INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

DEFINITION AND TERMINOLOGY

Course Title	**DISASTER MANAGEMENT**				
Course Code	ACEC31				
Program	B.Tech				
Semester	VI	EEE			
Course Type	Open Elective III				
Regulation	IARE - UG20				
Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	-	3	-	-
Course Coordinator	Ms.B Bhavani, Assistant Professor				

COURSE OBJECTIVES:

The students will try to learn:

I	The concept of environmental hazards, disasters and various approaches dealing with the mitigation of disasters.
II	The knowledge on various types of environmental disasters and their impacts on human beings and nature.
III	The Different types of endogenous and exogenous hazards and their influence on human life and nature.
IV	The immediate response and damage assessment with information reporting and monitoring tools.

COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Classify** Environmental hazards for developing modern disaster management system.	Understand
CO 2	**Explain** various approaches for reducing the level of risk associated with Disasters.	Understand
CO 3	**Compare** natural and manmade disasters for finding out intensity of damage loss occurred by them.	Understand

CO 4	**List** various hazards and their effects for evaluating their impact on society and Environment.	Remember
CO 5	**Explain** human adjustments and perception towards hazards for mitigation of disasters.	Understand
CO 6	**Summarize** disaster phenomenon and its different contextual aspects for implementing the Disaster Risk Reduction Strategy.	Understand
CO 7	**Explain** the characteristics of natural disasters used for mitigating of risk involved in property and life loss.	Understand
CO 8	**Classify** Environmental disasters for developing modern disaster risk reduction system.	Understand
CO 9	**Identify** Post Disaster stages and Rehabilitation for disaster mitigation towards the restoration of human-centered services.	Apply

DEFINITION AND TERMINOLOGY:

S.No	DEFINITION	CO's
MODULE I		
ENVIRONMENTAL HAZARDS AND DISASTERS		
1	**State various phases of disaster** Phases of disaster,1.Pre-impact phase 2.Impact phase 3.Post-impact phase	CO 1
2	**Define Principles of disaster management** Disaster management should use resources that exist for a day-to-day purpose. Individuals are responsible for their own safety.	CO 1
3	**Define rehabilitation phase** Water supply, Food safety, Basic sanitation and personal hygiene.	CO 1
4	**Define extra tropical Cyclones.** Extra tropical cyclones, sometimes called mid-latitude cyclones, are a group of cyclones defined as synoptic scale low pressure weather systems that occur in the middle latitudes of the Earth.	CO 1
5	**List various types of environmental disasters.** 1.Geo-hydrologicaldisasters. 2.Chemical accidents/disasters 3.Industrial environmental disasters.	CO 1
6	**Define cyclones.** Cyclone is the term used globally to cover tropical weather systems in which winds equal or exceed force (62kmph). These are intense low pressure areas of the earth atmosphere coupled system and are extreme weather events of the tropics.	CO 1
7	**What is National emergency management organization?** A national emergency management organization that is separate from other government agencies is preferable. Responsibility should also be decentralized to provincial government.	CO 1

8	**List any four environmental disasters.** 1.Bhopal: the Union Carbide gas leak.2 Chernobyl: Russian nuclear power plant explosion. 3Seveso: Italian dioxin crisis. 4.The 1952 London smog disaster	CO 1
9	**What is disaster-management cycle.** The Disaster management cycle illustrates process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred	CO 1
10	**What are factor of avalanche possibility.** The biggest factor of avalanche possibility is the accumulation snow over the winter season More snow = bigger avalanche	CO 1
11	**Define Earthquakes.** Earthquakes are caused by the release of built up pressure caused by the shifting of Tectonic plates-Earthquakes usually occur on fault lines, or areas where tectonic plates meet	CO 1
12	**Define Global warming** Global warming is the rise in the average temperature of Earth's atmosphere and oceans since the late 19th century and its projected continuation. Since the early 20th century, Earth's mean surface temperature has increased by about 0.8 °C (1.4 °F), which about two thirds of the increase occurring since 1980.	CO 2
13	**What are the major forms of pollution** The release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, sulfur dioxide, chlorofluorocarbons (CFCs) and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight.	CO 2
14	**Recall disaster and hazard** Hazard is a dangerous situation or event that poses a threat to humans while disaster is an event that actually harms human's life, property and thus disrupts social activities.	CO 2
MODULE II		
TYPES OF ENVIRONMENTAL HAZARDS AND DISASTERS		
1	**What is Environmental Degradation?** Environmental degradation is the disintegration of the earth or deterioration of the environment through consumption of assets, for example, air, water and soil; the destruction of environments and the eradication of wildlife.	CO 2
2	**State the causes of Environmental Degradation** 1.Land Disturbance. 2.Pollution 3.Overpopulation 4.Landfills 5.Deforestation 6 Natural Causes	CO 2

