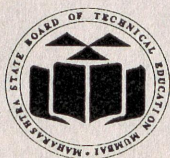


**CURRICULUM
FOR
POST GRADUATE DIPLOMA IN
NATURAL RESOURCE MANAGEMENT,
RESTORATION AND SUSTAINABLE
DEVELOPMENT
(NR)**

**ONE YEAR
(FIRST & SECOND SEMESTER - PART TIME)**

(To be implemented from the Academic Year 2005 – 2006)



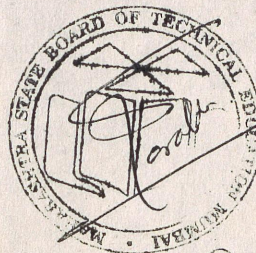
**MAHARASHTRA STATE
BOARD OF TECHNICAL EDUCATION**
49, Kherwadi, Aliyawer Jung Marg, Mumbai – 400 051

Entry Qualification :- Any Graduate

Duration :- One Year (Semester Pattern – Part Time)

INDEX

SR. NO.	NAME OF THE CONTENT	PAGE NO.
FIRST SEMESTER		
1.	Resource Management Practices	1 - 2
2.	Sustainable Land Management	3 - 5
SECOND SEMESTER		
1.	Sustainable Water Management	6 - 7
2.	Principles of Environmental Management	8 - 9
3.	Restoration and Conservation of Eco-system	10 - 11
4.	Project	12



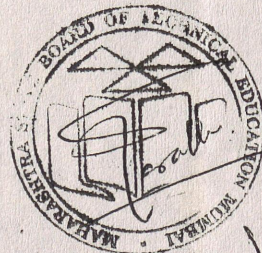
Boochu
30/12/05
O.S.D

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI										
TEACHING AND EXAMINATION SCHEME FOR POST GRADUATE DIPLOMA COURSES										
COURSE NAME : POST GRADUATE DIPLOMA IN NATURAL RESOURCE MANAGEMENT, RESTORATION AND SUSTAINABLE DEVELOPMENT										
COURSE CODE : NR										
DURATION OF COURSE : ONE YEAR (TWO SEMESTERS)										
YEAR / SEMESTER : SEMESTER (FIRST SEMESTER) (Implementation Year 2005 - 2006) (A)										
FULL TIME / PART TIME : PART TIME										
SR. NO.	SUBJECT TITLE	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
			TH	PR	PAPER HRS	TH	PR	OR	TW	SW
1.1	Resource Management Practices	7004	05	05	03	100	-	50#	50#	50
1.2	Sustainable Land Management	7005	05	05	03	100	-	50#	50#	50
TOTAL			10	10		200	-	100	100	100
INSTITUTIONS HOURS PER WEEK : 30 HRS										
STUDENT CONTACT HOURS PER WEEK (FORMAL TEACHING) : 20 HRS										
@ INTERNAL ASSESSMENT # EXTERNAL ASSESSMENT										
STUDENT CENTRED ACTIVITIES (LIBRARY STUDIES, GUIDANCE AND COUNSELLING, SEMINAR, SELF LEARNING ETC) HOURS PER WEEK : 10 HRS										
TOTAL MARKS: 500										
ABBREVIATIONS: TH-THEORY, PR-PRACTICAL, OR-ORAL, TW-TERMWORK, SW-SESSIONAL WORK										

- 1) THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.
- 2) TWO CLASS TEST TO BE CONDUCTED FOR SESSIONALS AS PER FORMAT.
- 3) @ INDICATES -PROGRESSIVE EVALUATION IS TO BE DONE BY SUBJECT TEACHER AS PER THE REVISED CIAAN NORMS.
- 4) # ALL OTHER PRACTICAL, ORAL AND TERM WORK ASSESSMENT IS TO BE DONE BY EXTERNAL
- 5) ALL SUBJECTS INCLUDING SESSIONAL WORK HAVE MINIMUM PASSING OF 50%.
- 6) PROPORTION OF MARKS BY EXTERNAL EXAMINER AND INTERNAL EXAMINER AS PER CIAAN NORMS.

