every course. The AAT may include seminars, assignments, term paper, open ended experiments, micro projects, five minutes video and MOOCs

**IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:**

√	CHALK & TALK	√	QUIZ	√	ASSIGNMENTS	√	MOOCs
√	LCD/PPT	√	SEMINARS	√	MINI PROJECT	√	VIDEOS
√	OPEN ENDED EXPERIMENTS						

**V. ASSESMENT METHODOLOGIES DIRECT:**

√	CIE XAMS	√	SEE EXAMS	√	ASSIGMENTS	√	SEMINARS
X	LABORATORY PRACTISES	X	STUDENT VIVA	√	MINI PROJECT	X	CERTIFICATION
√	TERM PAPER						

**VI. ASSESMENT METHODOLOGIES - INDIRECT**

√	ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	√	STUDENT FEEDBACK ON FACULTY (TWICE)
√	ASSESSMENT OF MINI PROJECTS BY EXPERTS		

**VII. COURSE OBJECTIVES:**

The course should enable the students to:

- I. Identify the major disaster types and develop an understanding of modern disaster management.
- II. Recognize and develop awareness of the chronological phases of natural disaster response and refugee relief operations
- III. Understand the key concepts of disaster management related to development and the relationship of different disaster management activities
- IV. Categorize the organizations that are involved in natural disaster assistance and relief system.

**VIII. COURSE LEARNING OUTCOMES**

Students, who complete the course, will have demonstrated the ability to do the following:

CACE551.01	Integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available
CACE551.02	Analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters. and to know about different types of environmental hazards
CACE551.03	Obtain knowledge on different types of natural and man- made disasters. Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery)
CACE551.04	Describe endogenous and exogenous hazards their harmful effects to the environment. Case studies of India

CACE551.05	Analyze, and communicate information on risks, relief needs and order to formulate strategies for mitigation
CACE551.06	Understand the Mitigation and control measures of exogenous hazards
CACE551.07	Understand the Mitigation and control measures of endogenous hazards
CACE551.08	Understand different approaches of different phases
CACE551.09	Capacity to analyze and evaluate research work on the field of emergencies and disaster while
CACE551.10	Demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used. And emerging approaches of disasters
CACE551.11	Analyze the future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them
CACE551.12	Understand integrated approach for disaster preparedness, mitigation & awareness; mitigation
CACE551.13	Understand different types of institution for disaster mitigation and management
CACE551.14	Design and perform research on the different aspects of the emergencies and disaster
CACE551.15	Relate their interconnections, particularly in the field of the Public Health aspects of the disasters
CACE551.16	Understand different approaches to prevent disasters.
CACE551.17	Understanding the race process of dealing with work place hazards.
CACE551.18	Identification of natural calamities that tends to hazards and disasters.

#### IX. HOW PROGRAM OUTCOMES ARE ASSESSED

Program Outcomes		Level	Proficiency assessed by
PO1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	S	Assignments, Tutorials.
PO2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	H	Assignments, Tutorials.
PO3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	N	---
PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	S	Open ended experiments
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	S	Mini projects
PO6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	N	---
PO7	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	N	---

<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	N	---
<b>PO9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	N	---
<b>PO10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	H	Seminars / 5 minute video
<b>PO11</b>	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	N	---
<b>PO12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	H	Seminar/Workshops

#### X. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED

Program Specific Outcomes		Level	Proficiency Assessed by
<b>PSO1</b>	<b>PROFESSIONAL SKILLS:</b> The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity	H	Assignment Tutorials
<b>PSO2</b>	<b>PROBLEM-SOLVING SKILLS:</b> The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success	S	Projects
<b>PSO3</b>	<b>SUCCESSFUL CAREER AND ENTREPRENEURSHIP:</b> The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies	S	Guest Lectures

N - None

S - Supportive

H – Highly related

#### XI. SYLLABUS

<b>Unit-1</b>
<b>ENVIRONMENTAL HAZARDS AND DISASTERS</b> Environmental hazards and disasters: meaning of environmental hazards, environmental disasters ; environmental stress; concept of environmental hazards, environmental stress and environmental disaster; different approaches and relation with human ecology, landscape approach, ecosystem approach, percept approach, human ecology and its application in geographical researches
<b>Unit-II</b>
<b>TYPES OF ENVIRONMENTAL HAZARDS AND DISASTERS</b> Types of environmental hazards and disasters: Natural hazards and disasters, man induced hazards and disasters, natural hazards, planetary hazards/ disasters, extra planetary hazards/ disasters, planetary hazards, endogenous hazards, exogenous hazards.
<b>Unit-III</b>
<b>ENDOGENOUS HAZARDS</b> Endogenous hazards, volcanic eruption, earthquakes, landslides, volcanic hazards/ disasters, causes and distribution of volcanoes, hazardous effects of volcanic eruptions, environmental impacts of volcanic eruptions.  Earthquake hazards/ disasters, causes of earthquakes, distribution of earthquakes, hazardous effects of, earthquakes, earthquake hazards in India, human adjustment, perception and mitigation of earthquake

