UNIVERSITY OF MUMBAI

No.UG/ 144 of 2005

CIRCULAR :

Principals, affiliated colleges in Arts and Professor-cum-Director, Institute of Distance Education are hereby informed that the proposal for introduction of Certificate/Diploma/Advanced Diploma Course in Rainfed Agriculture (Revised Course of Dryland Agriculture-Vocational Course of the University Grants Commission ) as an Add-on Course, has been accepted by the Academic Council at its meeting held on 14th December, 2004 vide item No. 4.1 and subsequently approved by the Management Council at its meeting held on 21st December, 2004 vide item No.13 and that in accordance therewith the scheme and syllabus for the (Certificate/Diploma /Advanced Diploma Course in Rainfed Agriculture (Revised Course of Dryland Agriculture-Vocational Course) of the University Grants Commission) as an Add-on Course for the students of the F.Y.B.A., S.Y.B.A. and T.Y.B.A. courses will be introduced with effect from the academic year 2005-2006 as per **Appendix.**

Mumbai 400 032,
20th April, 2005.

for REGISTRAR.

A.C.4.1/14.12.2004
M.C.13/21.12.2004

To,

Principals, affiliated colleges in Arts and Professor-cum-Director, Institute of Distance Education

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No.UG/ 144-A of 2005 20th April, 2005.

Copy forwarded with Compliments to the Dean, Faculty of Arts, for information.

for REGISTRAR.

P.T.O.

Enclosures to Item No. - 4.1 / 14.12.04

# UNIVERSITY OF MUMBAI

## Scheme and Syllabus of Certificate/Diploma/Advanced Diploma Course in Rainfed Agriculture (Revised Course of Dryland Agriculture Vocational Course of U.G.C.) (ADD-ON Course) For the

*First year* :- Certificate course
*Second year* :- Diploma course
*Third year* :- Advanced Diploma course.

*(To be introduction w. e. f. the academic year of 2004-2005)*

# Rainfed Agriculture (ADD ON Course)

*Revised course of Dryland Agriculture( vocational course of U.G.C.)

**F.Y.B.A. paper –1:-Agriculture and Vegetation Resource**

Section- 1: Rainfed Agriculture (to be completed during the first term)

1.Definitions: dry farming, dryland agriculture, rainfed agriculture and concepts. History of rainfed agriculture research and development . Critical appraisal of each programme(objectives, achievements and failures)

2. Rainfed agriculture in India- Its contribution to national economy, employment: export potential, linkage with animal wealth and environment.
Natural resources in rainfed agriculture (Land, Climate, Vegetation, animals)

3. Various systems of agriculture- mono cropping , double cropping, rotations, mixed cropping, mixed farming, zooming (Shifting cultivation)

4. Important rainfed crops, their distributions, specific characteristics and requirements, concentration zones of rainfed crops, productivity levels, strategies to raise productivity, alternative uses, processing for value addition and export.

5. Package of cultivation practices for….
Grain crops: Rice, Nachani, Vari,
Pulses: Green gram, black gram, pigeonpea, chickpea,
Soybean, Cowpea,
Oil seeds: edible oil seeds- soybean, groundnut
non-edible oil seeds- Castor etc.
Root crops- sweet potato, onion etc
Other crops- potato, sugarcane, tapioca

6. Perennial vegetation-
a) Forages and grasses
b) Trees and bushes yielding herbs, drugs, minor fruits
Vegetables
Give more emphasis to the crops relevant to the area of University.

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## Section- II

Climate and vegetation Resources
( To be completed during second term )

7. Basic climate parameters- their diurnal and seasonal distribution, Meteorological instruments- their operation and usages.

8. Agro climatic zones of maharashtra.

Commercially important species yielding fruits, drugs, herbs, essential oils dyes bio-pesticides
Ecological distribution of weeds and their management.

9. Detorestation- problems and strategies to check it:
Aforestation programmes
-joint forest management, Social foresty,Agroforesty

10. Role of vegetation in natural resource conservation
-Aesthetic value of landscape
Environmental management
Land degradation control
Vegetation capping for wasteland management

Field Practicals

1) Acquaintance with meteorological observatory and Measurement of weather parameters Equipments and their functions.
2) Work experience in field.
3) Identification and collection of vegetation species- crops, trees, grasses and shrubs.
4) Basic understanding of different types of energy use in Agriculture, Operation of bullock and tractor drawn implements, description of their operational aspects.
5) Visit to rainfed areas
6) Visit to Agriculture University.
7) Analysis of rainfall data.

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# F.Y.B.A.Paper- II- Soils and Energy Management

## Section - I

## Soil Management

( to be completed during the first term)

1. Soil forming processes- soil profile and its development, soil Classification (Soil taxonomy)
   Soil nutrients- concepts of soil fertility and its evaluation.
   Different types of rainfed soils.

2. Soil physical properties-texture structure, bulk density. water holding capacity, physical problems (crusting, sealing, hard setting, temperature aeration) soil related problems and their
   Management-Salinity, sodicity , alkalinity, erosibility vulnerability, nutritional constraints. water logging, desertification, degradation.