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI										
TEACHING AND EXAMINATION SCHEME FOR POST GRADUATE DIPLOMA COURSES										
COURSE NAME : POST GRADUATE DIPLOMA IN NATURAL RESOURCE MANAGEMENT, RESTORATION AND SUSTAINABLE DEVELOPMENT										
COURSE CODE : NR										
DURATION OF COURSE : ONE YEAR (TWO SEMESTERS)										
YEAR / SEMESTER : SEMESTER (SECOND SEMESTER) (Implementation Year 2005 - 2006) (A)										
FULL TIME / PART TIME : PART TIME										
SR. NO.	SUBJECT TITLE	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
			TH	PR	PAPER HRS	TH	PR	OR	TW	SW
2.1	Sustainable Water Management	7006	04	04	03	100	-	50#	50#	50
2.2	Principles of Environmental Management	7007	03	-	02	50	-	-	-	50
2.3	Restoration and Conservation of Eco-system	7008	03	03	02	50	-	-	-	50
2.4	Project	-	01	02	-	-	-	50#	150#	-
TOTAL			11	09		200	-	100	200	100
INSTITUTIONS HOURS PER WEEK : 30 HRS										
STUDENT CONTACT HOURS PER WEEK (FORMAL TEACHING) : 20 HRS										
@ INTERNAL ASSESSMENT # EXTERNAL ASSESSMENT										
STUDENT CENTRED ACTIVITIES (LIBRARY STUDIES, GUIDANCE AND COUNSELLING, SEMINAR, SELF LEARNING ETC) HOURS PER WEEK : 10 HRS										
TOTAL MARKS: 600										
ABBREVIATIONS: TH-THEORY, PR-PRACTICAL, OR-ORAL, TW-TERMWORK, SW-SESSIONAL WORK										

- 1) THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.
- 2) TWO CLASS TEST TO BE CONDUCTED FOR SESSIONALS AS PER FORMAT.
- 3) @ INDICATES -PROGRESSIVE EVALUATION IS TO BE DONE BY SUBJECT TEACHER AS PER THE REVISED CIAAN NORMS.
- 4) # ALL OTHER PRACTICAL, ORAL AND TERM WORK ASSESSMENT IS TO BE DONE BY EXTERNAL
- 5) ALL SUBJECTS INCLUDING SESSIONAL WORK HAVE MINIMUM PASSING OF 50%.
- 6) PROPORTION OF MARKS BY EXTERNAL EXAMINER AND INTERNAL EXAMINER AS PER CIAAN NORMS.



Boards

1.1 Subject Title - Resource Management Practices (7004)

Semester - First

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
05	05	03	100	-	50#	50#	50

RATIONALE :

As sustainable development is national policy, a holistic approach to any problem is a basic necessity. This module which discusses basic concepts of social, natural & management sciences is aimed at changing the mindset of the student; so that professionals such as engineers & technologists understand social & environmental impacts of their actions & social scientists, economists etc. appreciate technical & ecological niceties. This module is therefore, relevant to any occupation.

OBJECTIVES :

This module imparts to the student all the basics necessary to obtain a holistic approach. It breaks down compartmentalization of knowledge, reveals links between different disciplines and promotes solutions which reconcile interests of nature & human beings. Such a holistic approach is necessary for Sustainable development.

Detailed Contents:

Chapter	CONTENTS	Marks	Hours
CH-1	A: Perspective in Evolution It discusses early evolution of the planet, evolution of life supporting systems, evolution of life's diversity, rise of human beings, their use of resources from earliest times to just before modern age	10	8
CH-2	B: Modern Age Trade & economic expansion since 16 th Century. Industrial revolution & its impact on resource use & environment. Evolution of modern agriculture & its impact on resources & environment. Rise in scale of human activities & use of fossil fuels; Post-second world war development, the management revolution; the boom in production, technology & their impacts on resource & environment.	10	17
CH-3	C: Modern Age & Environmentalism Rising pollution & loss of quality life. Rise of Environmentalism, from Rachel Carson to Rio Conference, International protocols & treaties.	10	10
CH-4	D: Indian Perspectives Resource use in India before & during the British rule. The changing social order & economic scenario. The conflict between old & new. Gandhian, Marxist & Socialist philosophies & their impact on social & economic activities. The age of planning & modern usage of natural resources.	20	15

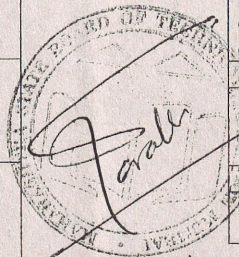
Chapter	CONTENTS	Marks	Hours
CH-5	E: Ecology & Management of resources Basic concepts in ecology. Ecological approach to use of natural resources. Ecology & technology. Impact of technology on natural resources & the Environment. Impact assessment.	20	15
CH-6	F: Sustainable Development Laws of Thermodynamics, Different approaches to sustainability. Opportunities & constraints in tropical environment. Environmental & Ecological economics. Sustainability in Indian context A holistic approach	20	10
CH-7	G: Mountain Eco-System Himalayan hydrology , ecology. Distribution of flora & fauna. Human settlements & livelihood in Himalayas. State & community initiatives in development . Western Ghats-livelihoods & sustainable development , other mountain systems in India.	10	05
TOTAL		100	80

