



Central University of Himachal Pradesh

(ESTABLISHED UNDER CENTRAL UNIVERSITIES ACT 2009)

Dharamshala, Himachal Pradesh-176215

75
आज़ादी का
अमृत महोत्सव

NAAC Criterion-I

Key Indicator – 1.3.2

**Brochure and course content or syllabus along
with courses outcomes of values added courses**

1.3.2 Evidences



**Central University of Himachal Pradesh, Dharamshala,
Kangra**

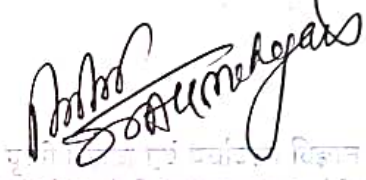


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Department of Environmental Sciences

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अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विभाग, देहरा
Dean, School of Earth & Environmental Sciences
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय
Central University of Himachal Pradesh
आस्था, विश्वविद्यालय, देहरादून
शासक, देहरादून (Dehra/Dharamshala, Utt. Pr.)



CENTRAL UNIVERSITY OF HIMACHAL PRADESH

[Established under the Central Universities Act 2009]

PO Box: 21, Dharamshala, District Kangra - 176215 (HP)

www.cuhimachal.ac.in

Value added Courses Offered from Department of Environmental Sciences

YEAR - 2018

Course code: FHM-14 (ENV 437)

Course Name: Earthquake awareness FHM -14 (Human Making course-new course)

Teacher: Prof A.K. Mahajan

Course Objective

Why this course is important: Trends for disaster losses are increasing rapidly, and earthquake disasters are among the highest threats. Projected losses are unsustainable, and there must be greater emphasis placed on mitigation of hazards, as opposed to the traditional approach that placed most emphasis on response and recovery. This course is intended to help create a new generation of earthquake hazard managers who are better informed and better prepared to make decisions, obtain relevant information, and better understand how to make effective impacts on reduction of earthquake hazards. Since the students are from different field i.e. sciences and Humanities group so the information is provided accordingly.

Attendance Requirement:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25% (Breakup is following)

Course Outcome: The outcome of the course will be

- Co¹ Do and don'ts about earthquake
- CO² Awareness about the earthquake occurrence and its mitigation

- **Co³ How to protect yourself from earthquake disaster**
- **Co⁴ How to construct environment from earthquake**
- **Co⁵ Employability in disaster management centers of different states**

Lecture Topics (approximate Duration): 20 hrs

Unit-1

1. Introduction: purpose of course, requirements (1 hrs.)
2. Causes of Earthquakes: basic cause of earthquakes (2 hrs.)
3. Distribution of Earthquakes: where earthquakes tend to occur (1 hrs.)

Unit-2

4. Characteristics of Earthquakes: measuring sizes of earthquakes, etc. How to measure an earthquake magnitude and intensity. What are different magnitude scales like Richter scale, body wave magnitude, surface wave magnitude and moment magnitude. What are different intensity scales explain each intensity scale i.e. Rossi Forel scale, MMI Intensity scale, MSK-64 intensity scale and EMS -98 scale. (2 hrs.)
6. Earthquake Research and Information: Why is earthquake research important for hazard reduction, what do we know and what are the contemporary research issues (prediction, etc.)? (2 hrs.)

Unit-3

7. The Nature and Effects of Earthquake Hazards: How earthquake hazards are unique and what affects they produce (2 hrs.)

Unit-4

8. Seismic zonation of India, criteria for seismic zonation, different seismic zoning map of India 2Hrs
9. Awareness and preparedness: public awareness, awareness derives earthquake preparedness, medical preparedness, disaster management plans and schedule for awareness activities. Disaster Phases and Earthquake Policies: review of earthquake disaster phases and history and current status of earthquake policy (2 hrs.)

Unit 5

10. Mitigation: what mitigation involves, typical mitigation procedures, and the importance of this concept what mitigation involves, typical mitigation procedures, and the importance of this concept (1 hrs.)
11. Earthquake Disaster Response and Recovery: a brief on overview and basic principles and issues associated with earthquake response and recovery (1 hrs.)

12. Nature of Earthquake Disaster Vulnerability: what factors affect earthquake vulnerability and why is there a growing trend for disaster losses? Community participation for outreach programme. (2 hrs.)

Books Recommended:

1. Srivastava H.N. 2004. Earthquakes, Forecasting and Mitigation National Book Trust pub. 399p
2. NDMA Report: Earthquake disaster guidelines 48p
<http://www.ndma.gov.in/en/guidelines.html>
3. GSI 1992. Uttarkashi Earthquake October, 20, 1991. Geol. Surv. Spec. Publ. 30 Case histories of Uttarkashi earthquake .
4. Sharma K.K, et al., 2006. Environmental Geohazards: Science and society Research India press. 455pp.
5. Notes to be provided by the teachers from time to time. As the topic does not have one books for all lectures.

