Office of the Principal

Nayak Nityanand Sai Govt College Aara Distt- Jashpur

No. IQAC/03 Dated- 12/12/2023

List and description of courses which address the Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum for Session 2022-23

SN	Program Name	Year / Semester	Name of Course	Relevant Unit	Relevant Cross cutting issue
1	B.Sc.	1st Year	Environmental Studies	Whole Course	Environment and Sustainability
2.	B.A.	1st Year	Environmental Studies	Whole Course	Environment and Sustainability
3.	B.Com.	1st Year	Environmental Studies	Whole Course	Environment and Sustainability
4.	B.Sc.	3rd Year	Ecology, Environmental Biology, Toxicology, Microbiology and Medical Zoology	Unit -1 and Unit 2	Environment and Sustainability
5.	B.Sc.	2nd Year	Ecology and Plant Physiology	Unit - 1 and Unit 2	Environment and Sustainability
6.	B.Sc.	3rd Year	Analytical Technology, Plant Pathology, Experimental embryology, Elementary Biostatistics, Environmental Pollution and Conservation	Unit – 4	Environment and Sustainability
7.	B.A.	1st Year	Human Geography	Unit – 5	Environment and Sustainability
8.	B.A.	2nd Year	Economic and Resources Geography	Unit – 5	Environment and Sustainability
9.	B.A.	3rd Year	Development and Environmental Economics	Unit – 4	Environment and Sustainability
10.	B.A.	1st Year	Contemporary Indian Society	Unit – 2 to Unit – 5	Gender
11.	M.Sc. (Botany)	3rd Semester	Principles of Ecology	Whole Course	Environment and Sustainability

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PART - I

SULLABUS FOR ENVIRONMENTAL STUDIES* FOR UNDER GRADUATE

"इन्वाहरमेन्टल साईसेस" के पाठ्यक्रम को स्नातक स्तर भाग-एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003-2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न-पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

:. पाठ्यक्रम 100 अंको का होगा, जिसमें से 75 अंकर सैद्धांतिक प्रश्नों पर होगे एवं 25 अंक क्षेत्रीय कार्य (Field Work) पर होगे।

1. सैद्धांतिक प्रश्नों पर अंक - 75 (सभी प्रश्न इकाई आधार पर रहेगे जिसमें आंतरिक विकल्प रहेगा)

(अ) लघु प्रश्नोत्तीर - 25 अंक

(ब) निबंधात्मक - 50 अंक

.. Field Work - 25अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों की प्रयोगिक उत्तर पुस्तिकाओं के समान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेगे।

:. उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा के साथ किया जाएगा।

.. पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग-एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान के सैद्धांतिक एवं फील्ड वर्क में संयुक्त रूप से 33% (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होगे।

'. स्नातक स्तर भाग-एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधीक्षकों/परीक्षकों की नियुक्ति के लिए अधिकृत रहेगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेगे।

PART - I

SULLABUS FOR ENVIRONMENTAL STUDIES* FOR UNDER GRADUATE M.M.75

UNIT-I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES :

Definition, scope and importance

Need for public awarness.

Natural Resources :

Renewable and nonrenewable resources :

Natural resources and associated problems.

(a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

(c) Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

(f) Land resources : Land as a resources, land degradation, man induced landslides, soil erosion and desertification.

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- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable life-styles.

UNIT-II ECOSYSTEMS (9 Lecture)

Concept of an ecosystems.

Structure and function of an ecosystem.

- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III Biodiversity and its Conservation (9 Lecture)

- Introduction - Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : In situ and Ex-situ conservation of biodiversity.

UNIT-IV Environmental Pollution (9 Lecture)

Definition

- Causes, effects and control measures of -
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution
  e. Noise pollution
  g. Nuclear hazards.
- Solid waste management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies
- Disaster management : floods, earthquake, cyclone and landslides.

Human Population and the Environment

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.

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(9 Lecture)

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Social Issues and the Environment

- From Umsuslainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed managemen
- Resettlement and rehabilitation of people, its problems and concerns. Case studies.
- Environmental ethies : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act
- Air (Prevention and Control of Pollution) Act.
- Water (Pervention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.
- Value Education
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and Human Health.
- Case Studies.

