

UNIVERSITY OF MUMBAI
No.UG/ 346 of 2009

CIRCULAR: -

The Principals of the affiliated colleges in Science are hereby informed that the recommendation made at the joint meeting of the Board of Studies in Zoology and the Conveners of the Syllabus Committee for the revision of B.Sc. syllabus at its meeting held on 23rd April, 2009 has been accepted by the Academic Council at its meeting held on 27th May, 2009 vide item No. 47 and subsequently approved by the Management Council at its meeting held on 24th July, 2009 vide item No. 13 and that, in accordance therewith, One Year Post-graduate Diploma Course in Biodiversity (Add-on-course) has been introduced by the University from the academic year 2008-2009.

Further that in exercise of powers conferred upon the Management Council under Section 54(1) and 55(1) of the Maharashtra Universities Act, 1904, it has made **Ordinances 5865 and 5866 and Regulations 8038, 8039, 8040, 8041, 8042 and 8043** including the scheme and syllabus relating to the One Year Post-graduate Diploma Course in Biodiversity (Add-on-course) is as per Appendix and that the same has been brought into force with retrospective effect from the academic year 2008-2009.

MUMBAI-400 032
7th September, 2009

PRIN.K.VENKATARAMANI
REGISTRAR

To,
The Principals of the affiliated colleges in Science.

AC/4.7/27/05/2009
M.C./13/24/07/2009

No. UG/346-A of 2009, MUMBAI-400 032 7th September, 2009

Copy forwarded with compliments for information to: -

- 1) The Dean, Faculty of Science,
- 2) The Chairman, Board of Studies in Zoology,
- 3) The Controller of Examinations,
- 4) The Co-Ordinator, University Computerization Centre.


(D.H.KATE)
DEPUTY REGISTRAR
(U.G./P.G. Section.)

Copy to: -

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro- Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ramagiri for information

The Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (2 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyavanagari (2 copies), the Deputy Registrar, Affiliation (2 copies), the Professor, Department of Distance Education (10 copies), the Director, University Computerization Centre (2 copies).

UNIVERSITY OF MUMBAI



Ordinances, Regulations
and Syllabus for the
One Year P.G. Diploma Course
in
Biodiversity
(Add-on Course)

(Introduced from the academic year 2008-2009)

DETAILS OF THE COURSE ^{course}
: **One Year P.G. Diploma in Biodiversity.**
(Add-on course)

O 5865 Title :- B.Sc.

O 5866 Eligibility :- One Year

R 8038 Duration :- 20

R 8039 Intake Capacity :-

R 8040 Structure of the Course :-

Two theory papers, one practical and project report

a) Paper I : 90 periods (I & II Term)

b) Paper II : 90 periods (I & II Term)

c) Practical : 120 periods,
24 practical (I & II Term)

Project work

R 8041 Medium of Instruction :- English

R 8042 Examination System :- Continuous assessment using (Seminar, model and chart preparation, oral, home assignment)

R 8043 TEACHING AND EVALUATION SCHEME

Sr. No.	Paper	Credits	Lectures	Examination Scheme		
				Internal	External	Total
1	Paper I Diversity of animal, Plants, Microbes Tools and Techniques.	06	90	40	60	100
2	Paper – II Community and population Ecology, Wild Life, Biodiversity, Ecological Diversity of habitats and adaptations.	06	90	40	60	100
3	Practical Course Paper – III	04	60	20	30	
4	Practical Course – Project	04	60	20	30	100
	Total	20	300	120	180	300

- Lectures – 3 hrs/week
- Practical batch – 1/week-4 hrs
- Compulsory project/field work & Submission of report
- Paper duration – 3 hrs
- Total periods – 300 hrs.

**Syllabus for P.G. Diploma Course in
Biodiversity**

(One Year P.G. Diploma course)

**PAPER I – Diversity of Animal groups, plants, Microbes
and Tools and Techniques.**

Unit I Introduction of Animal groups with examples.

