SNDT Women's University

1, NathibaiThackersey Road, Mumbai- 400020

Syllabus

Under NEP 2020
(As per 13 march 2024 GR)
(WEF A.Y.2024-25)

B.A.-Geography

(Sem I & II template)

SNDT WOMEN'S UNVERSITY, Mumbai-400 020

Undergraduate Programmes
Academic Year 2023

Programme: B.A. Geography

Programme/ Degree		**B.A.**
Specialization		**Geography**
Preamble		Undergraduate (FYUG) degree programmewith Geography as a major is a full-time 3/4 Years Programme (Level 4 to 6) divided into six / eight semesters with the option of Entry and Exit at every level of the programme. Three year Bachelor's degreeprogramme (Level 6) is maximum of 88 credits. Fourth year of degree programme with honours or honours with Research (Level 6)is maximum of 44 credits. During the programme, students will get acquainted with the knowledge of Physical Geography, Human Geography, Climatology Economic Geography, Population Geography, cartography, surveying, map reading. They will be equipped with the practical knowledge of Socio-Economic Development Survey, Field Excursion and Report Writing, Recent Trends in Geographic Research, Environmental lawsthat can be applied in various fields, and this will help them to be efficient for understanding basic concepts and enhance their level of knowledge.
Programme Specific Outcomes (PSOs)		After completing this programme, Learner will
	1.	The B. A. Geography programme aims to enhance geographical knowledge and awareness amongst students regarding the present scenario of environmental degradation, climate change, demographic issues, Urbanization and other problems affecting the earth.
	2.	The programme will also empower the students with the skills required to analyze, evaluate and act upon the problems by teaching them the modern techniques like GIS, GPS and Remote Sensing.
	3.	The programme will encourage students to study further for their post- graduate degree and take up further research in the field of Geography.
	4.	The programme aims to increase the employability quotient of the students and make them a skilled and educated work-force.
Eligibility Criteria for Programme		XII Pass Certificate or Equivalent
Intake (For SNDT WU Departments and Conducted Colleges)		As per university norms

Structure with Course Titles:

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	Semester I					
10010701	Physical Geography	Subject 1	2	50	50	0
		Subject 2	2	50	0	50
		Subject 3	2	50	50	0
10410711	Evolution of Universe and Earth	OEC	4	100	50	50
10610701	Cartographic Techniques-I	VSC	2	50	50	0
10710701	Map Reading	SEC	2	50	50	0
		AEC (English)	2	50	0	50
		IKS	2	50	0	50
		VEC	2	50	0	50
		CC	2	50	50	0
			22	**550**	**300**	**250**
	Semester II					
20010711	Introduction to Geomorphology	Subject 1	2	50	0	50
		Subject 2	2	50	50	0
		Subject 3	2	50	0	50
20410711	Climate Change: Vulnerability and Adaptation	OEC	4	100	50	50
20610701	Introduction to Digital Cartography	VSC	2	**50**	0	50
		VSC	2	**50**	0	50
	Environmental Laws of India	SEC	2	50	50	0
		AEC(English)	2	50	50	0
		VEC	2	**50**	0	50
		CC	2	**50**	50	0
			22	**550**	**250**	**300**

Exit with UG Certificate with 4 extra credits (44 + 4 credits)

Exit with UG Diploma with 4 extra credits (44 + 4)

Course Syllabus

Semester I

1.1 subject

Course Title	**Physical Geography**
Course Credits	**2**
Course Outcomes	After going through the course, learners will be able to
	1. Summarize the basic Concepts of Physical Geography
	2. Explain the Theories regarding of the Earth.
	3. Interpret the Fundamental Concepts of the Earth.
	4. Compare the Motions of the Earth.
Module 1(Credit 1): Introduction to Physical Geography	
Learning Outcomes	After learning the module, learners will be able to
	1. Describe the Nature and Scope of Physical Geography.
	2. Differentiate various approaches of physical geography.
	3. Carry out the Application of Physical Geography in different sectors.
Content Outline	**1. Introduction to Physical Geography** 1.1 Definitions of Physical Geography 1.2 Nature & Scope of Physical Geography 1.3 Branches of Physical Geography 1.4 Approaches of Physical Geography 1.5 Application of Physical Geography
Module 2(Credit 1): Origin and Evolution of the Earth	
Learning Outcomes	After learning the module, learners will be able to
	1. Compare the Theories of Origin & Evolution of the Earth
	2. Discuss the characteristics of Interior of the Earth