3. Soil fertility management- fertilizer use, crop residue
   organic and green manuring, integrated, nutrient use and
   supply system.
   Soil and rain water conservation techniques, role of tillage, bunding, vegetative barriers, in situ moisture conservation.

4. Problematic soils and their reclamation.

## Section-II

## Energy management

( to be completed during the second term)

5. Introduction of mechanization in agriculture-
   Important problems and possibilities.

6. Energy (draft power) availability- requirement gap for timely operations
   Energy assessment in drylands.
   Human
   Animal
   mechanical

7. Alternate sources of energy- Biogas, solar

8. Agricultural operation and choice implements
   Implements for field operations (designs, relevance in terms of Practicability, avail able amenability to draft power, maintenance needs, design improvements)
   Tillage
   Seed bed preparation
   Sowing
   Fertilizer placement

Weeding and interculturing
Harvesting
Threshing
Dehulling
Insect and pest control implement
    Sprayers
    Dusters

9. Storage and processing
   Post-harvest technology- Mango, cashew nut preservation
   Processing.

Field practicals (Compulsory)

1. Chemical properties-pH
2. Fertility related analysis- available NPK, micro and secondary nutrients, organic carbon.
3. Study of soil profile.
4. Soil texture by field-testing method.
5. Use of soil testing kit.
6. Technique of soil sampling
7. Implements developed by Konkan Krishi Vidyapeeth.

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S.Y.B.A. Paper III **Soil and Rain Water Management**

## Section I

### Soil Management for Land Use Planning
(To be completed during the first term)

1. Soils of rainfed regions their characteristics problems and management options. Explain of various soil types in different rainfed regions.
2. Land capability: Classification of land use pattern & selection of cropping practice as per land use.
3. Classification of fertilizers,
   - Fertilizer application methods
4. Alternative land uses
   - silvi pastoral
   - agri-horticulture
   - horti-pastoral
   - silvi-agriculture
   - ley farming, alley cropping, rotational grazing
5. Soil fertility management – in situ generation of restorer inputs (organic matter) – i.e. composting methods and green manuring.

## Section II

### Rain Water Management
(To be complete during the second term)

6. rain water availability and distribution behavior (Hydrologic cycle) Principles of rainwater conservation
   - in situ moisture conservation
   - runoff harvesting
7. Choice of crops and cropping practices to enhance rain water conservation.
8. Mulching to prevent losses of stored moisture
   - Mulching, definition, kinds of mulching materials their availability and efficiency
   - role of mulches in rain water conservation, erosion control improvement
   - soil fertility and biological environment
   - constraints and problems of various mulching practices
9. Runoff management
   - Region wise estimate of rainfall – runoff relationships
   - Runoff harvesting techniques
   - Water storage system
   - Farm and community ponds their designs, choice of construction and sealing materials

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10. Rain water harvesting for ground water recharge
    - Ground water potential, use, fluctuations
    - Percolation tanks
    - Other rain water harvesting methods
    - Diversion drain, wedge-shape trenches
    - Check dams, jacket well, underground dams
11. Rain water recycling techniques – water efficient methods
    - drip and micro sprinkler systems
    - pitcher irrigation
    - Choice of water efficient crops
    - Critical periods of irrigation, irrigation concepts – duty, delta

Field Practicals

1. Gravimetric measurement of soil moisture
2. Estimation of irrigation requirements, mulches
3. Visit to agroforestry sites
4. rhizobium and earthworm cultures
5. composting techniques
6. Study of different soil conservation structures
7. Calculation of fertilizer dose

## S.Y.B.A. Paper – IV Watershed Management and Study of Horticulture Crops

### Section – I

### Watershed Management
(To be completed during the first term)

1. Watershed approach for development of dryland agriculture watershed definition - macro and micro watersheds.
   Why watershed concept?
   Characteristics of watershed area.
2. Watershed hydrology, rainwater balance and natural resource buildup.
3. Watershed development programme – demarcation of watershed, location of rain water diversion structure and choice of crops and cropping systems integrated watershed management – concept and approaches, structures.
4. Rapid rural appraisal and participatory approaches, concept and relevance.
5. Socio – economic survey of beneficiaries in watershed.

### Section – II

### Study of Horticultural Crops
(To be completed during the second term)

1. Study of fruit crops in konkan region.
   Mango, Cashew, Kukum. Jamun, Anola, Jack fruit
2. Study of plantation crops and spices –
   Coconut, Arecanut, Cardamum, Cinnamone, Clove, Nutmeg, Rubber.
3. Study of different vegetable crops – Chilli, Brinjal, Tomato, Cucubits. Lady's finger
4. Study of different flower crops.
   Rose chrysanthemum, Jasmine, Aster, Gerbera
5. Post harvest technology for Mango, Cashew, Kokum and Karonda
6. Study of Greenhouse / poly house technology.

Field Practicals :

1. Socio-economic survey of watershed area
2. Visits to watershed sites
3. Design and layout of water harvesting structures – Preparation of model watershed
4. Cultivation of diff. Fodder crops in watershed areas
5. Grafting techniques for konkan plants
6. Visit to modern green/ploy house
7. Different prorogation methods for flower crops.
8. Preparation of different preserved product form mango, cashew, kokum. karonda.