23 L

- a) Protozoa
- b) Porifera
- c) Coelenterata
- d) Annelida
- e) Mollusca
- f) Helminthes
- g) Arthropoda
- h) Echinodermata
- i) Hemichordata
- j) Pisces
- k) Amphibia
- l) Reptilia
- m) Aves
- n) Mammals

**Unit II : Diversity, Distribution and elemental knowledge about plants using suitable
examples.**

23 L

- a) Algae
- b) Fungi
- c) Bryophytes
- d) Pteridophytes
- e) Angiosperms

Unit III : Diversity, Distribution and elemental knowledge about

22 L

- a) Bacteria
- b) Viruses
- c) Mycoplasma
- d) Rickettsia
- e) Chlamydia
- f) Plant microbe interaction
 - i) Microbial interactions
 - ii) Microbe – microbe interactions
 - iii) Animal – microbe interactions
- g) Soil Microbiology
 - i) Relationship between Microbes and Soil
 - ii) Microorganisms in soil
 - iii) Soil types and their micro flora
 - iv) Role of microbes in soil fertility
 - v) Biofertilizers, biological pest control
 - vi) Decomposition of plant and animal residue in soil
 - vii) Rhizosphere – habitat for soil microorganisms, structure, rhizosphere Effect.

Unit IV : Principles of components and applications of

22 L

- I) Microscopy –
- I) Electrophoresis
- II) Chromatography
 - i) TLC
 - ii) Gas Chromatography
 - iii) HPLC
- III) Biostatistics
 - i) Introduction
 - ii) Collection of Data
 - iii) Tabulation
 - iv) Graphic Presentation

- v) Probability
- vi) Standard Deviation
- vii) t-Test
- viii) Chi-square test

Computer Applications

IV)

- i) E-Connectivity
- ii) Bioinformatics

Research methodology:

V)

- i) Meaning of research
- ii) Objectives
- iii) Motivation
- iv) Types
- v) Significance
- vi) Criteria for good research
- vii) Writing the research proposal

Paper II

Community and population Ecology, Wild Life, Biodiversity, Ecological Diversity of habitats and adaptations.

Unit I

I) Community and Population Ecology – Concept of Ecological niche

23 L

- a) Nature of biotic community. Structure, organisation and stability of it intra and inter specific interactions.
- b) Methods of study of community.

II) Population and its characteristics.

- a) Natality
- b) Mortality
- c) Survivorship Curve
- d) Age structure
- e) Sex ratio
- f) Migration

III) Methods of estimation of population density

IV) Behavioural ecology –

- a) Aggregation
- b) Aggression
- c) Territoriality
- d) Homing

V) Microbial ecology –

- a) Characteristics of microbial ecology.
- b) Physiological adaptations of microbes.
- c) Techniques used to study Microbial ecology.

- a) Status of wild life in India and Abroad. Brief history.
- b) Rare and Endangered species
- c) Distribution of wild life in India
- d) Wildlife ethics, Wildlife values and human culture.

Wildlife conservation :

- a) Principles of wildlife conservation.
- b) Programme of conservation, Social Forestry, Agro Forestry and urban forestry .
- c) Economics of wildlife conservation. Species recovery and Re-introduction.
- d) Wildlife health and utilization. Captive breeding and Propagation.
- e) Zoo management Role of Zoos and botanical gardens in Ecotourism.
- f) Population Viability Analysis (Computer modeling).

Wildlife Management –

- I) Wildlife Techniques and Census. Tools for studying wildlife.
- II) Geographic Information system (G I S) and remote sensing in wildlife.
- III) Special technique in wildlife research.
- I) Wildlife forensics and conservation.

National and International Agencies of environment -

- I) Elementary idea of International Biological Programme (I B P)
- II) Man and Biosphere Programme.
- III) Environment Protection Agency (E P A)
- IV) International Union for Conservation of Nature (I U C N)
- V) State Pollution Control Board.
- VI) NGO's working on environment issues.