Content Outline	**2. Origin and Evolution of the Earth** 2.1 Hypothesis of the Earth Origin ▪ Monistic Hypothesis ➢ Gaseous Hypothesis of Kant ➢ Nebular Hypothesis of Laplace ▪ Dualistic Hypothesis ➢ Planetesimal Hypothesis of Chamberlin &Moulton ➢ Tidal Hypothesis of James Jeans & Harold Jeffreys's ▪ Modern Hypothesis ➢ The Big-Bang Theory 2.2 Interior of the Earth

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Seminar / Group Discussion : 10 Marks
2. Home Assignments/Group Activities : 10 Marks
3. Field visit and Report : 30 Marks

Internal AssessmentTotal: 50 Marks
External Assessment Total: 50 Marks

References:

- Bharambe S. N. (2004),"***Physical Geography"***,Prashant Pulications, Jalgaon
- Brayant Richard (2001) "***Physical Geography",*** Rupa& Co., New Delhi.
- Hussain Majid (2004), " ***Physical Geography***", RawatPublicatin, Jaipur.
- Leong, Goh Cheng (2000), "***Certificate Physical and Human Geography***", Oxford University Press, New Delhi.
- More, J. C. and Devne, M. P. (2019), "***Physical Geography – I",*** NilraliPrakashan, Pune.
- Robinson Harry (1995), "***Morphology and Landscape",*** Tata MacGraw Hill, New Delhi.
- Shrahler, A. H. and Strahler A. N. (2006), "***Modern Physical Geography",*** John Wiley and Sons (Asia) Pvt. Ltd.
- Singh Savindra (2009), "***Physical Geography"***, PrayagPustakBhawan, Allahabad.
- Strahler, A. N. (1965), " ***Introduction to Physical Geography***", Willey, New York.
- Trewartha, G. T. (1980), "***An Introduction to Weather and Climate"***, McGraw Hill, New York.
- Worcester P. (1990): ***A Text Book of Geomorphology***, Longman.
- कार्लेकर, श्रीकांतवभागवत, अ. वि. (२००८):, "***प्राकृतिकभूगोलाचीमुलतत्वे"***, डायमंडप्रकाशन, पुणे.
- घारपुरे, विठ्ठल(१९९५), " ***प्राकृतिकभूगोलाचीमुलतत्वे,मृदावरणआणिजलावरण***", पिंपळापुरेॲण्डकं. पब्लिशर्स, नागपूर.
- चौधरी, एस. आर.वचव्हाण, एम. बी. (२००९), "***प्राकृतिकभूगोल"***, प्रशांतपब्लिकेशन्स, जळगाव.
- दाते, सु. प्र.वदाते, संजीवनी(१९९५), "***प्राकृतिकभूगोल"***, विद्याप्रकाशन, नागपूर.
- पाथरे, यु. बी. वदाते, गजहंस, डी. एस. (२००८), " ***प्राकृतिकभूगोल"***, विद्याबुक्सपब्लिशर्स, औरंगाबाद.
- लाटकर, श्रीकांतवआपटे, अविनाश (२००८), "***प्राकृतिकभूगोलाचीमुलतत्वे"***, विद्याप्रकाशन, नागपूर.

Course Syllabus

Semester I
Open Elective Courses (OEC)

Course Title	**Evolution of the Universe and the Earth**
Course Credits	**4**
Course Outcomes	After going through the course, learners will be able to
	5. Describe the origin of the Universe and the Earth
	6. Comprehend the Solar System
	7. Summarize the various layers and it's evolution of the Earth
	8. Categories the properties of the Earth
Module 1(Credit 1): The Origin of the Universe:	
Learning Outcomes	After learning the module, learners will be able to
	4. Explain the various theories related to the Universe
	5. Explain the formation of Galaxies and Stars
Content Outline	**1.The Origin of the Universe:** 1.1 Theories related to the Universe 1.2 Nebulae Hypothesis 1.3 Binary Theories 1.4 Big Bang Theory 1.5 Formation of Galaxies and Stars
Module 2(Credit 1): Our Solar System:	
Learning Outcomes	After learning the module, learners will be able to
	1. Compare the various Planets of the Our Solar System
	2. Discuss the Characteristics of the Moon
Content Outline	**2. Our Solar System:** 2.1 Mercury 2.2 Venus 2.3 Earth 2.4 Mars 2.5 Jupiter 2.6 Saturn 2.7 Uranus 2.8 Neptune 2.9 Moon