Practical List :

1	Interpreting landscapes Formation of land types, various undulations.
2	Geology practical Demonstration of various rocks, geological features.
3	Himalayan broad leaved forest eco-system Study of Flora & Biomass measurement
4	Study of Himalayan Bird life Altitudinal migration, Habitat pattern and feeding habits
5	Himalayan eco-system Survey of Natural Resource use of indigenous communities

Reference Books:

Name of Book	Author	Publisher
The Culture & Civilization of ancient India	D.D. Kosambi	Vikas Publishing House
This Fissured Land	Gadgil & Guha	Oxford University Press
Why preserve natural variety?,	B.G.Norton	Princeton University
How many people can the Earth support?,	J.E.Cohen	W.W.Norton & Co.
India: Economic development & social opportunity	Dreze & Amartya Sen	Oxford University Press
Valuing the Earth	Daly & Townsend	MIT Press, Cambridge,USA
Economic Values & the Environment in the Developing world	Georgius, Whittington	Edward Elger, UK
Banavaa	Prakash Gole	Continental Prakashan, Pune
Nisarg Ani Manus	Prakash Gole	Continental Prakashan, Pune



Roch

1.2 Subject Title - Sustainable Land Management (7005)

Semester - First

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
05	05	03	100	-	50#	50#	50

RATIONALE :

This module is the center piece of the entire course as it analyses the functioning of different eco-systems. He/She understands the cogs & links that make up the eco-system. Through field work & practicals he/she becomes familiar with field problems & intricacies. This module is therefore one further step towards an occupational career built around Sustainable management of natural resources.

OBJECTIVE :

This module furnishes to the student all the essential ecological inputs about the present status & functioning of different tropical eco-systems with special reference to Indian conditions. The student is then exposed to the present practices of utilization of these eco-systems to satisfy human needs. He/She then appreciates the difference between the present practices & practices based on ecological considerations. The latter are more relevant & important for the policy of sustainable development. Understanding the functioning of different eco-systems in the tropics and the difference between current practices & ecological inputs are needed to better understand the principles & techniques of sustainable management of natural resources which forms the subject of the next paper.

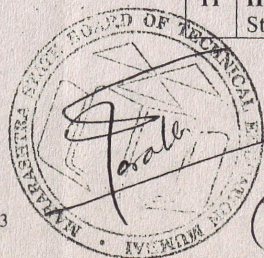
Detailed Contents:

Chapter	CONTENTS	Marks	Hours
CH-1	A: Ecology of tropical eco-systems. Micro-climates & developmental & use of resources at the local level. Decentralised technology, production & distribution, recycling & water minimization at local level	20	10
CH-2	B: Eco-systems & the Context of economic development in India The present status of terrestrial eco-systems in India. Problems of poverty & Population. Industrialism, urbanization & consequences of the policy of catching up with the west. Liberalization & globalization	15	12
CH-3	C: Agriculture & Resource use Perspectives in agriculture. Agriculture & ecology. Impact of agriculture on soil & bio-diversity. Modern agriculture & green revolution. Sustainable agriculture- organic, agro-forestry, Agri-based processing & its impact. Alternative livelihoods. Problems of marketing & distribution.	20	18
CH-4	D: Grasslands Tropical grass & savanna environments. Grasses & grazing	18	15

Chapter	CONTENTS	Marks	Hours
	regimes in India, Livestock, fodder resources & grazing regimes in India, Pastoralists & pastoral Strategies, Forage & fuel wood production. Hot & cold deserts. Life & adaptations in desert eco-systems. Living in deserts. Grassland as a sustainable livelihood		
CH-5	E: Forests in India Forest types & their ecology, Management of forests- Economic & sustainable, Forest- conservation & development, Ecology of Plantations, Forestry in India, Joint Forest Management and people's participation	15	12
CH-6	F: Biodiversity & Wildlife Management in India Biodiversity & its importance, Distribution of biodiversity in India, Hotspots of Biodiversity. Conservation of biodiversity- traditional & modern, Conservation of biodiversity- state's efforts & community based systems, Evaluation of biodiversity, Wildlife protection in India- ancient & modern, Wildlife protection legislation, Research & management techniques, Landscape ecology & wildlife management, Community & private reserves.	12	13
	TOTAL	100	80