YEAR - 2018

Course Name: Basics of Climate Change

Course Code: ENV 443

Level: 4

Credits: 2

Credits Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Outcomes:

On completion of the course, the students will be able:

1. To know about the structure and various components constituting the Earth's Climate System.
2. To distinguish between climate variability and climate change.
3. To understand Natural and Human Drivers of Climate Change.
4. To understand the roles of atmospheric aerosols and gases in the present process of Climate Change.
5. To know about the observations of climate change in the various spheres of the Earth's Environment.

Course Outcomes:

The deliverables Learning Outcomes of this paper with students are following:

- CO¹ Student will be able to understand the Earth's Climate System.
- CO² Will distinguish between natural climate variability and anthropogenic climate change.
- CO³ Familiarize the concept of Green House Effect, Radiative Forcing and Climate Sensitivity.
- CO⁴ Will be able to map the concept, meaning and theories of carbon sequestration and carbon capture.
- CO⁵ Explore the different phases of climate variability in the past and observation of present era of Global Climate Change.

Attendance Requirements:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination:20%
2. End Term Examination:60%
3. Continuous Internal Assessment: 20%. i.e. 20 marks out of100

Unit I: The Climate System: an overview [5

Hrs]

- Weather Vs Climate
- Components of the Climate System
- The Driving Forces of Climate
- Climate Parameters and Data-sets available to study Climate Change,
- Observed Natural Vs Anthropogenic Climate Change

Unit II: Natural and Human Drivers of Climate Change [5

Hrs]

- The Sun and the Earth Geometry,
- Milankovitch Cycles, Solar Constant,
- The Effect Temperature of the Earth,
- Green House Effect,
- The concept of Radiative Forcing and Climate Sensitivity

Unit III: Radiative effects of Aerosol and Gases [5

Hrs]

- Greenhouse gases
- Halocarbon radiative forcing
- Radiative forcing due to stratospheric ozone changes
- Tropospheric Aerosols: Direct forcing due to Sulphate aerosols and Soot aerosols,
- Indirect forcing due to effect of aerosols on cloud properties,

Unit IV: Observations of Changes in Climate

[5

Hrs]

- Atmospheric Changes: Instrumental Record,
- Changes in the Ocean: Instrumental Record,
- Changes in the Cryosphere: Instrumental Record,
- A Palaeoclimatic Perspective,
- Extreme Weather Events

Essential Readings

- Intergovernmental Panel on Climate Change (1995), *Climate Change 1995: The Science of Climate Change*, Edited by J.T. Houghton, L.G. MeiraFilho, B.A. Callander, N. Harris, A. Kattenberg and K. Maskell, Cambridge University Press, ISBN: 0 521 56436 0
- Intergovernmental Panel On Climate Change (2007), *Specifications of Climate Change 2007 - The Physical Science Basis*, Cambridge University Press, ISBN: 9780521705967
- John H. Seinfeld, Spyros N. Pandis: *Atmospheric Chemistry and Physics*, John Wiley & Sons, Inc., ISBN: 978-0-471-72018-8

Course Code: **ENV 547**
Course Name: **Contemporary Environmental Issues**

Credits: 2
Teacher: Dr. Dilbag Singh

Credits Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organized classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Aim: The main thing is to introduce the student to concepts and applications of geophysics to solving environmental and engineering problems.

Course Objective

This interdisciplinary course examines a broad range of contemporary global environmental issues, such as biodiversity, pollution, population growth, and global warming, and focuses on how those big issues might affect us locally. It develops students' environmental literacy and enables them to take part in informed debate and action. Disciplinary knowledge enables students to develop a comprehensive understanding of various facets of life forms, ecological processes and how humans have impacted them during the Anthropocene era. It also develops a critical thinking capability to identify relevant environmental issues, analyze the various underlying causes, evaluate the practices and policies, and develop framework to make informed decisions.

Course Outcomes:

- CO¹ Gaining in-depth knowledge on natural processes that sustain life and govern economy.
- CO² Predicting the consequences of human actions on the web of life, global economy and quality of human life.
- CO³ Developing critical thinking for shaping strategies (scientific, social, economic and legal) for environmental protection and conservation of biodiversity, social equity and sustainable development.
- CO⁴ Acquiring values and attitudes towards understanding complex environmental economic-social challenges, and participating actively in solving current environmental problems and preventing the future ones.
- CO⁵ Adopting sustainability as a practice in life, society and industry.