3	**List various types of damages occurred due to avalanches.** Traffic blocked by snow deposited on road surface. Roads damaged by avalanches. Road structures, such as retaining walls, overturned	CO 2
4	**What are the prevention of biological disasters?** Environmental Management. Post-disaster Epidemics Prevention. Detection and Containment of Outbreaks	CO 2
5	**What are the types of natural disaster?** Tornadoes and Severe Storms. Hurricanes and Tropical Storms. Floods. Wildfires. Earthquakes. Drought. Land-slides.	CO 2
6	**State different types of Natural Disasters** Atmospheric. Terrestrial. Aquatic. Biological.	CO 3
7	**State different types of droughts** Meteorological Drought. Agricultural Drought. Hydrological Drought	CO 3
8	**Define Hydrological Drought** It results when the availability of water in different storages and reservoirs like aquifers, lakes, reservoirs, etc. falls below what the precipitation can replenish.	CO 3
9	**Define Ecological Drought** When the productivity of a natural ecosystem fails due to shortage of water and as a consequence of ecological distress, damages are induced in the ecosystem.	CO 3
10	**List various causes of drought.** The primary cause of any drought is deficiency of rainfall and in particular, the timing, distribution and intensity of this deficiency in relation to existing reserves.	CO 3
11	**Define Tropical Cyclone** The major natural disaster that affects the coastal regions of India is cyclone and as India has a coastline of about 7516 kms, it is exposed to nearly 10 percent of the world's tropical cyclones. About 71 percent of this area is in ten states.	CO 3
12	**Define Cold Wave.** Occurrences of extreme low temperature in association with incursion of dry cold winds from north into the sub-continent are known as cold waves. The northern parts of India, specially the hilly regions and the adjoining plains, are influenced by transient disturbances.	CO 3
13	**Define Tsunami** An Earthquake which comes under sea is called Tsunami	CO 3
14	**What is Richter Scale** Richter Scale is used to measure earthquake intensity.	CO 3
15	**Define Disaster** A disaster is an event which results in loss of life, loss of property and loss of lively hood.	CO 3

MODULE III		
ENDOGENOUS HAZARDS		
1	**What are the main causes of an earthquake** Great explosions, landslides, slips on steep coasts, dashing of sea waves , avalanches , railway trains, heavy trucks, some large engineering projects cause minor tremors. some of them are manmade, other are natural.	CO 4
2	**Classification of Hazards On the basis of origin of the hazards .** Terrestrial hazards, Exo genic Hazards And Biotic Hazards	CO 4
3	**Why Regional Sediment Management** Sediment is an essential and dynamic part of the Harbor Estuary; its quality and quantity are integral to ecosystem health and a fundamental component of the regional economy.	CO 4
4	**What are the prevention of biological disasters?** Environmental Management. Post-disaster Epidemics Prevention. Detection and Containment of Outbreaks	CO 2
5	**What are the types of natural disaster?** Tornadoes and Severe Storms. Hurricanes and Tropical Storms. Floods. Wildfires. Earthquakes. Drought. Land-slides.	CO 2
6	**State different types of Natural Disasters** Atmospheric. Terrestrial. Aquatic. Biological.	CO 3
7	**State Common types of toxic gases encountered in confined spaces.** Hydrogen Sulfide, Carbon monoxide, olvents.	CO 4
8	**Define atmospheric hazards** Atmospheric hazards include things such as oxygen deficiencies, dusts, chemical vapors, welding fumes, fogs, and mists that can interfere with the bodies ability to transport and utilize oxygen, or that have negative toxicological effects on the human body.	CO 5
9	**Where do earthquakes occur most frequently** The uppermost layers of the earth are made up of many rigid plates (tectonic plates) that either slide towards or away from each other or over and under each other. The strongest earthquakes usually occur along the plate boundaries.	CO 5
10	**Define epicentre.** The epicentre is located on the Earth's surface directly above an earthquake's hypo centre. This is the place in the Earth's crust where the fracture begins to spread across the fracture face.	CO 5

