



INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING

COURSE DESCRIPTION FORM

Course Title	:	DISASTER MANGEMENT			
Course Code	:	A50117			
Regulation	:	R15 – JNTUH			
Course Structure	:	Lectures	Tutorials	Practicals	Credits
		4	-	-	4
Course Coordinator	:	Dr. Kavita Singh, Asso. Professor and Mr. K. Tarun Kumar			
Team of Instructors	:	Dr. Kavita Singh, Asso. Professor and Mr. K, Tarun Kumar			

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

PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	4	4	Knowledge of disaster management and its mitigation

II. MARKS DISTRIBUTION:

Sessional Marks	University End Exam marks	Total marks
Midterm Test There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment. The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks. The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries half mark.	75	100

Sessional Marks	University End Exam marks	Total marks
<p>First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.</p> <p>Five marks are earmarked for assignments. There shall be two assignments in every theory course. Assignments are usually issued at the time of commencement of the semester. These are of problem solving in nature with critical thinking.</p> <p>Marks shall be awarded considering the average of two midterm tests in each course.</p>		

III. EVALUATION SCHEME:

S. No	Component	Duration	Marks
1.	I Mid Examination	80 minutes	20
2.	I Assignment	-	5
3.	II Mid Examination	80 minutes	20
4.	II Assignment	-	5
5.	External Examination	3 hours	75

IV. COURSE OBJECTIVES:

At the end of the course, the students will be able to:

- I. **Identify** the major disaster types. and their environmental impacts. Develop an understanding of why and how the modern disaster management is involved with Pre-disaster and post-disaster activities.
- II. **Know** the key personnel or specialists related to disaster management and associate them with the types of disasters and phases in which they are useful..
- III. **Recognize** and develop awareness of the chronological phases of natural disaster response and refugee relief operations.
- IV. **Understand** how the phases of each are parallel and how they differ. Understand the key concepts of a) disaster management related to development, and b) the relationship of different disaster management activities to the appropriate disaster phase. Understand the relationship of disaster phases to each other and the linkage of activities from one phase to the next.
- V. **Understand** the "relief system" and the "disaster victim." Identify the organizations that are involved in natural disaster assistance.

V. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

1. **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.
2. **Describe**, 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

3. **Describe** different types of natural and man- made disasters. Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
4. **Describe** endogenous and exogenous hazards their harmful effects to the environment. Case studies of India.
5. **Obtain**, analyze, and communicate information on risks, relief needs and order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.
6. **Design** and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.
7. **Capacity** to analyze and evaluate research work on the field of emergencies and disaster while 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.

VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	H	Assignments, Tutorials, Exams
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences	H	Lectures, Assignments, Exams
PO3	Design/development of solutions: 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.	S	Mini Projects
PO4	Conduct investigations of complex problems: 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	Projects
PO5	Modern tool usage: 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	Projects
PO6	The engineer and society: 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.	S	Lectures, Assignments, Projects

PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	S	Labs, Exams, Assignments
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	S	Discussions
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	S	Lectures, Discussions
PO10	Communication: 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.	S	Labs
PO11	Life-long learning: 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.	S	Projects
PO12	Project management and finance: 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.	S	Discussions

S – Supportive

H - Highly Related

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	ENGINEERING KNOWLEDGE: Graduates shall demonstrate sound knowledge in analysis, design, laboratory investigations and construction aspects of civil engineering infrastructure, along with good foundation in mathematics, basic sciences and technical communication.	H	Lectures, Assignments
PSO2	BROADNESS AND DIVERSITY: Graduates will have a broad understanding of economical, environmental, societal, health and safety factors involved in infrastructural development, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.	H	Labs, Projects
PSO3	SELF-LEARNING AND SERVICE: Graduates will be motivated for continuous self-learning in engineering practice and/ or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.	S	Guest Lectures

Program Specific Outcomes	Level	Proficiency assessed by
S – Supportive		H - Highly Related

VIII. SYLLABUS:

UNIT I

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.

UNIT – II

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

UNIT – III

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.

UNIT – IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & 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 & forms of Soil Erosion- Factors & 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 & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

UNIT – V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

Disaster Mitigation: Experiences And Reflections by Pardeep Sahni

References:

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
3. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
8. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

IX. COURSE PLAN:

At the end of the course, the students are able to achieve the following course learning outcomes:

Lecture No.	Course Learning Outcomes	Topics to be covered	Reference
1-2	Understand Environmental hazards and disasters	Environmental Hazards & Disasters:	T1,R1
3-4	Summarize about environment and importance of ecosystems	Environmental hazards, Environmental Disasters.	T1,R1
5-6	Understand about Environmental Stress.	Environmental stress.	T1,R1
7-8	Understand the Concept of Environmental Hazards	Concept of Environmental Hazards	T1,R1
9-10	Understand Environmental stress & Environmental Disasters	Environmental stress & Environmental Disasters	T1,R1
11-12	Understand Endogenous Hazards -	Endogenous Hazards -	T1,R1
13-14	Understand Landscape Approach - Ecosystem Approach - Perception approach -	Landscape Approach - Ecosystem Approach - Perception approach -	T1,R1
15-16	Learn about Human ecology & its application in geographical researches.	Human ecology & its application in geographical researches.	T1,R1