Attendance Requirement:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

4. Mid Term Examination: 20%
5. End Term Examination: 60%
6. Continuous Internal Assessment: 20% (Breakup is following)
 - a. Assignment/Quiz/Term Paper: 20%
 - b. Presentation/Seminar/Field work: 20%
 - c. Practical: 60%

Course content**UNIT – I**

Environmental Education and Awareness, Environmental Ethics and Global Imperatives, Global Environmental problems- Acid rain, ozone depletion, Agenda-21, Global Warming and Climate Change. (4)

UNIT – II

National Action Plan on Climate Change, National Solar Mission, National Water Mission, National Mission for Enhanced Energy Efficiency, Sustainable Habitat, Sustaining the Himalayan Ecosystem, A Green India, Sustainable Agriculture and Strategic Knowledge on Climate Change. (4)

UNIT – III

Current Environmental issue in India, Desertification and its Control, Vehicular Pollution and Urban Air Quality, Waste Land and their Reclamation, Epidemiological Issue (e.g. Goitre, Fluorosis, Arsenic), National River Conservation Plan, Ganga Action Plan and NAMAMI GANGE. (4)

UNIT – IV

Carbon Sequestration, Types of Sequestration, Carbon credit, Rain Water Harvesting, Ground Water Recharge in Rural and Urban Areas, Wet Land Ecosystem, National Wetland Conservation Program (NWCP), Ramsar Convention. (4)

UNIT – V

Project Tiger, Project Elephant, Indian Rhino Vision 2020, Sea Turtle Project, The Crocodile Conservation Project, Eutrophication and Restoration of Indian Lakes. (4)

Books Recommended:

1. Contemporary Environmental Issues by Slattery Michael
2. Global Environmental Issues by Frances Harris

3. Environmental Issues in India: A Reader by Mahesh Rangarajan
Course Articulation Matrix of ENV 547

Course outcome/PSO's	PSO's ¹	PSO's ²	PSO's ³	PO's ¹	PO's ²	PO's ³	PO's ⁴
Co ¹	3	3	3	2	3	2	3
Co ²	3	3	2	3	3	2	2
Co ³	3	3	2	3	2	3	2
Co ⁴	3	3	3	3	2	3	3
Co ⁵	3	2	3	3	2	3	3

1: Partially Related, 2: Moderately Related, 3: Highly Related

YEAR – 2019

Course Code: ENV 441
Course Name: Water Resource Conservation in Hilly Region
Faculty: Dr. Anurag Linda

Credits Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Objectives: The course is designed to:

- Introduce the concept water resource management in the Himalaya
- Understand the distribution of surface and groundwater resources.
- Understand basic concepts and methods for rain and snow water harvesting and its use for agriculture, drinking etc.
- Understand different techniques for artificial recharge of ground water and spring revival
- Understand different structures as well as some of the traditional practices prevalent in this country for water conservation in the Himalaya.

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25% (Breakup is following)
 - a. Assignment/Quiz/: 40%
 - b. Presentation/Seminar/: 40%
 - c. Class participation: 20%

Course Contents:

Unit I

4 hrs

- Water as a resource and its usage in evolution of history
- Water Resources development Scenario in the Himalaya and its environmental impact
- Brief outline of historic development in the Himalaya and its impact on natural drainage pattern

- Indian Water Scenario with respect to different season's in the hills and plains.

Unit II

4 hrs

- Distribution of surface and ground water resources: dimension and challenges
- Land use and Land Cover change, Hydrological cycle and its impact in the local hydrology
- Water supply-demand management in the hills
- Environmental impact due to overexploitation of water resources and urgency of sustainable water resource management

Unit III

6hrs

- Groundwater and its contaminations
- Aquifer structure and types
- Aquifer capacity
- Determining aquifer flow velocity-Darcy Law
- Integrated water resource management (IWRM) and virtual water

Unit IV

6 hrs

- Water harvesting techniques in the hilly region
- Artificial ground water recharge techniques and designs: With special reference to spring revival
- Snow harvesting, roof top harvesting and dew drop harvesting
- Sustainable agriculture and irrigation in the hills.

Suggested Readings:

1. Patel, A. S., Shah, D. L., (2007): Water Management: Conservation, Harvesting and Artificial Recharge, New Age International, ISBN: 9788122422245.
2. (2001): Standard Guidelines for Artificial Recharge of Ground Water, EWRI/ASCE 34-01 illustrated ed Edition, American Society Of Civil Engineers, ISBN: 9780784405482.
3. Huisman, L., (1982): Artificial Groundwater Recharge (Monographs and surveys in water resources engineering) ISBN: 9780273085447.
4. CGWB, (2007): Manual on artificial recharge of ground water, Ministry of Water Resources, Central Ground Water Board.Govt. of India.
5. UNEP, (2009): Rainwater Harvesting: A Lifeline for Human Well-Being, United Nations Environment Programme, ISBN: 9789280730197.