11	**What is "earthquake magnitude"?** Magnitude is the logarithmic measure of the seismic energy released by an earthquake at its hypo centre. To determine the magnitude, the ground movements must be recorded as seismograms using seismometers. An increase in magnitude of one unit corresponds to an increase in ground movement by a factor of 10 and increase in energy roughly to the power of thirty.	CO 5
12	**What is a Richter scale?** It is a magnitude scale designed by the American seismologist Charles Francis Richter in 1935 for California. It ranks the ground motion of the primary waves measured with a special seismograph on a logarithmic scale.	CO 5
13	**What is NDMA?** National Disaster Management Authority	CO 5
14	**Recall health effects of global environmental change** Global warming may cause increased heat-wave-related illness and death, the spread of vector borne infections, and more frequent cyclones, floods, landslides and fires. The resulting rise in sea levels may lead to health problems associated with deteriorating water supply and sanitation, loss of agricultural land and fishing grounds, and flooding.	CO 5
15	**What are the Responsibility for environmental health manager in disasters and emergencies?** There is seldom a single environmental health manager responsible for emergency planning. In most countries, particularly in urban areas, numerous local government bodies and private enterprises are responsible for environmental health infrastructure and services, with little coordination between them. It is not only professional sanitary engineers and public health workers who must be involved in emergency planning.	CO 5
MODULE IV		
EXOGENOUS HAZARDS		
1	**State various types of cyclones** Tropical cyclone, Subtropical cyclone , Extra tropical cyclone	CO 5
2	**Define tropical cyclone** Tropical Cyclone Genesis is the technical term for the process of storm formation that leads ultimately to what are called hurricanes, typhoons, or tropical cyclones in various parts of the world.	CO 5

3	**Define hydro-meteorological disasters** A flood is an excess of water (or mud) on land that's normally dry and is a situation where in the inundation is caused by high flow, or overflow of water in an established watercourse, such as a river, stream, or drainage ditch; or ponding of water at or near the point where the rain fell. This is a duration type event. A flood can strike anywhere without warning, occurs when a large volume of rain falls within a short time.	CO 5
4	**State different types of floods** Flash Floods, River Floods, Coastal Floods, Urban and small stream flood	CO 5
5	**State primary causes for Floods** Intense rainfall when the river is flowing full. Cyclone and very intense rainfall when the EL Nino effect is on a decline. Synchronization of flood peaks in the main rivers or their tributaries. Landslides leading to obstruction of flow and change in the river course. Poor natural drainage system. Backing water in tributaries at their confluence with the main river.	CO 5
6	**Specify the Flood Safety Tips** 1. All your family members should know the safe routes to nearest shelter/raised house. 2. If your area is flood-prone, consider suitable flood resistant building materials. 3. Tune to your local radio/TV for warnings and advice. Have an emergency kit ready.	CO 5
7	**What are the flood management Components** (i) Critical flood control and river management works in the entire country (includes river management, flood control, anti-erosion, drainage development, anti-sea erosion, and flood proofing works besides flood prone area development programme in critical regions and restoration of damaged flood control/ management works). (ii) The spillover works of on-going central plan schemes of Xth Plan would also be supported under this scheme.	CO 5
8	**Explain about physical hazards** A physical hazard is defined as "A factor within the environment that can harm the body without necessarily touching it. Vibration and noise are examples of physical hazards". Physical hazards include but aren't limited to electricity, radiation, pressure, noise, heights and vibration amongst many others.	CO 5
9	**Define soil erosion** The upper layer of the soil consists of fine soil particles. It is rich in minerals and has humus. Hence, humus makes the soil fertile. Sometimes heavy rain, running water and wind remove the top layer of soil. This phenomenon is soil erosion.	CO 5

10	**Explain about soil by water erodes.** Water erodes soil mainly in two ways: 1) By the violent splash of the falling raindrop on bare soil. 2)By the scouring action of soil-laden water moving down the slopes.	CO 5
11	**Explain about Wind Erosion** Wind erosion starts when bare sandy soil becomes dry and high winds roll the sand grains over each other, resulting in shifting sand dunes. During dust storms, the finer particles of silt may be picked up by the wind and carried for miles. The results are depletion of the soil, a covering up of good farmland by worthless sand, and menacing dust storms.	CO 5
12	**What are the Causes of Soil Erosion** Soil erosion is a natural process which occur when there is loss of or removal of top layer of soil to due to rain, wind, deforestation or any other human activity	CO 5
13	**What are the problems caused by soil erosion** In India a total of 1 750 000 km2 out of the total land area of 3 280 000 km2 is prone to soil erosion. Thus about 53% of the total land area of India is prone to erosion Areas affected by soil erosion in India can be broadly grouped into two categories, representing, firstly, the Himalayan and Lower Himalayan region and, secondly, other regions.	CO 5
14	**Explain about sediment basins** Basins constructed to collect and store sediment during runoff events. Also known as detention ponds. Sediment is deposited from runoff during impoundment in the sediment basin.	CO 5
15	**Explain about Terracing.** Terraces are constructed earthen embankments that retard runoff and reduce erosion by breaking the slope into numerous flat surfaces separated by slopes that are protected with permanent vegetation or which are constructed from stone, etc.	CO 5
MODULE V		
DESIGN, MATERIALS AND TESTING OF ROCKETS		
1	**What is disaster prevention and mitigation** Disaster prevention and mitigation refers to the activities which are undertaken to prevent or mitigate the adverse effects of a disaster.	CO 6
2	**Define disaster preparedness** The intention of Disaster preparedness is to prevent or minimize the losses and damage in case of a disaster.	CO 6

