Course co	ode: NRC 136   No. of credits: 3   L-T-P: 45-0-0   Learning l	iours:	45	
Pre-requi	isite course code and title (if any): None			
Departm	ent: Natural and Applied Sciences			
Course co	<b>bordinator(s):</b> Dr Anand Madhukar <b>Course instructor(s):</b> Dr An	and M	adhuka	ır
Contact d	letails: anand.madhukar@terisas.ac.in			
Course ty	<b>pe</b> : Compulsory Core <b>Course offered in</b> : Semester 1			
Course d	escription			
The purp	ose of the course is to develop a holistic understanding of Eart	h's sys	stem. I	Earth
System So	cience is inherently interdisciplinary in scope, linking oceanography	, atmo	spheric	e and
terrestrial	sciences, climatology, hydrology, biology, physics, and chemistry	to und	erstand	d the
environm	ent and climate. After the course, the students will be able	to app	reciate	the
importanc	e of taking a systemic approach in understanding the earth	syster	n and	for
managem	ent of different earth components, natural resources and climate.			
Course of	bjectives			
<ul> <li>To un</li> </ul>	derstand the basic principles of Earth's system, its various component	ents an	d the i	nter-
linkag	es between these components.			
<ul> <li>To un</li> </ul>	derstand how the interplay between various earth's spheres influence	es clim	ate.	
Course co	ontent			
Module	Торіс	L	Т	Р
1.	Overview; Systems approach to understand and analyze	2		
	environmental systems; Sustainability and challenges			
2.	Ocean	5		
	Marine food and economic resources; sustainability issue;			
	distribution of temperature and salinity; ocean currents; ocean			
	and climate			
3.	Climate	7		
	Temperature and pressure belts of the world; Heat budget of the			
	earth; Atmospheric circulation; atmospheric stability and			
	instability. Air masses and fronto-genesis, Temperate and tropical			
	cyclones; Climatic regions; Global climatic change and role and			
	response of man in climatic changes			
4.	Biogeography	5		
	Genesis, classification and distribution of soils; Factors			
	influencing world distribution of plants and animals; conservation			
	measures; Sustainability issues.			
5.	Earth dynamism	6		
	Earth's interior; Geosynclines; Plate tectonics; mountain building;			
	Volcanicity; Earthquakes and Tsunamis; Landslides and mass			
	movemenr; management of natural disasters.			
6.	Human population	5		
	Growth and distribution of world population; demographic			
	attributes; concepts of over-under-and optimum population;			
	Population theories, Regional planning and planning for			
	average and a second seco		1	

Course title: Earth System Sciences

7.	India's environmental setting	7		
	Structure and relief; Drainage system and watersheds;			
	Mechanism of Indian monsoons and rainfall patterns, Floods and			
	droughts; Climatic regions; Soil types and distribution.			
8.	India's Environmental resources and management	8		
	India's environmental and economic resources; agriculture and			
	food security: Infrastructure: irrigation, seeds, fertilizers, power;			
	Institutional factors: land holdings, land tenure and land reforms;			
	Cropping pattern, agricultural productivity, agricultural intensity,			
	crop combination, land capability; Green revolution and its socio-			
	economic and ecological implications.			
	Total	45	0	0

## **Evaluation criteria**

- Minor Test 1: 20%
- Minor Test 2: 20%
- Assignments: 10%
- Major Test: 50%

### Learning outcomes

Upon completion of the course, students would be able to:

- Understand the various components of the earth's system and its interlinkages
- Explain the workings of the earth's system and feedback mechanism

Pedagogical approach: Lectures, tutorials and case studies

#### **Suggested Readings**

#### Textbooks

- 1. Strahler, 2010. Physical geography, John Wiley & Sons, Inc., USA.
- 2. Holden, 2012. An Introduction to Physical Geography and the Environment. Pearson Education Limited, Essex, England.
- 3. Knowled R. and Wareing J., 1990. Economic and Social Geography: Made Simple, New Delhi, Rupa Publications, India.
- 4. Singh, 2015. Physical Geography, Pravilika Publications, India.
- 5. Bryant R.H. (1990) Physical Geography: Made Simple, Rupa Publications, New Delhi.
- 6. Thornbury WD (2004), Principles of Geomorphology, CBS publication

#### Additional information (if any)

Research paper reading and discussions

#### **Student responsibilities**

The students are expected to submit assignments in time and come prepared with readings when provided.

# **Course Reviewers**

The course is reviewed by the following experts.

- 1. Dr Pawan Kumar Jha, Earth and Planetary Sciences, University of Allahabad.
- 2. Dr. Tamoghna Archarya, Xaviers School of Sustainability, Bhubaneshwar.
- 3. Dr. Gurmeet Singh, Futuristic Research Division, National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Chennai.