(9 Lecture)

IELD WORK

Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.
Visit to local polluted site : Urban/Rural/Industrial/Agriculture.
Study of common plants, insects, birds.
Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

IEFERENCES :

. Agarwal K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
. Bharucha Erach, the Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad 380 013, India, Email : mapin@icenet.net(R)
. Bruinner R.C., 1989, Hazardous Waste Incineration, Mc Graw Hill Inc. 480p
. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB).
. Cuningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 200,
. Dr A.K. Environmental Chemisry, Wiley Estern Ltd.
. Down to Earth, Centre for Science and Environment (R)
. Gloick, H.P. 1993 Water in crisis, Pacific Institute for studies in Deve, Environment & Security. Stockholm Eng. Institute. Oxford Univ, Press. 473p.
. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R).
0. Heywood, V.H. & Watson, R.T. 1995 Global Biodiversity Assessment, Cabridge Univ. Press 1140p.
11. Jadhav H. & Bhosale, V.H. 1995, Environmental Protection and Laws. Himalaya Pub. House. Delhi 284p.
12. Mckinney M.L. & School R.M. 1996, Environmental Science systems & Solutions, Web enhanced editio, 639p..

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Zoology

B.Sc. Part III 2018-19

Paper-I

ECOLOGY, ENVIRONMENTAL BIOLOGY: TOXICOLOGY, MICROBIOLOGY AND MEDICAL ZOOLOGY

Unit: I (Ecology)

- Aims and scopes of ecology
- Major ecosystems of the world-Brief introduction
- Population- Characteristics and regulation of densities
- Communities and ecosystem
- Bio-geo chemical cycles
- Air & water pollution
- Ecological succession

Unit: II (Environmental Biology)

- Laws of limiting factor
- Food chain in fresh water ecosystem
- Energy flow in ecosystem- Trophic levels
- Conservation of natural resources
- Environmental impact assessment

Unit: III (Toxicology)

- Definition and classification of Toxicants
- Basic Concept of toxicology
- Principal of systematic toxicology
- Heavy metal Toxicity (Arsenic, Murcury, Lead, Cadmium)
- Animal poisons- snake venom, scorpion & bee poisoning
- Food poisoning

Unit: IV (Microbiology)

- General and applied microbiology
- Microbiology of domestic water and sewage
- Microbiology of milk & milk products
- Industrial microbiology: fermentation process, production of penicillin, alcoholic breverages, bioleaching.

Unit:V (Medical Zoology)

- Brief introduction to pathogenic microorganisms, Ricketssia, Spirochaetes, AIDS and Typhoid
- Brief account of life history & pathogenicity of the following pathogens with reference to man: prophylaxis & treatment
- Pathogenic protozoan's- Entamoeba, Trypanosome & Plasmodium
- Pathogenic helminthes- Schistosoma
- Nematode pathogenic parasites of man
- Vector insects

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B.Sc.-II (BOTANY) PAPER-II

(ECOLOGY AND PLANT PHYSIOLOGY)

UNIT-I

Introduction and scope of ecology, environmental and ecological factors, Soil formation and soil profile, Liebig's law of minimum, Shelford's law of tolerance, morphological and anatomical adapataions in hydrophytes, xerophytes and epiphytes.

UNIT-II

Population and community characteristics, Raunkiaer's life forms, population interactions (e.g. Symbiosis, Amensalism etc.), succession, ecotone and edge effect, ecological niches, ecotypes, ecads, keystone species

Concept of ecosystem, trophic levels, flow of energy in ecosystem, food chain and food web, concept of ecological pyramids

Biogeochemical cycles:carbon cycle, nitrogen cycle and phosphorus cycle

UNIT-III

Plant water relations: Diffusion, permeability, osmosis, imbibitions, plasmolysis, osmotic potential and water potential, Types of soil water, water holding capacity, wilting, Absorption of water, theories of Ascent of sap, Mineral nutrition and absorption, Deficiency symptoms, Transpiration, stomatal movement, significance of transpiration, Factors affecting transpiration, guttation.

UNIT-IV

Photosynthesis: Photosynthetic apparatus and pigments, light reaction mechanism of ATP synthesis. C3, C4 CAM pathway of carbon reduction, photorespiration, factors affecting photosynthesis.

Respiration: Aerobic and anaerobic respiration, Glycolysis, Kreb's cycle, factors affecting respiration, R.Q.

UNIT-V

Plant growth hormones: Auxin, Gibberellin, Cytokinin, Ethylene and Abscissic acid. Physiology of flowering, Florigen concept, Photoperiodism and Vernalization. Seed dormancy and germination, plant movement.