Module 3(Credit 1): Evolution of the Earth:	
Learning Outcomes	After learning the module, learners will be able to
	1. Discuss the evolution of the various layer of the Earth
	2. Explain the evolution of the life on the Earth
Content Outline	**3. Evolution of the Earth** 3.1 Evolution of the Lithosphere 3.2 Component of Hydrosphere 3.3 How Atmosphere Developed 3.4 Origin & Evolution of Life on the Earth
Module 4(Credit 1): The Earth and It's Properties:	
Learning Outcomes	After learning the module, learners will be able to
	1. Acquaint the properties of the Earth
	2. Describe the Characteristics of the Earth
Content Outline	4.The Earth and It's Properties 4.1 The Earth 4.2 Position of the Earth with respect to the Sun 4.3 Properties of the Earth 4.5 Characteristics of the Earth

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Seminar / Group Discussion: 20 Marks
2. Assignments/Group Activities: 20 Marks
3. Overall Performance: 10Marks

Internal Total: 50 Marks
External Total: 50 Marks

References:

- Brayant Richard (2001): ***Physical Geography,*** Rupa& Co., New Delhi.
- Dalrymple, G. Brent (1991): **The Age of the Earth - A comprehensive discussion of the evidence for the ages of the Earth, moon, meteorites, solar system, Galaxy, and universe**, Stanford University Press, Stanford
- Hussain Majid (2004): ***Physical Geography***, RawatPublicatin, Jaipur
- Leong, Goh Cheng (2000): ***Certificate Physical and Human Geography***, Oxford University Press, New Delhi.
- Longair, Malcolm S. (1996): **Our Evolving Universe - A brief discussion of the origin and evolution of the universe** Cambridge University Press, New York.
- More, J. C. and Devne, M. P. (2019): ***Physical Geography – I***, NilraliPrakashan, Pune.
- National Academy of Science (1996): **Science and Creationism - A View from the National Academy of Sciences**, Washington.
- Shrahler, A. H. and Strahler A. N. (2006): ***Modern Physical Geography***, John Wiley and Sons (Asia) Pvt. Ltd.
- Singh Savindra (2009**): *Physical Geography***, PrayagPustakBhawan, Allahabad
- Strahler, A. N. (1965): ***Introduction to Physical Geography***, Willey, New York.
- कार्लेकर, श्रीकांतवभागवत, अ. वि. (२००८**): *प्राकृतिकभूगोलाचीमुलतत्वे*,** डायमंडप्रकाशन, पुणे**.**

- घारपुरे, विठ्ठल(१९९५): ***प्राकृतिकभूगोलाचीमुलतत्वे,मृदावरणआणिजलावरण,*** पिंपळापुरेॲण्डकं. पब्लिशर्स, नागपूर.
- चौधरी, एस. आर.वचव्हाण, एम. बी. (२००९): ***प्राकृतिकभूगोल,*** प्रशांतपब्लिकेशन्स, जळगाव.
- दाते, सु. प्र.वदाते, संजीवनी(१९९५): ***प्राकृतिकभूगोल,*** विद्याप्रकाशन, नागपूर.
- पाथरे, यु. बी. वदाते, गजहंस, डी. एस. (२००८): ***प्राकृतिकभूगोल,*** विद्याबुक्सपब्लिशर्स, औरंगाबाद.
- लाटकर, श्रीकांतवआपटे, अविनाश (२००८): ***प्राकृतिकभूगोलाचीमुलतत्वे,*** विद्याप्रकाशन, नागपूर.