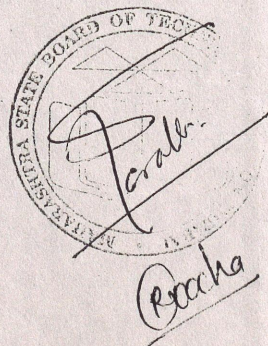
Practical List ;

No.	Title of Practical
1	Landscape features and soil profiles Water divide, slope units, pediment, flood plain, river terrace, variation in soil thickness according to land units.
2	Map reading Toposheet reading, Index system, representation of relief features in maps.
3	Sample vegetation on land Landscape and vegetation relation
4	Low rainfall area -vegetation and insects Visit to Bapdev ghat- vegetation identification , climax stages, fauna identification
5	Grassland ecosystem Phaltan restoration project background, Grass identification, succession in grass communiti
6	Forest ecosystem Bhimashankar- forest character, edge effect, bird composition changes.
7	Study of Sacred groves Monitoring of sacred groves in Mulashi area, Diversity and character of vegetation in core and edge.
8	Urban vegetation Vegetation in different areas, flora-fauna association
9	Medium rainfall forest Character of medium rainfall forest at Ambi, Observation of biodiversity
10	Himalayan eco-system Understanding Geology of a Himalayan location
11	Himalayan eco-system Study of Karst topography, limestone caves: stalactites & stalagmites



Reference Books:

Name of Book	Author	Publisher	Year of Publication
Tropical Rain Forest Ecology	D.J. Mabberlay	Blackie	1983
Tropical Ecosystems	K.P.Singh, J.S.Singh	Wiley Eastern Ltd.	1992
Basic Ecology	Eugene P. Odum	Holts Sanders Int.	1983
Agroforestry in India	K.G.Tejawani	Concept Publishing Company	2001
Challenges of Agriculture in the 21 st Century	G.M.Pillai	MCAER, Pune	1999
The Organic Farming Reader	Claude Alvares & others	Other India Press	2002
The Ecology of Agricultural Systems	T.P. Bayliss-Smith	Cambridge University Press	1990
The Origin of Agriculture	David Rindos	Academic Press Inc.	1984
Fodder From Forests	T.C.Pokhriyal, Adarsh Kumar & others	Indian Council of Forestry Research and Education, Dehra Dun	1992
Grasses of Western India	Toby & Patricia Hodd	Bombay Natural History Society	1982
Sustainable Development in Fragile Environments	N. S. Jodha	Centre for Environment Education, Ahmedabad	1984
Forest & Forestry	K.P. Sagriya	NBT	1967
The Purpose of Forests	Jack Westoby	Basil Blackwell	1987
The Price of Forests	Anil Agarwal	Centre of Science & Environment	1992
The Himalaya	J.S.Lall	OUP, India	1995
Himalayan Biodiversity	Upendra Dhar	Gynodaya Publication	1997
Gazetteer of Garwhal Himalaya	H.S. Walton	Natraj Publishers, Dehradun	1989
Himalayan Snow & Glaciers	Jagdish Bahadur	Concept Publishing Company	2004
Uttaranchal	Dewan & Jagdish Bahadur	Concept Publishing Company	2004



2.1 Subject Title - Sustainable Water Management (7006)

Semester - Second

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
04	04	03	100	-	50#	50#	50

RATIONALE

As sustainable development is national policy, a holistic approach to any problem is basic necessity. The paper discusses a major resource Water in a totally different perspective. Instead of just managing the production pattern, it involves consideration of River Ecology to its equitable use and management. It gives insight to Engineers and student about how to implement ecological solutions in watershed development along with engineering methods. This paper in present scenario is very much relevant as water has become a subject of national concern. This paper empowers students about alternative water management techniques.

OBJECTIVES :

This paper explains to the student where the basic problem of water lies. It shows solution and alternatives to present problems of water management. This will lead to co-operation between various disciplines and help in solving problems of distribution of water. This training will lead to restoration of Traditional Water Systems and sustainable development of water resources.

Detailed Contents:

Chapter	CONTENTS	Marks	Hours
CH-1	A: Water Water as a resource. The Hydrological cycle, Stream & river ecology. The associated eco-systems; wetlands- functions & management, underground sources & soil moisture	25	16
CH-2	B: Traditional water management Traditional systems throughout in India. Traditional systems & economy. Significance & rejuvenation of these in today's scenario.	12	6
CH-3	C: Modern Water Management in India Water resource development in British rule; Water development since Independence; Dams & canals: their impacts; economics of present water management; Equity issues. Reform of the present system, Clean up of rivers.	25	16
CH-4	D: Alternative Water Management Integrated water resources development. Restoration of surface flows; Recharge of ground water, local resources development & decentralization, water quality & Waste Disposal.	18	10
CH-5	E: Watershed Development Watershed as a unit. Methods, training, procedures in Watershed development. Production oriented systems. Data	20	16