17-18	Understand types of Environmental hazards & Disasters:	Types of Environmental hazards & Disasters:	T1,R1
19-20	Understand Discuss about Natural hazards and Disasters	Natural hazards and Disasters	T1,R1
21-22	Understand Man induced hazards & Disasters	Man induced hazards & Disasters	T1,R1
23-24	Understand Natural Hazards- Planetary Hazards/ Disasters	Natural Hazards- Planetary Hazards/ Disasters	T1,R1
25-26	Understand Discuss Planetary Hazards- Endogenous Hazards - Exogenous Hazards	Planetary Hazards- Endogenous Hazards - Exogenous Hazards	T1,R1
27-28	Understand the reason for volcanic Eruption of – Earthquakes – Landslides	Volcanic Eruption – Earthquakes – Landslides	T1,R1
29-30	Explain the Hazards/ Disasters - Causes and distribution of Volcanoes	Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes	T1,R1
31-32	Discuss Hazardous effects of volcanic eruptions -	Hazardous effects of volcanic eruptions -	T1,R1
33-34	Understand Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes	Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes	T1
35-36	Discuss the Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India	Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India	T1,R1
37-38	Explain Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters,	Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters,	T1,R1
39-40	Learn about harmful effects of Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones:	Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Earthquake Hazards in India	T1,R1
41-42	Understand Impact of Tropical cyclones & Local storms	Tropical cyclones & Local storms -	T1,R1
43-44	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)	T1

45-46	Identify Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:-	Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:-	T1,R1
47-48	Discuss the Flood control measures (Human adjustment, perception & mitigation),	Flood control measures (Human adjustment, perception & mitigation),	T1,R1
49-50	Identify the Droughts:- Impacts of droughts- Drought hazards in India-	Droughts:- Impacts of droughts- Drought hazards in India-	T1,R1
51-52	Discuss the Extra Palnetary Hazards/ Disasters- Man induced Hazards /Disasters-	Extra Palnetary Hazards/ Disasters- Man induced Hazards /Disasters	T1,R1
53-54	Understand Physical hazards/ Disasters-Soil Erosion.	Physical hazards/ Disasters- Soil Erosion.	T1,R1
55-56	Explain the Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion	Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion	T1, R1
57-58	Understand Define Conservation measures of Soil Erosion,	Conservation measures of Soil Erosion,	T1,R1
59-60	Understand Chemical hazards/ disasters Release of toxic chemicals,	Chemical hazards/ disasters Release of toxic chemicals,	T1,R1
61-62	Identify the effects of nuclear explosion- Sedimentation processes,	nuclear explosion- Sedimentation processes,	T1,R1
63-64	Understand Sedimentation processes	Sedimentation processes:-	T1,R1
65	Discuss Global Sedimentation problems	Global Sedimentation problems -	T1,R1
66	Understand Regional Sedimentation problems	Regional Sedimentation problems	T1,R1
67	Identify the Sedimentation & Environmental problems-	Sedimentation & Environmental problems-	T1,R1

68	Discuss the Corrective measures of Erosion & Sedimentation	Corrective measures of Erosion & Sedimentation,	T1,R1
69	Discuss Biological hazards/ disasters: Population Explosion.	Biological hazards/ disasters:- Population Explosion	T1,R1
70	Understand the Emerging Management- Three Stages approaches in Disaster	Emerging approaches in Disaster Management- Three Stages	T1,R1
71	Understand Management- Three Stages 1. Pre- disaster stage (preparedness)	1. Pre- disaster stage (preparedness)	T1, R1
72	Understand Emergency Stage importance and Post Disaster stage- Rehabilitation phase	Emergency Stage Post Disaster stage- Rehabilitation	T1,R1

X. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF 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
I	S	H	S	S	S		S	S	S	S	S			H	
II	S	H	S	S	S		S	S	S	S	S			H	
III	S	H	S	S	S		S	S	S	S	S			H	
IV	S	H	S	S	S		S	S	S	S	S			H	
V	S	H	S	S	S		S	S	S	S	S			H	

S – Supportive

H - Highly Related

XI. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcomes	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	S	H	H	S	S	H	S	S	H	S		S		H	
2	S	H	H	S	H	H	S	S	H	S	S	S		H	
3		S	H	S	S	S	S	S	H	S		S		H	
4		H	S	S	S	S	S	S	H	S		S		H	
5	S	H	S	S	S	S	S	S	H	S	S	S		H	
6	S	H	H	S	S	S	S	S	S	S		S		H	
7	H	H	H	S	S	S	S	S	H	S	S	S		H	

S – Supportive

H - Highly Related

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