1.4 VSC Major

Course Title	**Cartographic Techniques-I**
Course Credits	**2**
Course Outcomes	After going through the course, learners will be able to
	1) Acquaint the students with Cartographic Techniques.
	2) Understand the various aspects of Cartography.
	3) To equipped students career in Cartography.
	4) Develop awareness of new changes in Cartography.
Module 1 Introduction of Cartography	
Learning Outcomes	After learning the module, learners will be able to
	1.**Acquire knowledge about basic structure of Cartography**
	2.Acquire knowledge about Data Ordering and Processing
Content Outline	**1 Introduction to Cartography** 1.1 Definition of Cartography, History and types of Cartography 1.2 Concept of Map and Elements of Map 1.3 Types of Maps 1.4 Map Data and Conventional signs and symbols
Module 2 Scale	
Learning Outcomes	After learning the module, learners will be able to
	1) Differentiate various types of scales and its application.
	2) Develop the skill of graphical scale construction.
Content Outline	**2 Scale** 2.1 Definition of scale 2.2 Types of Scales- Verbal, Numerical, Graphical 2.3 Types of Graphical Scale 2.3.1 Simple Graphical scale

	2.3.2 Comparative scale

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Presentation - 15 Marks
2. Assignments - 10 Marks
3. Field Visit and Report – 25 Marks

Total Internal = 50 Marks

References:-

1. Gopalsing (1999),"*Map-work and Practical Geography*", Vikas Publishing House, New Delhi.
2. Monkhouse, F. J. and Wilkinson, H. R., (1976): "*Maps and Diagrams"*, Methuen & Co.
3. Rashid, S. M., Ishtiaq M. (1974),"*Practical Geography*", Jawahar Publishers and Distributors, New Delhi.
4. Robinson A., Sale R., Morrison J. (1978),"*Elements of Cartography*", John Wiley and Sons, U.S.A.,
5. Sarkar Ashis (1997): "*Practical Geography: A Systematic Approach*", Orient Black-Swan.
6. Singh R. L. & Rana P. B. Singh (2005),"*Elements of Practical Geography*", Kalyani Publisher, New Delhi.
7. Singh R. L. (1979),"*Elements of Practical Geography*", KalyaniPublisher,New Delhi.
8. Tamaskar, B. G. (1974),"*Geographical Interpretation of Indian Topographical Maps"*, Orient Logman.
9. Mishra R. P. (1999),"*Map Work & Practical Geography*" , Concept Publication New Delhi.
10. George P. Kellaway (1970),"*Map Projection*", Methuen & Co. Ltd. 11, New Fetter Lane, London.
11. John Bygott& Money D. C,"*An Introduction to Map-work and Practical Geography*," University Tutorial Press Ltd, 9-10 Great Sutton street, London.
12. MISTIAO (1989),"*Practical Geography*", Heritage Publisher New Delhi.
13. Mishra R. P. & Ramesh (1998),"*Fundamentals of Cartography*", Concept, Publication New Delhi.
14. Chaudhari A P (2015),"*Practical Geography*" (in Marathi)Prashant Publication, Jalgaon.

1.5 Map Reading (SEC)

Course Title	**Map Reading**
Course Credits	**2**
Course Outcomes	After going through the course, learners will be able to
	Acquaint the students with the concepts of maps.
	Understand the various aspects of Map Reading and Interpretation.
Module 1 Introduction to Map Concepts	
Learning Outcomes	Understand various elements of maps, types of maps and its uses in day to day life.
Content Outline	**1. Introduction to Map Concepts** 1.1 Definition of Map and Elements of Maps 1.2 Classification of Maps 1.3 Uses of Maps
Module 2	Topographical Maps

Learning Outcomes	Identify the natural and cultural features and able to write the interpretation of map.
Content Outline	**2. Topographical Maps** 2.1 Marginal Information 2.2 Maps of Survey of India 2.3 Arrangement of Sheets on Maps of India 2.4 Map Reading and Interpretation of Topographic Maps

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1. Home Assignments/Group Activities: 10 Marks
2. Field visit and Report Writing 15 Marks
3. Examination 25 Marks

Internal AssessmentTotal: 50 Marks

References:

1. Gopalsing (1999),"*Map-work and Practical Geography*", Vikas Publishing House, New Delhi.

2. Monkhouse, F. J. and Wilkinson, H. R., (1976): "*Maps and Diagrams"*, Methuen & Co.

3.Rashid, S. M., Ishtiaq M. (1974),"*Practical Geography*", Jawahar Publishers and Distributors, New Delhi.