Chapter	CONTENTS	Marks	Hours
	collection, Cost estimates, planning & implementation & monitoring. People's participation, interventions; Ecological approach, conservation of bio-diversity, micro-environments & eco-services. Ecological interventions		
	TOTAL	100	64

Practical List :

No.	Title of Practical
1	Stream ecosystem Features and functions of stream, associated flora and fauna
2	River ecology Stream restoration work
3	Pond ecosystem Section of pond, various habitats and associated flora and fauna
4	Coastal ecosystem - Life in the Inter-tidal zone: Sandy beach Measuring extent of the zone, Tide movements, fauna of sandy beaches, flora of sandy beaches: Sand binders, Protective vegetation, Stream vegetation, Assessment of threats
5	Coastal eco-system- Life in Inter- tidal zone: Rocky beach Measuring the extent of the zone, Habitat pattern, Fauna of rocky beaches, Extent of algal cover, Flora of cliffs & adjacent habitats, Assessment of threats
6	Coastal eco-system- Study of mangrove eco-system True mangroves and mangroves associates; Associated fauna, Assessment of threats

Reference Books:

Name of Book	Author	Publisher
The Oceans	Prager & Erie	Magraw-Hill
Marine Biology	Levinton J.S.	Oxford University Press
The state of India's environment 1984-85, Citizen's fifth report	Centre for Science & Environment	Centre for Science & Environment, New Delhi
Tropical Eco-systems	Singh & Singh (Eds)	Wiely Eastern Ltd.
Tropical Rain Forest Ecology	Mabberley D.J.	Blackie, USA
Forests & Forestry	Sagreiya K.P.	National Book Trust
Wetlands of India	ISRO	
The Ecology of Agricultural systems	Bayliss-Smith T.P>	Cambridge University Press
A manual for planning wildlife management in Protected areas and managed forests	Wildlife Institute of India	-
Management of National Parks & Sanctuaries in India	Ashis Kothari	Indian Institute of Public Administration
Environment & Ornithology in India	Prakash Gole	Rawat Publication
Saras Kaunch - Ek Magova	Prakash Gole	Continental Prakashan, Pune
Katha Kokan Kinaryachi	Prakash Gole	Continental Prakashan, Pune

2.2 Subject Title - Principles of Environmental Management (7007)

Semester - Second

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
03	-	2	50	-	-	-	50

RATIONALE :

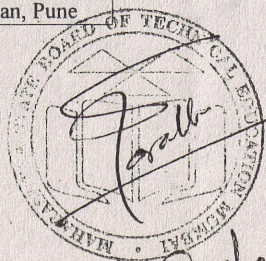
This paper supplements the knowledge gained in earlier semester prepares the student to take the actual working of different projects connected with different natural resources & eco-systems. gains analytical skills concerned with cost items, learns to handle labour & other organization components & becomes capable of preparing reports & organizing & analyzing data & communicational results to appropriate authorities & / or agencies. Project & field work exposes the student to realities of the field.

OBJECTIVE :

This paper equips the student with management & organizational tools for successful planning & operation of projects and dissemination of information and knowledge to appropriate audiences. the necessary management ingredients including cost analysis, statistical analysis, organizational culture, entrepreneurial development are included in this module. These supplement the ecological knowledge of different eco-systems that the student acquires in earlier papers. The student is therefore well equipped to take up the actual challenges in the field of planning for a development / conservation restoration project & implement it.

Detailed Contents :

Chapter	CONTENTS	Marks	Hours
CH-1	Basic Principles of Management <ul style="list-style-type: none"> • Role & importance of Management • Approach to management- scientific, operational, human relations, systems • History of management thought, functions of management; Contribution of Taylor • Traditional Indian Management thinking 	7	7
CH-2	Environmental Management <ul style="list-style-type: none"> • Planning: Nature & Purpose • Setting the objectives, Management by objective, Decision making. • Organising: Nature & properties, Line & staff authority • Staffing: selection, recruitment, performance appraisal, training & development • Direction: elements of directing, manager as a leader, motivator, communicator • Controlling: basic control process, control techniques, budgetary controls, co- ordination 	10	10



7 (Prakash)