3	**Define response, recovery and reconstruction.** The response phase includes the search and rescue; fulfilling basic humanitarian needs of victims. Assistance by regional, national and international bodies etc. Recovery phase starts after the immediate threat to human life has subsided. The immediate goal of the recovery phase is to bring the affected area back to some degree of normalcy. During reconstruction, the location or construction material of the property is considered.	CO 6
4	**Define the goal of Environment and Disaster Management** The goal of Environment and Disaster Management is the safety and sustainability of human lives. Safety is related to avoiding death and injuries to human lives during a disaster Sustainability is related to livelihood, socio-economic, cultural, environmental and psychological aspects.	CO 6
5	**Recall Coastal Zone Management and Disaster Preparedness** Green belt and mangrove in the coastal zone, coral reef protection and coastal regulatory zones are considered as environment protection measures. However, these elements are strongly linked to tsunami protection in the coastal areas. Livelihood support to the fisherman, protection of environment in the coastal area, and disaster prevention interface was lacking in most of the places.	CO 6
6	**What is Community risk assessment** A highly localized risk analysis is produced in this way, and local participants also discuss the appropriate response to those risks. Past disasters are recalled. Lessons of other people's experience are discussed. In this way, the locality studies itself. A core group of knowledgeable and motivated volunteers is developed, who can help to train others in the community, possibly on a paid basis.	CO 6
7	**Define risk perception** The perception of risk is not universally the same. It can vary from culture to culture, by socioeconomic class and even by individual. For example, many farmers live on the slopes of active volcanoes or in the flood plains of rivers because they perceive the balance of benefits to risks as favorable. However, some risks are not consciously chosen, but simply thrust upon people because information is not made available and there is no public discussion.	CO 6

8	**What are the points should Remember at the time of disaster emergency** Language used should be simple and non-technical. If different warning systems are used, they should not give conflicting messages, or people will tend to ignore them. Messages should state clearly the exact nature of the impending threat and its implications for the target population. The potential victims of a disaster should be clearly identified.	CO 6
9	**What are the Problems with temporary emergency settlements** Inappropriate choices of settlement sites. These sites are usually forced settlement sites and the problems include: no reliable water supplies; a high water-table Random defecation. This is hard to control when populations have no experience of, or access to, latrines. A population that is too frightened, too hostile, or too socially fragmented to collaborate effectively.	CO 6
10	**What are the priorities in the acute emergency phase** Protecting water supplies from contamination. Providing a minimum amount of water for drinking, cooking and personal and domestic hygiene. Ensuring that people have enough water containers to collect and store water cleanly. Ensuring that people have sufficient cooking utensils, equipment and fuel to cook and store food safely.	CO 6
11	**What are the Facilities for emergency personnel** The facilities required by emergency personnel will vary substantially according to the customary level of basic support, the task involved and the local conditions generated by the emergency. Broadly, however, all facilities will have common requirements, including: basic personal needs; family support; safety and security; emotional support and counselling.	CO 6
12	**Safety needs of personnel in post-disaster** In post-disaster situations there are many other threats to the health and safety of staff. The working environment tends to be unsafe, as a result of damage to buildings and roads, infectious diseases, or lack of appropriate equipment for reconstruction. In addition, the need to act fast, the great risks faced by the affected population, and the lack of close monitoring all discourage staff from applying health and safety procedures.	CO 6

13	**How you can Increasing individual and institutional capacity at the time of disaster** Increasing the capacity of people to offset risk, absorb shocks and meet contingencies is central to the goal of sustainable recovery. Reconstruction of a damaged area is not limited to the erection of new buildings. An integrated development process is required that should embrace the full redevelopment of the affected area according to the needs of its population.	CO 6
14	**Why transportation and logistics is important at the time of disaster** Transportation is needed for a range of environmental health operations during emergencies, including: moving assessment and operational teams; road clearance; moving people affected by disaster; moving equipment and supplies; trucking water.	CO 6
15	**State various Special rules in areas of high potential public-health risk.** The following major risk areas must be subject to detailed control and regulation, even under extreme emergency conditions. The continued operation or recommissioning of large water-supply systems that have been damaged. The selection of sources for emergency water supply. The emergency disposal of toxic materials, especially soluble industrial waste. large-scale feeding	CO 6

Course Coordinator: **HOD, CE**
Ms.B Bhavani,, Assistant Professor