4. Robinson A., Sale R., Morrison J. (1978),"*Elements of Cartography*", John Wiley and Sons, U.S.A.,

5. Sarkar Ashis (1997): "*Practical Geography: A Systematic Approach*", Orient Black-Swan.

6. Singh R. L. & Rana P. B. Singh (2005),"*Elements of Practical Geography*", Kalyani Publisher, New Delhi.

7. Singh R. L. (1979),"*Elements of Practical Geography*", KalyaniPublisher,New Delhi.

8. Tamaskar, B. G. (1974),"*Geographical Interpretation of Indian Topographical Maps"*, Orient Logman.

9.Mishra R. P. (1999),"*Map Work & Practical Geography*" , Concept Publication New Delhi.

10.George P. Kellaway (1970),"*Map Projection*", Methuen & Co. Ltd. 11, New Fetter Lane, London.

11.John Bygott& Money D. C,"*An Introduction to Map-work and Practical Geography*," University Tutorial Press Ltd, 9-10 Great Sutton street, London.

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13.Mishra R. P. & Ramesh (1998),"*Fundamentals of Cartography*", Concept, Publication New Delhi.

14.Chaudhari A P (2015),"*Practical Geography*" (in Marathi)Prashant Publication, Jalgaon.

1.8 Environment Awareness (VEC)

Course Title	**Environment Awareness**
Course Credits	**2**

Course Outcomes	After going through the course, learners will be able to
	Associate the role of environment in man-environment relationship and critically analyse the necessity of environment awareness in society.
	Create awareness about the environmental issue and the role of pollution act in the conservation of resources.
Module 1	**Environment and Ecosystem**
Learning Outcomes	Assess the relationship among ecosystem components and its importance in environmental sustainability.
Content Outline	**1. Environment and Ecosystem** 1.1 Environment –Meaning of Environment, Types of Environment, Components of Environment, 1.2 Man- Environment relationship, importance of environment, Need for Public Awareness 1.3 Ecosystem-Meaning, Major Components of Ecosystem 1.4 Case studies of Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem 1.5 Stability of Ecosystem in Sustainable Environment
Module 2	**Environment Pollution**
Learning Outcomes	Create awareness about the different pollution and pollution act.
Content Outline	2. **Environment Pollution** 2.1 Definition of Pollution, Types of Pollution 2.2 Air Pollution-Meaning, Sources, effects of air pollution, Air Pollution Act 2.3 Water Pollution – Meaning, Sources, Effects of Water pollution, Water Pollution Act 2.4 Noise Pollution – Meaning, Sources, Effect of Noise Pollution 2.5 Solid Waste Pollution – Meaning, sources, Effect of Waste Pollution 2.6 Environment Protection Act – Air (Prevention and control of Pollution)Act, Water Act (Prevention and control of Pollution) Act , Solid waste Pollution Act in India

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1.Seminar / Group Discussion : 15 Marks
2.Home Assignments/Group Activities: 15Marks
3.Report Writing : 20 Marks

Internal Assessment Total : 50 Marks

References:

- Agarwal, D.P. (1992): *Man and Environment in India through Ages*, Books & Books, New Delhi.
- Arthur N. Strahler and Alan H. Strahler (1973 1st Ed): *"Environmental Geoscience – Interaction between natural systems and man",* Wiley International Ed.
- Balakrishnan, M., 1998: *Environmental Problems and Prospects in India*, Oxford & IBH Pub., New Delhi.
- Barrow, C. J. (2003): *Environmental Change and Human Development*. Arnold Publication.
- Bhaduri, S., and Basu, R. (2006): *Society Development and Environment*. Progressive Publishers.
- Blowers, Andrews, (1993): *"Planning for a sustainable Environment,"* Earthscan Publication, London.
- Botkin, D.B., and Keller, E.A. (2013): *Environmental Science*, Wiley, New Delhi
  CSE. (2017): *Environment Reader for Universities.* New Delhi: Centre for Science and Environment.
- Divan S. and Rosencranz A. (2005), "Environmental Law and Policy in India", 2 nd ed., Oxford, New Delhi.
- Ehrlich, P.R. and Ehrlich, A.H. (1996): *Eco-science: Population, Resources and Environment*, W.H. Freeman and Company, San Francisco.
- Goel R.S., (2000): *Environment Impacts Assessment of Water Resources Projects-Concerns, Policy Issues Perceptions and Scientific Analysis,* Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.
- Gole, P., (2001): *Nature Conservation and Sustainable Development in India*, Rawat Pub., Jaipur
- Hussain, M., (ed. 1996): *Environmental Management in India*, Rawat Pub., Jaipur
- Kamala S. and Singh U.K. (eds.) (2008) "Towards Legal Literacy: An Introduction to Law in India", Oxford, New Delhi.
- Kates, R.W. & Burton, I (ed. 1986): *Geography, Resources and Environment*,Vol I & II, University of Chicago Press, Chicago,.
- Savindra Singh (2004): *Environmental Geography*, Prayog Pustak Bhawan, Allahabad, India.
- Shyam Diwan and Armin Rosencranz,(2001), " *Environmental Law and Policy in India– Cases, Materials and Statutes"*,2nd ed.P.
- Smith, K. (2001): *Environmental Hazards: Assessing Risk and Reducing Disaster*, Routledge
- Stahler, A.N. and Stahler A.N. (1997): *Geography and Man's Environment*, John Wiley and Sons, New York