T.Y.B.A. Paper No V **Crop Management & Sustainable Agriculture**

Section – I

Crop Management
(To be completed during the first term)

1. Agro-eco concept – agro ecological / climatic regions of India
2. Micro level planning for land use diversification and management
   - land capability criteria
   - length of growing season, critical stages of crop growth
   - biotic and abiotic stresses
   - socio-economic considerations
   - crop diversification
3. drought classification and management – agronomic practices – crop choices – introduction of drought tolerant crop varieties and cropping systems.
   - high value (medicinal, aromatic, pesticide, dyes) high tec (drip, fertigation, micro sprinkler system) agriculture.
4. Standard agronomic options and practices for konkan region
   - Tillage, Intercultural
   - Timely seeding
   - Choice of high yielding crops and varieties, examples
   - Weed management (Integrated)
   - Land configuration to maximize in situ rain water conservation
   - Water surplussing technique
   - In situ generation of restorer inputs (organic matter)
5. Mushroom culture, sericulture and apiculture.

Section – II

Sustinable Agriculture
(To be completed during the second term)

6. Integrated pest and disease management – potential and possibilities.
7. Pesticides, their types and use
   - method of application
   - Pests and diseases, their control.
8. Region – wise crop and cropping systems.
9. Sustainable agriculture – concept, potential and possibilities
   - Conservation and efficient use of natural resources
   - Risk aversion through farming enterprises
   - Alternate land use systems
   - Role of livestock
   - Alternate rural occupation for resource generation
10. Modern trends in Agriculture

Field Practicals :

1. Types of Irrigation – sprinkler and drip systems
2. Tillage and weed management practices
3. Integrated Pest and disease management practices
4. Poultry management
5. Mushroom culture
6. Dairy management
7. Determining spray volume of pesticides
8. Visit to Dairy farm and poultry sites.

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T.Y.B.A. Paper No. VI **Technology Transfer**

Section I

Extension Education

(To be completed during the first term)

1. Concepts of technology transfer, agricultural extension.
   System of technology transfer
2. Front line demonstration
   Farmer training centers
   KVKs
   Transfer of technology center, T & V System
   Lab to land programmes
   Operational research programme
   Institute village linkage programme
   Distance learning techniques
   Principles of agricultural economics, co-operative marketing in agricultur

Section II

**Extension System**

(To be completed during the second term)

3. Conventional extension system of transfer of technology
   Village level extension workers, study of democratic decentralization gra
   panchayats & service co-operatives
   Input supports systems
   Subsidies
   Credit support institution, co-op banks
   Rapid rural appraisals
   Community based technology transfer, method and result demonstration
   Women in agriculture
   Role of NGOs in transfer to technology
4. Human resource development through
   - Training and visits
   - Participatory learning processes
   - Publications
   - Role of Audio-Visual aids in agricultural technology transfer.
   - Electronic media (T.V., Radio)
   - Use of cultural (song and drama) methods

Field Practicals :

1. Identification kharif and rabi crops, grasses
2. Acquaintance with field operations like seeding, thinning gap, filling, weeding, plant protection, fertilizers application
3. Identification of breeds of cattle, sheep and goat
4. Acquaintance with rural and cottage industries by visit
5. Methodologies of agricultural extension – training, demonstration and conduct of group meetings.
6. Visit to KVKs, NGOs and advance institutes of training.

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# Pattern of Rain fed Agriculture

1. Name of Course: Rainfed Agriculture.
2. Brief Introduction of the course:

The course of Dry land Agriculture has been started as vocational course approved by University Grants Commission since 2002-03 academic year. DBJ College now plans to start this subject as ADD ON Course under Mumbai University by partly revising the syllabus as applicable to konkan conditions. It will cover various aspects of crop production, weather information, land and vegetation studies, soil-water management, agricultural extension and socio-economic surveys applied to Konkan conditions. These aspects will be covered in 6 papers, including theory, practicals, work experience, study trips, audio-visual demonstrations etc. There will be two papers of Dry land Agriculture for each year ie. Certificate, Diploma and Advanced Diploma Course

3. Plan of course:

First year: Certificate course.

Second year: Diploma Course.

Third year: Advanced Diploma Course.

4. Scheme of Examination:

There will be two papers (viz. Paper I and Paper II ) of 100 marks each, in one year. Each paper has Theory of 60 marks, divided in two terms of 30 marks. While practical exam carries 40 marks ( including tutorials, viva, field work and visits ). ( 30 + 30 + 40 = 100)

Passing standard will be 35 marks for each Paper of 100 marks.

5. Work load:

Presently for each year 324 hors for theory and practicals and some additional hours for visits and training summing total upto 450 hours per year is required.

6. Any other things to be mentioned:

a. The department has started regular recording of rainfall, maximum and minimum temperatures.

b. The students of this department have prepared the watershed model for demonstration purpose.

c. Recording of other meteorological parameters like relative humidity, wind speed, evapotranspiration will be started within few months.

d. Department is in a position to stat a soil testing laboratory for the benefit of farmers in the Chiplun locality.