Books Recommended:

Koromondy, EJ. *Concepts of Ecology,* Prentice Hall, USA

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B.SC.-III (BOTANY) PAPER –I

(ANALYTICAL TECHNOLOGY PLANT PATHOLOGY, EXPERIMENTAL EMBRYOLOGY, ELEMENTARY BIOSTATISTICS, ENVIRONMENTAL POLLUTION AND CONSERVATION)

UNIT-I

Structure, Principle and applications of analytical instrumentation.

Chromatography technique, Oven, Incubator, Autoclave, Centrifuge, Spectrophotometere

UNIT-II

Plant Tissue culture techniques, growth media, totipotency, protoplast culture, somatic hybrids and cybrids, micropropagation , somaclonal variations, haploid culture.

Analytical techniques: Microscopy-Light microscope, Electron microscope

UNIT-III

General principles of plant pathology, general symptoms of fungal, bacterial and viral diseases, mode of infection, diseases resistance and control measures, plant quarantine. A study of epidemiology and etiology of following plant diseases.

Rust diseases of wheat, Tikka diseases of groung nut, Red rot of sugar can, Bacterial blight of rice, Yellow vein mosaic of b hindi, Little leaf of brinjal.

UNIT-IV

Introduction to pollution, green house gases, Ozone depletion, Dissolve oxygen, B.O.D., C.O.D.

Bio magnification, Eutrophication, Acid precipitation, Phytoremediation, Plant indicators,. Biogeographical Zones of India, Concept of biodiversity, CBD, MAB, National parks and

biodiversity Hot spots, Conservation strategies, Red Data Book, IUCN threat categories, invasive species, endemic species, concept of sustainable development.

UNIT-V

ELEMENTARY BIOSTATISTICS:

Introduction and application of Biostatics, measure of central tendency-Mean, Median, Mode, measures of dispersal-Standard deviation, standard error.

Books Recommended:

Singh, RS, ***Plant Diseases,*** Oxford & IBH, New Delhi.

Pandey, BP, ***Plant Pathology,*** S.Chand Publishing, New Delhi

Sharma, PD, ***Microbiology and Plant pathology***, Rastogi Publications, Meerut

Sharma PD, ***Mycology and Phytopathology***, Rastogi Publications, Meerut

Singh JS, Singh SP and Gupta, SR, ***Ecology Environmental Science and Conservation,*** S. Chand Publishing, New Delhi

Sharma, PD. ***Ecology and Environment,*** Rastogi Publiications, Meerut

Bhojwani, SS and Razdan, MK, ***Plant Tissue Culture:Theory and Practices,*** Elsevier

Sharma AK, ***Text book of Biostatistics,*** Discovery Publishing House Pvt. Ltd.

(Dr. J.N. Verma)
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(Dr. Rekha Pimpalgaonkar)
Proff. & Head
Govt. N PG Science College
Raipur, (C.G.)

(Dr.Ranjana Shristava)
Proff. & Head
Govt. VYTPG Science College
Raipur, (C.G.)

(Mrs. Sanchal Moghe)

(Mr. Shivakant Mishra)

(Mr Sudheer Tiwari)

B.A. /B.Sc. Part I

PAPER - II
HUMAN GEOGRAPHY
Max. Marks: 50
(Paper Code-0118)

Unit I Definition and Scope of Human Geography. Man - environment relationship; Determinism, Possibilism, and Probabilism; Human Development Index (HDI).

Unit II Classification of Human Races – their Characteristics and Distribution; Human adaptation to environment: Eskimos, Bushman, Pigmy, Gond, Masai, and Naga.

Unit III Growth, Density and Distribution of World Population and factors influencing Spatial distribution; Over , Under, and Optimum Population; Migration of Population. .

Unit IV Settlements – Urban Settlements: Urbanization, Evolution and Classification, Trends of Urbanization.

Rural settlements: Characteristics, Types and Regional Pattern, Rural Houses in India - Types, Classification and Regional Pattern.

Unit V Issues – Global Warming, Climate Change, Deforestation, Desertification, Air, Water and Soil Pollution.