- Winin Pereira and Jeremy Sea Brook (1996): *"The spread of unsustainable development"* The Other India Press Mapusa 403507, Goa, India.
- Wright, R.T. and Boorse, D.F. (2011): *Environmental Science: Toward A Sustainable Future,* PHI Learning Private Limited, New Delhi

Semester II

2.1 Subject 1 B Introduction to Geomorphology

Course Title	**Introduction to Geomorphology**
Course Credits	**2**
Course Outcomes	After going through the course, learners will be able to

	1. Describe the basic Concepts of Geomorphology
	2. Explain the need & Importance of the Study of Geomorphology
	3. Carry out comparative study of the Crustal Movements of the Earth
	4. Differentiate the Landforms made by various Agents
Module 1(Credit 1): Introduction of Geomorphology:	
Learning Outcomes	After learning the module, learners will be able to
	1. Explain the Nature & Scope of Geomorphology
	2. Differentiate the Process of Folds & Faults
	3. Describe the process of Earthquake & Volcanoes
Content Outline	**1. Introduction of Geomorphology** 1.1 Nature and Scope of the Geomorphology ▪ Definitions , Nature & Scope of Geomorphology ▪ Branches in Geomorphology ▪ Need and Importance of Study of Geomorphology 1.2 Diastrophic Movements ▪ Folds and Faults ▪ Earthquake and Volcanoes
Module 2(Credit 1): Weathering and Landforms:	
Learning Outcomes	After learning the module, learners will be able to
	1. cognize the Process of Weathering
	2. Compare the Process of Landforms made by various external Agents
Content Outline	**2. Weathering and Landforms** 2.1 Weathering 2.1.1 Mechanical Weathering 2.1.2 Chemical Weathering 2.1.3 Biological Weathering 2.2 Landforms of the Earth ▪ Erosional and Depositional Landforms : Rivers , Glaciers, Wind and Waves

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

External Assessment Total: 50 Marks

References

- Bharambe S. N. (2004),"***Physical Geography"***,Prashant Pulications, Jalgaon
- Brayant Richard (2001) "***Physical Geography",*** Rupa& Co., New Delhi.
- Hussain Majid (2004), " ***Physical Geography***", RawatPublicatin, Jaipur.
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- Shrahler, A. H. and Strahler A. N. (2006), "***Modern Physical Geography",*** John Wiley and Sons (Asia) Pvt. Ltd.
- Singh Savindra (2009), "***Physical Geography"***, PrayagPustakBhawan, Allahabad.
- Strahler, A. N. (1965), " ***Introduction to Physical Geography***", Willey, New York.
- Trewartha, G. T. (1980), "***An Introduction to Weather and Climate"***, McGraw Hill, New York.
- Worcester P. (1990): ***A Text Book of Geomorphology***, Longman.
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- घारपुरे, विठ्ठल(१९९५), " ***प्राकृतिकभूगोलाचीमुलतत्वे,मृदावरणआणिजलावरण***", पिंपळापुरेॲण्डकं. पब्लिशर्स, नागपूर.
- चौधरी, एस. आर.वचव्हाण, एम. बी. (२००९), "***प्राकृतिकभूगोल"***, प्रशांतपब्लिकेशन्स, जळगाव.
- दाते, सु. प्र.वदाते, संजीवनी(१९९५), "***प्राकृतिकभूगोल"***, विद्याप्रकाशन, नागपूर.
- पाथरे, यु. बी. वदाते, गजहंस, डी. एस. (२००८), " ***प्राकृतिकभूगोल"***, विद्याबुक्सपब्लिशर्स, औरंगाबाद.
- लाटकर, श्रीकांतवआपटे, अविनाश (२००८), "***प्राकृतिकभूगोलाचीमुलतत्वे"***, विद्याप्रकाशन, नागपूर.