Chapter	CONTENTS	Marks	Hours
	<ul style="list-style-type: none"> Organisational behaviour: definition, concepts, motivation Group dynamics: team formation, formal & informal groups, organizational design Organisational culture, climate, effectiveness 		6
CH-3	Entrepreneurial Development <ul style="list-style-type: none"> Setting of an enterprise: basic requirements of an enterprise, organizing land, labour & capital Manufacturing, financial, marketing & human resource management 		4
	<ul style="list-style-type: none"> Environmental Cost accounting: financial accounting, introduction to cost management, cost determination process-job costing & process costing Management accounting: some tool & techniques An overview of audit: statutory, internal & management & cost, social audit & responsibility Green audit 	12	5
CH-4	Communication Skills <ul style="list-style-type: none"> Communication process & principles of communication Barriers to communication, communication channels Factors governing efficiency in communication Written communication – letter & report writing Oral communication – presentation, use of OHP, Slide Projector, Power Point 	09	06
CH-5	Statistical Analysis : <p>a) Use of statistics in Ecological Studies; nature of data; graphical presentation of data b) Measuring Biodiversity – biodiversity indices, use & limitations c) Population abundance estimation – Sossile objects; mobile objects; Quadrat sampling; line transect; sampling method; Capture – recapture method d) Growth curves – linear, exponential, logistic – methodology, interpretation e) Graphical presentation of biodiversity – pie chart, histogram f) Designing surveys.</p>	12	10
TOTAL		50	48

Reference Books:

Name of Book	Author	Edition	Publisher
Landscape Ecology Principles in Landscape Architecture and Land use Planning	Dramstad, Olgon & Forman	1996	Harvard University School of Design, Island Press
Environment & Ornithology in India	Prakash Gole	1996	Rawat Publication, Jaipur
Landscape Ecology and Resource Management	John A. Bissonette	2003	Island Press, Washington
Island Management & Restoration	Max Finlason, Larsson	1991	Swedish Environmental Protection Agency
Landscape Mosaics, The ecology of landscapes and regions	Richard T.T Forman	1995	Cambridge University Press
Management of National Parks and Sanctuaries in India	Ashish Kothari & others	-	Indian Institute of Public Administration
Principles of Management	Koontz & O'donnel	-	-
Principles of Management	Tripathi & Reddy	-	-
Principles & Practices of Management	Shejwalkar & Anjali	-	-
Principles of Cost Accounting	M.L. Agrawal	-	-
Job cost accounting	Ashok Ranade	-	-
Business correspondence & report writing	Mohan Sharma	-	-
Communication Skills	-	-	-

2.3 Subject Title - Restoration Conservation of Eco-system (7008)

Semester - Second

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
03	03	02	50	-	-	-	50

RATIONALE :

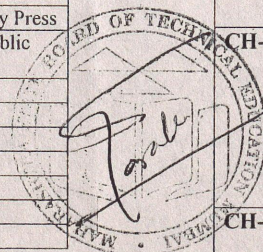
In this module various case studies concerning conservation & restoration of eco-systems are discussed with students. The students also carry out actual restoration work on sites identified. They analyse problems, work out solutions & are encouraged to try them out. They work on stream restoration, slope & ravine restoration, erosion control, grassland & forest rejuvenation & get an opportunity to plan & participate in various land & water resources development schemes in villages & on private lands.

OBJECTIVE:

The last module equips the students with tools & techniques of eco-system preservation. This essentially involves a soft engineering approach based on inter relationships in nature. These are essential elements of a holistic approach which basically involves consideration of non-human beings & minimum damage to natural systems. Various practices prevalent in other countries are demonstrated / discussed & the character of Indian conditions is emphasized. At the end of a theoretical & practical work, the student is therefore, fully equipped to carry out the projects of conservation & restoration of nature.

Detailed Contents:

Chapter	CONTENTS	Marks	Hours
CH-1	Approaches to Restoration: Definition of Ecological restoration, Attributes of restored eco-systems, Planning, monitoring & evaluation	6	4
CH-2	Landscape ecology & restoration: Explanation of terms; Patches, Edges & boundaries, Corridors & connectivity; Mosaics, Practical applications	8	5
CH-3	Restoration of land, Civil engineering works & care for nature: Green elements in civil engineering layout & management of herbaceous vegetation; Layout & management of roads & canal verges plantations; banks & bank protection covers	8	10
CH-4	Restoration of rivers & streams, Lake restoration, management & technology : Restoration of rivers, streams, lakes and reservoirs: Restoration in the river source zone, flood plain restoration, river-front development in urban areas, Maintenance of natural drainage channels in rural and urban areas, Reservoir management, Restoration of lake habitats and management of adjacent lands.	8	10
CH-5	Integrated aquatic eco-system management : Integration of multiple issues in restoration, Human element in	6	5