Books Recommended:

1. Chisholm, M. (1985): Human Geography, 2nd edition, Penguin Books, London.
2. De Blij, H.J.(1996): Human Geography: Culture, Society and Space,. 2nd edition. John Wiley and Sons, New York,
3. Fellman, J. D., Arthur, G., Judith, G., Hopkins, J. and Dan, S. (2007): Human Geography: Landscapes of Human Activities. McGraw-Hill, New York. 10th edition.
4. Haggett, P. (2004): Geography: A Modern Synthesis. 8th edition, Harper and Row, New York.
5. Huggett, R. J. (1998): Fundamentals of Biogeography, Routledge, London.
6. Hussain, M. (1994): Human Geography, Rawat Publications, Jaipur.
7. Johnston, R. J., Gregory, D., Pratt, G. and Watts, M. (2009): The Dictionary of Human Geography. 5th edition, Basil Blackwell Publishers, Oxford.
8. Kaushik, S.D. and Sharma, A.K. (1996): Principles of Human Geography (in Hindi), Rastogi Publication, Meerut.
9. Norton, W. (2008): Human Geography, Oxford University Press, New York. 5th ed.
10. Saxena, H. M. (2000): Environmental Management. Rawat Publications., Jaipur and New Delhi.
11. Singh, K. N. and Singh, J. (2001): *Manav Bhugol*. Gyanodaya Prakashan, Gorakhpur. 2nd edition.
12. Singh, L.R. (2005): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad
13. Smith, D. M.(1977): Human Geography- A Welfare Approach, Edward Arnold (Publishers) Ltd.,London
14. Stoddard, R.H., Wishart, D.J. and Blouet, B.W. (1986): Human Geography. Prentice-Hall, Englewood Cliffs, New Jersey.

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B.A. /B.Sc. Part II

PAPER - I

ECONOMIC AND RESOURCES GEOGRAPHY

Max. Marks: 50

(Paper Code-0187)

Unit I Meaning, scope and approaches to economic geography; Main concepts of economic geography; Resource: concept and classification; Natural resources: soil, forest and water.

Unit II Mineral resources: iron ore and bauxite; Power resources: coal, petroleum and hydro electricity; Resource conservation; Principal crops: wheat, rice, sugarcane and tea

Unit III Agricultural regions of the world (Derwent Whittlesey); Theory of agricultural location (Von Thunen); Theory of industrial location (Weber); Major industries: iron and steel, textiles, petrochemical and sugar; industrial regions of the world.

Unit IV World transportation: major trans-continental railways, sea and air routes; International trade: patterns and trends; Major trade blocks: LAFTA, EEC, ASEAN; Effect of globalization on developing countries.

Unit V Conservation of resources; evolution of the concept, principles, philosophy, and approach to conservation, resources conservation and practices. Policy making and sustainable development.

Books Recommended:

1. Alexander, J. W. (1988): Economic Geography. Prentice-Hall, New Delhi,.
2. Bryson, J., Henry, N., Keeble, D. and Martin, R. (eds.) (1999): The Economic Geography Reader: Producing and Consuming Global Capitalism. John Wiley and Sons, Inc, New York.
3. Clark,G. L., Gertler, M. S. and Feldman, M. P. (eds.) (2000): The Oxford Handbook of Economic Geography. Oxford University Press, USA.
4. Coe, N. (2007): Economic Geography: A Contemporary Introduction. Blackwell Publishers, Inc., Massachusetts.
5. Gautam, A. (2006): *Aarthik Bhugol Ke Mool Tattava,* Sharda Pustak Bhawan, Allahabad.
6. Guha, J. S. and Chattoraj, P.R. (2002): A New Approach to Economic Geography: A Study of Resources. The World Press Private Limited, Kolkata.
7. Hanink, D. M. (1997): Principles and Applications of Economic Geography: Economy, Policy, Environment. John Wiley and Sons, Inc, New York.
8. Hartshorne, T. A. and Alexander, J. W. (1988): Economic Geography (3rd revised edition) Englewood Cliff , New Jersey, Prentice Hall
9. Hudson, R. (2005): Economic Geographies: Circuits, Flows and Spaces. Sage Publications, London.
10. Knowles, R, Wareing, J. (2000): Economic and Social Geography Made Simple, Rupa and Company, New Delhi.

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REVISED SYLLBUS

B. A. Part- III (Economics)

Subject : Development and Environmental Economics, Paper-I (Paper Code:0242)

UNIT 1

Economic Growth and Development : Factor affecting economic growth (Labour, capital and technology), Developed and under developed Economy, Poverty-absolute & relative, Marxian model of Economic Growth, Mahalanobis Model of Economic Growth. Balanced and unbalanced growth.