<b>Unit-IV</b>
<b>EXOGENOUS HAZARDS</b>
Exogenous hazards/ disasters, infrequent events, cumulative atmospheric hazards/ disasters; Infrequent events: Cyclones , lightning , hailstorms; Cyclones: Tropical cyclones and local storms, destruction by tropical cyclones and local storms (causes, distribution human adjustment, perception and mitigation); Cumulative atmospheric hazards/ disasters: Floods, droughts, cold waves, heat waves floods; Causes of floods, flood hazards India, flood control measures ( human adjustment, perception and mitigation); Droughts: Impacts of droughts, drought hazards in India, drought control measures, extra planetary hazards/ disasters, man induced hazards /disasters, physical hazards/ disasters, soil erosion, Soil erosion: Mechanics and forms of soil erosion, factors and causes of soil erosion, conservation measures of soil erosion; Chemical hazards/ disasters: Release of toxic chemicals, nuclear explosion, sedimentation processes; Sedimentation processes: Global sedimentation problems regional sedimentation problems, sedimentation and environmental problems, corrective measures of erosion and sedimentation, biological hazards/ disasters, population explosion.
<b>Unit-V</b>
<b>EMERGING APPROACHES IN DISASTER MANAGEMENT</b>
Emerging approaches in Disaster Management, Three Stages 1. Pre, disaster stage (preparedness) 2. Emergency Stage 3. Post Disaster stage, Rehabilitation

**TEXT BOOKS:**

1	Pardeep Sahni, “Disaster Mitigation: Experiences and Reflections”, Prentice Hall Publishers, 2001.
2	J. Glynn and Gary W. Hein Ke, “Environmental Science and Engineering”, Prentice Hall Publishers, 1996.

**REFERENCE BOOKS:**

1	R.B.Singh (Ed), “Environmental Geography”, Heritage Publishers New Delhi, 1990.
2	R.B. Singh (Ed), “Disaster Management”, Rawat Publication, New Delhi, 2006.

**XII. COURSE PLAN:**

The course plan is meant as a guideline. There may probably be changes.

Lecture No.	Topic Outcomes	Topics to be covered	References
1	Understand Environmental hazards and disasters	Environmental Hazards & Disasters:	<b>T1: 1.1</b>
2	Understand Hazards	Meaning of Environmental Hazards	<b>T1:1.3</b>
3	Summarize about environment and Environmental stress.	Environmental Stress	<b>R2:1.6</b>
4	Understand about Environmental Stress.	Environmental stress.	<b>R1:2.2</b>
5-6	Understand the Concept of Environmental Hazards	Concept of Environmental Hazards	<b>T2:2.4</b>
7	Understand Environmental stress & Environmental Disasters	Environmental stress & Environmental Disasters	<b>T1:3.1</b>
8	Learn about ecology	Ecology	<b>R1:2.5</b>
9	Understand types of Approaches	Different Approaches	<b>T2:3.3</b>
10	Understand Landscape Approach -	Landscape Approach -	<b>T2:3.4</b>
11	Understand Ecosystem approach Perception approach -	Ecosystem approach - Perception approach	<b>T1:2.2</b>
12-13	Learn about Human ecology & its application in geographical researches.	Human ecology & its application in geographical researches.	<b>T1:3.4</b>
14	Understand the types of Environmental hazards & Disasters:	Types of Environmental hazards & Disasters:	<b>R1:3.7</b>