6. Heather Kinkade-Levario, (2007): Design for Water: Rainwater Harvesting, Stormwater Catchment, and Alternate Water Reuse, New Society Publishers, ISBN: 9780865715806.
7. Piyoosh Rautela, M. L. Dewan, (2007): Water Resources in The Himalayas: Harvesting, Tradition and Change, Concept Publishing, ISBN: 9788170228042.
8. Ljiljana Baird, (2011): How to 'Harvest' Water: The Art of Saving Water, National Trust, ISBN: 9781907892004

YEAR-2021

Course Code: ENV 547
Course Name: Contemporary Environmental Issues (SD Course-Monsoon 2017)
Teacher Name: Dr. Subhankar Chatterjee

Credits Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Objectives: The course is designed to:

- Introduce students to know recent environmental issues, their cause and environmental impact
- Acquire knowledge related to these issues in national and international perspective
- Give some future direction towards the protection of environment

Attendance Requirement:

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25% (Breakup is following)
 - a. Quiz/Class Test: 20%
 - b. Presentation/Seminar: 40%
 - c. Assignment: 40%

Course Contents:

UNIT I

4 hrs

Environmental Ethics: Definition. Principles. Need of the subject at present time. Moral

standing. Human responsibilities towards nature, environment and other species. Anthropocentric ethics, intrinsic and instrumental values. Our relationship with nature/environment.

UNIT II

6 hrs

The state of the World Environment: Significant global environmental issues. Human impact on the environment. Examining both the nature of the issues and their causes. Earth overshoot day. Global Climate Change- (i) Causes and consequences of Global warming: Greenhouse effect; Global and regional trends in greenhouse gas emissions; Sea level rise; role of oceans and forests as carbon sinks (ii) Ozone depletion-stratospheric ozone shield; Ozone hole (iii) Recent records of climate change; Impact of climate change on Indian environment; Measures to cope with climate change.

UNIT III

6 hrs

Water Pollution and Human Health. Pollution by microplastic, microbeads, microfibers: Sources, distribution, environmental impact. Effect of microplastic in ocean health and mechanism of pollution. Deleterious Effect in food chain, on Plankton and on corals health. Ocean pollution- a threat to human health. Way out and Governmental Policies.

UNIT IV

4 hrs

Responsibility for the Environment. International and National efforts for Environment Protection. Sustainable living.

Suggested Readings:

1. Miller. G.T. 2004. Environmental Science. Thomson, California.
2. K.B. Chokkan, Pandya, H and Raghunathan, H (Eds), 2004, Understanding Environment. Sagar publication India Pvt. Ltd., New Delhi.
3. Barry, R. G., 2003. Atmosphere, weather and climate. Routledge Press, UK
4. Firor, J., and J. E. Jacobsen, 2002. The crowded greenhouse: population, climate change and creating a sustainable world. Yale University Press.
5. Harvey D., 2000, Climate and Global Climate Change, Prentice Hall.
6. Environmental Chemistry By G.S.Sodi
7. Geist, Helmut 2005. The causes and progression of desertification. Ashgate Publishing. ISBN 978-0-7546-4323-4
8. F. T. Mackenzie and J. A. Mackenzie, Our Changing Earth: An Introduction to Earth System Science and Global Environmental Change, Prentice Hall, 1995
9. World Resources 1992-1999: A Guide to the Global Environment, Oxford, 1992.

YEAR -2022

Course Code: ENV 573
Course Name: Water Resource Management
Faculty: Dr. Anurag Linda

Credits Equivalent: 2 Credits (One credit is equivalent to 10 hours of lectures / organised classroom activity / contact hours; 5 hours of laboratory work / practical / field work / Tutorial / teacher-led activity and 15 hours of other workload such as independent individual/ group work; obligatory/ optional work placement; literature survey/ library work; data collection/ field work; writing of papers/ projects/dissertation/thesis; seminars, etc.)

Course Objectives: The course is designed to:

- Introduce the concept water resource management and its movement through the hydrological cycle
- Understand the distribution of surface and groundwater resources.
- Understand basic concepts and methods for rain water harvesting and its use for agriculture, drinking etc.
- Understand different techniques for artificial recharge of ground water.
- Understand different structures as well as some of the traditional practices prevalent in this country for water conservation

Students are expected to attend all lectures in order to be able to fully benefit from the course. A minimum of 75% attendance is a must failing which a student may not be permitted to appear in examination.

Evaluation Criteria:

1. Mid Term Examination: 25%
2. End Term Examination: 50%
3. Continuous Internal Assessment : 25% (Breakup is following)
 - a. Assignment/Quiz/: 40%
 - b. Presentation/Seminar/: 40%
 - c. Class participation: 20%

Course Contents:

Unit I

4 hrs

- Brief outline of historic development
- Water usage in evolution of history
- Water Resources Development Scenario
- Global and Indian Water Scenario