2.4 Open Elective Courses (OEC)

Course Title	Climate Change: Vulnerability and Adaptation
Course Credits	4
Course Outcomes	After going through the course, learners will be able to
	1. Explainthe basic concepts of Climate and Weather
	2. Describe the causes and effects of Climate Change
	3. Summarize the Climate Change Vulnerability and Adaption
	4. Acquaint Vulnerability Assessment of Climate Change and its Mitigation
Module 1 (Credit 1): Introduction to Climate Change	

Learning Outcomes	After learning the module, learners will be able to
	1. Describe the concepts of Weather, Climate and Climate Change 2. Explain the evidence and events of Climate Change
Content Outline	**1. Introduction to Climate Change:** 1.1 Concept of weather and Climate 1.2 Definition, Meaning of Climate Change. 1.3 Concept of Climate change 1.4 Evidence of Climate change: Meteorological, biological, greenhouse effect, Global Warming 1.5 Extreme Weather and Climate events: Drought, Extreme Heat, Extreme precipitation, Hurricanes, Tornadoes and Wild fire.
Module 2 (Credit 1): Causes and Effects of Climate Change	
Learning Outcomes	After learning the module, learners will be able to
	1. Interpret the Causes and Effects of Climate Change. 2. Describe the Efforts to control the Climate Change
Content Outline	**2. Causes and Effects of Climate Change:** 2.1 Causes of Climate Change 2.1.1 Natural Causes – a) Solar variationb) Volcanic eruption c) Ocean Currents d) Earth orbital change e) Internal variability 2.1.2 Human Causes- a) Burning fossil fuel b) Deforestation c) Intensive Agriculture d) Industries 2.2 Effects of Climate Change 2.2.1 Water Resources 2.2.2 Agriculture 2.2.3 Human Health 2.2.4 Vegetation 2.2.5 Economy 2.2.6 El Nino and La Nina 2.3 International Efforts to control the Climate Change 2.3.1 UNFCC its policy framework and provisions 2.3.2 Earth Summit Rio-de-Janeiro 2.3.3 World Summit 2.3.4 Kyoto Protocol 2.3.5 Copenhagen Summit 2.3.6 Doha Conference
Module 3 (Credit 1): Climate Change Vulnerability and Adaptation	
Learning Outcomes	After learning the module, learners will be able to
	1. Acquaint with the meaning and types of Climate Change Vulnerability 2. Acquire the various Approaches and Strategies of Climate Change Adaptions
Content Outline	**3. Climate Change Vulnerability and Adaptation** 3.1 Meaning and Types of Vulnerability 3.2 Meaning, definition and types of adaptation 3.3 Approaches of adaptation 3.4 Adaptation strategies

	3.5 Adaptation in different sectors – Agriculture, forest, Water Resources, Biodiversity, Disaster risk Management
Module 3 (Credit 1): Vulnerability Assessment of Climate Change and Its Mitigation	
Learning Outcomes	After learning the module, learners will be able to
	1. Differentiate the Assessment of Climate Change Vulnerability 2. Appreciate the world wide Climate Change Mitigation initiatives
Content Outline	**4. Vulnerability Assessment of Climate Change and Its Mitigation:** 4.1 Climate Change Vulnerability Assessment 4.2 Global Initiative to climate change mitigation: Kyoto Protocol, Carbon trading, clean development mechanism, COP, 4.3 Indian Initiative to support climate change mitigation: improving energy efficiency, Diversification of energy source, modifying industrial processes, a multipronged strategy for sustainable development and clean development mechanism (CDM) in India.