15-16	Understand Discuss about Natural hazards and Disasters	Natural hazards and Disasters	<b>T1:3.3</b>
17-18	Understand Man induced hazards & Disasters	Man induced hazards & Disasters	<b>T2:1.4</b>
19-20	Understand Natural Hazards- Planetary Hazards/ Disasters	Natural Hazards- Planetary Hazards/ Disasters	<b>T2:3.4</b>
21-22	Understand Discuss Planetary Hazards- Endogenous Hazards - Exogenous Hazards	Planetary Hazards- Endogenous Hazards - Exogenous Hazards	<b>T1:2.2</b>
23-24	Understand the reason for volcanic Eruption of – Earthquakes – Landslides	Volcanic Eruption – Earthquakes – Landslides	<b>T1:4.1</b>
25-26	Explain the Hazards/ Disasters - Causes and distribution of Volcanoes	Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes	<b>T2:3.2</b>
27-28	Discuss Hazardous effects of volcanic eruptions -	Hazardous effects of volcanic eruptions -	<b>R1:4.4</b>
29-30	Understand Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes	Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes	<b>R2:3.6</b>
31	Discuss the Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India	Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India	<b>R2:1.8</b>
32-33	Explain Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters,	Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters,	<b>T2:3.5</b>
34-35	Learn about harmful effects of Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones:	Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Earthquake Hazards in India	<b>T2:4.4</b>
36-37	Understand Impact of Tropical cyclones & Local storms	Tropical cyclones & Local storms -	<b>T1:4.2</b>
38	Identify the Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation)	Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation)	<b>R1:5.2</b>
39-40	Identify Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:-	Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:-	<b>R2:4.6</b>
41-42	Discuss the Flood control measures ( Human adjustment, perception & mitigation),	Flood control measures ( Human adjustment, perception & mitigation),	<b>R1:4.5</b>
43-44	Identify the Droughts:- Impacts of droughts- Drought hazards in India-	Droughts:- Impacts of droughts- Drought hazards in India-	<b>T2:4.4</b>
45-46	Discuss the Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters-	Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters-	<b>T2:1.4</b>
47-48	Understand Physical hazards/ Disasters- Soil Erosion.	Physical hazards/ Disasters-Soil Erosion.	<b>T1:1.5</b>
49-50	Explain the Soil Erosion:-- Mechanics	Soil Erosion- Mechanics	<b>R1:5.2</b>
51-52	forms of Soil Erosion- Factors & causes of Soil Erosion	Forms of Soil Erosion- Factors & causes of Soil Erosion	<b>R2:1.2</b>
53	Understand about Chemical Hazards	Chemical hazards and Disasters	<b>T2:5.2</b>
54	Learn about Nuclear Technology	Nuclear explosion and its behaviour	<b>T2:4.4</b>
55	Understand Sedimentation process	Sedimentation	<b>T1:1.2</b>
56	Learn about global sedimentation	Global sedimentation	<b>R2:5.2</b>
57	Look after Sedimentation process	Sedimentation problems with respect to environment	<b>T2:4.4</b>
58	Study about different Environmental problems	Environmental problems	<b>T1:6.3</b>
59	Meaning and control of Erosion	Measures of erosion, sedimentation	<b>T2:6.4</b>

60	Identifying Biological Hazards	Biological Hazards	<b>R2:5.5</b>
61	Identifying Biological Disasters	Biological Disasters	<b>R1:2.6</b>
62	Understand explosion of Population	Population explosion	<b>T2:5.2</b>
63	Identify different approaches in Disaster Management	Emerging approaches in Disaster Management	<b>T1:5.6</b>
64	Learn approaches	Approaches for Disaster	<b>T1:3.2</b>
65	Understand Emerging approaches in Disaster Management- Three Stages	Pre-disaster stage (preparedness)	<b>T1:5.5</b>
66	Discuss Emergency Stages of Disaster management	Emergency stages of disaster management	<b>R2:4.7</b>
67	Describe Post disaster stage rehabilitation.	Post disaster stage rehabilitation stage	<b>R2:4.8</b>
68	Describe Post disaster stage rehabilitation.	Rehabilitation stage	<b>T2:4.1</b>

### XIII. GAPS IN SYLLABUS TO MEET INDUSTRY/ PROFESSION REQUIREMENTS:

S NO	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH PO's	RELEVANCE WITH PSO's
1	Methods for obtaining flow nets, seepage in anisotropic soils	Seminars/Guest Lectures/NPTEL	PO 3, PO 4	PSO 1
2	Stresses in soil due to externally applied line, strip and trapezoidal loading	Seminars/Guest Lectures/NPTEL	PO 1	PSO 1
3	Fields tests to determine the shear strength of soils	Seminars/NPTEL	PO 4	PSO 1

### XIV. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF THE PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

Course Objectives	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
<b>I</b>	S				S					H			H		S
<b>II</b>		H								H				S	
<b>III</b>				S								H	H		S
<b>IV</b>	S									H					

**S – Supportive**

**H – Highly Related**

**XV.MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF THE PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES**

Course Learning Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CACE551.01	S									H		H	H		S
CACE551.02		H												S	
CACE551.03				S	S					H				S	
CACE551.04													H		S
CACE551.05				S								H		S	
CACE551.06	S	H											H		S
CACE551.07					S										
CACE551.08										H					
CACE551.09												H			
CACE551.10	S											H			S
CACE551.11	S			S	S							H		S	
CACE551.12															
CACE551.13		H													
CACE551.14					S					H		H	H		S
CACE551.15	S												H		
CACE551.16		H													S
CACE551.17					S								H		
CACE551.18										H					S

**S – Supportive**

**H - Highly Related**

**XVI. DESIGN BASED PROBLEMS (DP) / OPEN ENDED PROBLEM:**

1. Describe the structural mitigations and non- structural mitigations that should be restored to in case of floods.
2. How do engineered structures help us to withstand like floods, earthquakes, and cyclones?
3. Elucidate different skills and techniques adopted by a disaster manage

**Prepared by: Mr. S. Varadarajan, Assistant Professor**

**HOD, CIVIL ENGINEERING**