Chapter	CONTENTS	Marks	Hours
	integrated environmental management. Relationship between Restoration practice and Restoration ecology, Relationship of Restoration to other activities, Integration of ecological restoration into larger programmes.		
CH-6	Restoration in the context of Sustainability : Sustainability indices & productivity, Sustainability in restoration. Restoration in the context of sustainability: Sustainability indices and productivity, Economic criteria in Restoration, Threats and dangers to be avoided, Presence and absence of reference ecosystems. Roles of indigenous and exotic vegetation.	6	5
CH-7	Globalization and sustainability: Globalization and less developed countries, economic and social consequences of globalization.	6	5
CH-8	Environmental Law: Progress of environmental legislation, Does environmental law promote sustainability? Case studies.	2	4
TOTAL		50	48

Practical List :

No.	Title of Practical
1	Insect fauna, pioneer plants Identification of habitats for insects, pioneer plants.
2	Wetland vegetation and visit to restored land Visit to Panshet, wetland flora and fauna identification, comparison with earlier data.
3	Landscape ecology Interpreting the landscapes, mosaic and matrix concept.

Reference Books:

Name of Book	Author	Publisher
World Development Reports	-	World Bank
Indian Economic Survey	-	Government of India
Monitoring Sustainability	N. Ramchandran	Concept Publishing & Co. N. Delhi 2002
Trees for Dry lands	Hocking D.(Ed.)	Oxford & IBH Publishing Co.N. Delhi 1993
Nature Engineering & Civil Engineering Works	-	Ministry of Transport, Government of Netherlands 1997
Restoration of Stream Eco-systems	Eiseltova M & Biggs J.	IWRB England 1995
Wetland creation & Restoration	Kusler J.A & Kentula	Island Press, USA Washington DC 1990
Land Mosaics	R.T.T Forman	Cambridge University Press, 1995
Restoration of Aquatic Eco-systems	-	National Research Council, USA, National Academy Press, Washington, 1992
An introduction to Experimental ecology- a student guide to fieldwork and analysis	T. Lewis, L. R. Taylor	Academic Press, London, New York 1974
Introduction to field biology	D.P.Bennett, D.A. Humphries	Edward Arnold publishers Ltd., London, 1965
Biomass Studies- Field methods for monitoring biomass	Shailaja Ravindranath and Sudha Premnath	Oxford and IBH publishing co. Pvt. Ltd. 1997
Grasses of Western India	Toby & Patricia Hodd	Bombay Natural History Society, 1982

2.4 Subject Title - Project

Semester - Second

Teaching And Examination Scheme

TEACHING SCHEME		EXAMINATION SCHEME & MAXIMUM MARKS					
THEORY HRS / WEEK	PRACTICAL HRS / WEEK	PAPER HRS	TH	PR	OR	TW	SW
01	02	02	-	-	#50	#150	-

RATIONALE :

Full freedom has been given for the project report writing / presenting. All the facilities will be given to the students by the institution.

OBJECTIVE:

The students are expected to get acquainted with the existing market project having socio economic impact on farming community specially the farmers and farm economy. With this concept the students will have full knowledge of fruit processing industry and will build confidence for starting the industry with previous knowledge of marketing.

Detailed Content :

CONTENTS	MAR
<p>1. Team Size -: Max.5 students or individual.</p> <p>2. Selection of Project Topic -: Each team by Self or in consultation with any staff member or expert from outside. It should be intimated to the project coordinator.</p> <p>3. Sponsorship -: Sponsored by self or any other sponsorer.</p> <p>4. Guide lines for selection of the project: the students are having full freedom to select the project. The project shall be selected looking at the eco system or research in the field of ecology. It should have good socio-economical impact on community.</p> <p>5. Proprietary rights: The institute and projector will have equal proprietary rights over the project.</p> <p>6. Submissions Project-: 1. Working on the project can be started from the beginning of the course and submitted 15 days earlier than the date of examination.</p> <p>7. The working on the project can be continued after examination in the same institute and the institute must provide all the infrastructure facilities to the projector with 10% of the annual tuition fees of the last year.</p> <p>8. Guidelines for set-up of project:</p> <ol style="list-style-type: none"> 1. Introduction. 2. Selection of project. 3. Selection of location and site. 4. Provisional registration. 5. Statutory licenses/clearances 6. Organizational structure 7. Standards and specifications. 8. Personnel. 9. Estimated cost of the project. 10. Suggested means of financing. <p>9. Marks Distribution-:</p> <ol style="list-style-type: none"> 1) Methodology - 50 2) Testing by experts. - 35 3) Application. - 35 4) Writing of report - 30 	150
TOTAL	150