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

4. Seminar/Group Discussions: 20 Marks
5. Assignments/Project writing: 20 Marks
6. Overall Performance: 10 Marks

Internal Total : 50 Marks

ExternalTotal : 50 Marks

References:

- Earth: Evolution of a Habitable World, 2nd edn., Cambridge, UK, Cambridge University Press (2013) Jonathan I Lunine.
- Evolution of the Earth, McGraw-Hill Education, 8th edition (2009), Donald Prothero, Robert Dott, Jr.
- A textbook of Climatology, Wisdom Press (2015) Tapas Bhattacharya,
- Glabal Warming the complete Briefing, Cambridge University Press 4thedition (2009) Jonhn Houghton.
- K. Siddhartha (2020): Clomatology, Atmosphere, Weather and Climate, KitabMahal Publication, New Delhi.
- K. Siddhartha and Others (2014): Basic Physical Geography, Kishalaya Publications pvt. Publication, New Delhi.
- Sathpathy, S: Adaptation to Climate Change with a Focus on Rural Area and India. Indian Ministry of Environment and forest, Director of the Climate Change division.
- Patricia Butler, Chris Swanston, Maria Janowiak, Linda Parkar, Matt st. Pierre, Leslie Brandt: Adaptation Strategies and Approaches.
- Ministry of Environment and forest, Gov. of India: Adaptation to Climate Change with a focus on Rural Area and India.
- NeelamRana, Anand Kumar, KavitaSyal and Mustafa Ali Khan: Climate Change Mitigation in India

Web Resources:

- http://www.iisd.org/pdf/2010/iea_training_vol_via.pdf
- http://www.oecd.org/dac/43652123.pdf

2.7 Environmental Laws of India (SEC)

Course Title	**Environmental Laws of India**
Course Credits	**2**
Course Outcomes	After going through the course, learners will be able to
	Upgrade the knowledge of environmental laws.
	Analyse the role of environmental laws in environmental sustainability.
Module 1 Environmental Laws	
Learning Outcomes	Create awareness about the environmental laws.
Content Outline	**1. Environmental Laws** 1.1 Need of Environmental laws in India 1.2 Wild life Protection Act 1972 1.3 Environmental Protection Act 1.4 Biodiversity Act 2002 1.5 Forest Conservation Act 1980
Module 2	
Learning Outcomes	Develop the attitude of laws to maintain the environmental sustainability.
Content Outline	Energy Conservation Act 2001 Water Prevention & Control of Pollution Act National Green Tribunal Act Coastal Regulation Zone Notification 2018

Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

1.Seminar / Group Discussion : 15 Marks
2.Home Assignments/Group Activities: 15Marks
3.Report Writing : 20 Marks

Internal AssessmentTotal: 50 Marks

References:

Shibani Ghosh ed.,(2019), *"Indian Environmental Law: Key Concepts and Principles".*

GeetanjoySahu, (2014), *"Environmental Jurisprudence and the Supreme Court: Litigation, Interpretation, Implementation".*

ShyamDiwan and Armin Rosencranz,(2001), " *Environmental Law and Policy in India– Cases, Materials and Statutes"*,2nd ed.P. Leelakrishnan, (2010), " *Environmental Law Case Book*", 2nd ed.

Gurdip Singh, (2016), "*Environmental Law in India",* 2nd ed .

P. Leelakrishnan, (2019) "*Environmental Law in India",* 5th ed.

Stuart Bell & Donald Mc Gillivray,(2008), "*Environmental Law",* 7th ed.

Kamala S. and Singh U.K. (eds.) (2008) "Towards Legal Literacy: An Introduction to Law in India", Oxford, New Delhi.

Leelakrishnan P. (2006), "Environmental Law Case Book", 2nd ed, Lexis Nexis, India.

Upadhyay S. and Upadhyay V. (2002), "Hand Book on Environmental Law- Forest Laws, Wildlife Laws and the Environment", Vols. I, II and III, Lexis Nexis- Butterworths-India, New Delhi.

Divan S. and Rosencranz A. (2005), "Environmental Law and Policy in India", 2 nd ed., Oxford, New Delhi.

Leelakrishnan P. (2008), "Environmental Law in India", 3rd ed., Lexis Nexis, India.