UNIT 2

Problems of Population and growth pattern of population. Theory of demographic transition. Population, poverty and environment. Schumpeter's theory of economic growth, Theory of Big-Push, Nelson's theory of low-level income equilibrium trap , Theory of Critical minimum efforts ,

UNIT 3

Harrod and Domar growth model, Solow's model of economic growth, Meades Neo classical models, , Mrs. Joan Robinson's growth model , A. Lewis theory of unlimited supply of labour.

UNIT 4

Environment: Environmental and use, environmental disruption as an allocation, problem. valuation of environmental damages- land, water , air & forest , prevention control and abatement of pollution, choice of policy instruments in developing countries, environmental legislation, indicators of sustainable development, environmental accounting

UNIT 5

Concept of Intellectual Capital : Food Security, Education, Health & Nutrition, Role of agriculture in economic development, Land reforms, Efficiency & Productivity in Agriculture, new technology & Sustainable agriculture, Globalization & agriculture growth, the choice of technique appropriate technology & employment.

Reference :-

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Revised syllabus

SOCIOLOGY 2018-2019

B.A. PART-I

Paper –II

CONTEMPORARY INDIAN SOCIETY (Paper Code-0116)

UNIT-I **Classical View about Indian Society:** Verna, Asharam, Karma, Dharma and Purusharth.

UNIT-II **The Structure and composition of Indian society.**
Structure : Village ,Towns, Cities and Rural – Urban Linkage.
Compositinns: Tribes, Dalits, Women and Minorities.

UNIT-III **Basic Institutions of Indian Society:**
Caste system, Joint Family, Marriage and Changing dimensions.

UNIT-IV **Familial Problems:**
Dowry, Domestic violence, Divorce, Intra-intergenerational conflict, problem of elderly.

UNIT-V **Social Problems:**
Surrogate Motherhood, Live in Relationship, Regionalism, Communalism, Corruption, Youth unrest.

ESSENTIAL READINGS :-

1 Dube, S. C. 1995. Society in India, New Delhi: National Book Trust.
2 Mandelbaum, D.G. 1970 Society in India, Bombay: Poular Prakashan.
3 Shriniwas, M.N. 1973. Social Change in Modern India, California: University of California Press
4 Shriniwas, M.N. 1990. Social Change Structure, New Delhi: Hindustan Publishing Corporation.
5 Uberoi Patricia, 1993 Family and Marriage In India, New Delhi: Oxford University Press.

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Head,
S.O.S. in Sociology & Social
Pt. Ravishankar Shukla U
Raipur (C.G.)

M.Sc (BOTANY)		IIIRD SEMESTER	
COURSE CODE: MBT302		COURSE TYPE:CCC	
COURSE TITLE: **PRINCIPLES OF ECOLOGY**			
CREDIT:7		**HOURS:135**	
THEORY: 5	**PRACTICAL:2**	**THEORY:90**	**PRACTICAL: 45**
MARKS			
THEORY: 100 (20+80)		**PRACTICAL:33**	

OBJECTIVE : This course is aimed towards generating fundamental knowledge, concepts and dimensions of Botany/ Plant Science

UNIT-1- **18 Hours**	**Introduction** to ecology, evolutionary ecology, environmental concepts, Population ecology – characters of polulation, population growth, population dynamics life forms, age structure, fertility, growth curves, eades and ecotypes.
UNIT-2- **18Hours**	Nature of ecosystem, structure, component, productivity, food chain, food web, energy flow through ecosystem. Biogeochemical cycles – Carbon cycle, nitrogen cycle, phosphorus cycle, Sulpher. Ecosystem management, Community Ecology
UNIT-3- **18 Hours**	Environmental Stresses and their management, Global climatic pattern and variations over time, Global climatic changes, Global warming, acid rain and Nitrogen deposition. Ecological succession – Types, mechanism, changes envolved in succession, concept of climax.
UNIT-4- **18Hours**	Biodiversity & Conservation, concept and levels, distribution and global patterns biodiversity act of India and related international conventions. Phytogeography, behavioral ecology, molecular ecology.
UNIT-5- **18Hours**	Environmental pollution air, water, soil pollution, use of fertilizer, pestisides and other chemicals in agriculture. Industrial pollution and impact of chemical on Biodiversity of microbes animals and plants. Seed and seedling ecology.