Chairman

Vice Admiral M. P. Awati
PVSM, Vrc

Director

Prakash Gole

Ecological Society

1/B Abhimanashree Society
Off Pashan Road
Pune 411008
Telephone : (0212) 350408

Environment and Development

A New Orientation

First Day

9.30 - 10.30	Introduction and Historical Perspective
10.30 - 11.30	Inter-relationships
11.30 - 11.45	Break
11.45 - 12.45	Environmental History of India - Ancient/Medieval
12.45 - 2.00	Lunch Break
2.00 - 3.00	Modern Environmental History
3.00 - 4.00	Forest Ecology - Types/Status
4.00 - 4.15	Break
4.15 - 5.15	Forest in our life

Second Day

9.00 - 10.00	Mountains and Rivers - India's Rivers
10.00 - 11.00	Arid and Semi-Arid areas
11.00 - 11.15	Break
11.15 - 12.15	Indian Sea Fronts
12.15 - 1.30	Lunch
1.30 - 2.30	Estuaries and Mangroves
2.30 - 3.30	Productivity of Ecosystems, Fragile Ecosystems
3.30 - 4.00	Break
4.00 - 5.00	Management of Land and Agriculture

Third Day

9.00 - 10.00	Problems of Agriculture, Wastelands, Cattle & Grazing
10.00 - 11.00	Stream and River Ecology
11.00 - 11.15	Break
11.15 - 12.15	Problem of Water Management - Modern/Ancient
12.15 - 1.30	Lunch
1.30 - 2.30	Catchment and Command area Development - Wetlands
2.30 - 3.30	Importance of Plants in Water Management
3.30 - 4.00	Break
4.00 - 5.00	Biodiversity

Fourth Day

9.00 - 10.00	Biodiversity and its Conservation
10.00 - 11.00	Management of Wildlife
11.00 - 11.15	Break
11.15 - 12.15	Wildlife and Man
12.15 - 1.30	Lunch
1.30 - 2.30	Ecology and Life
2.30 - 3.30	Concept of Sustainable Development
3.30 - 4.00	Break
4.00 - 5.00	Environment and Development in an Indian Perspective

Certificates will be distributed on the last day.

This four day programme will give some interesting facts and information about what is happening in the field of nature conservation and restoration today. All those interested in going beyond the University curriculum will find this a useful and refreshing exposure as to how ecological concepts can be practically applied in the field. We show this to the participants during a one day field trip at Panshet where the Ecological Society's forest and wetland restoration project is currently underway. This field trip will be arranged on one of the days during the period of this orientation programme.

The course fee is Rs. 250/- per participant.

You are welcome to join this programme since the informal discussions combined with lectures aim to encourage students to boldly ask queries, interact with each other and express their opinions on conflicting issues concerning Environment in India today.

This programme will be held between 23/2/97 and 28/2/97 for four days.

Vice Admiral M. P. Awati (Retd.)
PVSM, VrC
Chairman
Prakash Gole
Director

ECOLOGICAL SOCIETY

(Registration No. E-822 (Pune)
under the Bombay Public Trust Act 1950)
1 B ABHIMANSHREE SOCIETY
PASHAN ROAD, PUNE 411008, INDIA
TELEPHONE : 0212-336408

ENVIRONMENT, SUSTAINABLE LIVING AND YOU : **AN ORIENTATION COURSE**

Life is a whole. We, for our own convenience divide it into compartments such as sciences and arts, into non-technical and technical parts. This division seems useful when we are learning to grasp various things. However, as one proceeds to graduate and post-graduate studies it becomes essential to synthesize, grasp the essence and significance of life, as one prepares to confront life's struggles. Relevant to this, Environmental Science essentially draws upon the contributions of various disciplines and requires the understanding of how different disciplines can be inter-related if one keeps an open mind.

As one proceeds in life a deeper understanding of today's technical, economic, environmental and social problems depends on how different sciences and arts are meshed together to give a holistic view of life and current issues of concern. Our orientation course attempts to give students and others this facility to understand how different interests, exposure from different fields, culminate to what in today's times means environment.

This 15-day course will be held in the evenings at Akshar Nandan, Bhandarkar Road between 6.00 to 8.00 p.m. from 16th to 30th September. This workshop will help to give an exposure to those interested in conservation and restoration of nature, to social workers, graduates and post-graduate students from any science or arts or technical fields and anyone interested in nature and environment. For details and registration please contact the Ecological Society (Tel. 350408) between 2.00 p.m. to 4.00 p.m. or Amita Pandit (Tel. 367202) between 6.00 p.m. to 9.30 p.m. before 15th September 1996.

Prakash Gole
Director