Unit III : **Concept of Biodiversity.**

22 L

- I) Biodiversity - the natural biological capital of the Earth, it's local, national, global and aesthetic importance.
- II) Biodiversity at Genetic, Species, Ecosystem level.
- III) Biodiversity in Terrestrial Biomes with special emphasis on Forest, Grasslands, Deserts.
- IV) Biodiversity in Man made environment-
 - a) Agriculture fields, Dams, Reservoirs, Botanical Gardens and Zoos.
 - b) Possibility of Extra Terrestrial life (As Assignment only).
- V) Biodiversity distribution.
 - a) Biodiversity Hot spots of the world.
 - b) India as a Mega diversity Nation.
 - c) Biodiversity of Western Ghats
- VI) Economics and values of natural resources and biodiversity -
 - a) Social, Cultural, Religious, Ethical values of Biodiversity.
 - b) Consumptive use vs Productive use.

Unit IV :

Ecological Diversity of habitats and adaptations.

22 L

- a) Energy flow in ecosystem.
- b) Nutrient Cycles
- c) Diversity of Habitats
- d) Adaptations
 - i) Aquatic - Planktonic, Nektonic, Demersal
 - ii) Terrestrial - Fossorial, Cursorial, Psaltatory.
 - iii) Volant

Practical No. 1 - Based on Theory Paper I and Theory Paper II

1. Quantitative analysis of soil

- i) Organic matter
- ii) Moisture Content
- iii) pH & conductivity.
- iv) Phosphate
- v) Nitrates
- vi) Potassium
- vii) Carbonates
- viii) Sulphate

2. Study of Soil biota

3. To Study the vegetation by Line - Transect method and Quadrature method

4. Study of wild animals (Photographs).

5. Study of Different Microscopes - Working Principals

6. Study of Electrophoresis - Working Principals

7. Determination of Sugar by TLC

8. Determination of Amino Acids by Chromatography

9. Examples based on biostatistics t-test, z-test, chi square test.

10. Examples based on Computer Applications, Introduction to computers.

- i) Components of Computer
- ii) Disk Operating System
- iii) Windows Operating System.
- iv) MS-Office
- v) E-Connectivity

11. Bioinformatics.

12. To study mangrove, wetland flora & fauna.

13. Project - Biodiversity of Sindhudurga District.

14. Visit to national park/ sanctuary, submission of report.

Books

- 1) Microbiology by Pelczar, Chan and Noel Krieg.
- 2) Biotechnological applications of Microbes by Ajit Varma and Gopi K Podila
- 3) Text book of Microbiology by K. Sharma.
- 4) Manual of Microbiology by K. Sharma
- 5) Microbiology by Prescott.
- 6) Microbiology : Fundamentals and applications by Purohit.
- 7) Principle of systematic zoology – Ernst Mayr and Peter D. Ashlock.
- 8) Systematic and origin of species – Ernst Mayr.
- 9) A Handbook of Biological Illustration – Zweifel, F.W.
- 10) Biodiversity – Wilson, E.O.
- 11) Biological Techniques: Collecting Preserving and Illustrating Plant & Animals
Knudsen, J W.
- 12) Discrimination and classification – Hand, D.J.
- 13) Guide to the Taxonomic literature of vertebrate – Black welder, R.E. Vertebrat
speciation – Blair, W.F.
- 14) The chordats-Alexander, R.M.
- 15) The chordats- Moneith A.R.
- 16) Chordata-Waterman A.J.
- 17) The life of Vertabrates-Young JZ
- 18) Limnology-Welch
- 19) Principle of systematic zoology-Ernst Mayr and Peter D. Ashlock.
- 20) Systematic and origin of species-Ernst Mayr.
- 21) A Handbook of Biological Illustration – Zweifel, F.W.
- 22) Biodiversity-Wilson, E.O.
- 23) Biological Techniques; Collecting, Preserving and Illustrating Plant & Animal
Knudsen, J.W. Discriminationand classification-Hand, D.J.
- 24) Guide to the Taxonomic literature of vertebrate – Black welder, R.E.
- 25) Vertebrate speciation – Blair, W.F.
- 26) Plant Taxonomy – Saxena & Saxena

- 27) A text book of Gymnosperms – Vyas, Purohit, Garg
- 28) A text book of botany- A C Dutta
- 29) A text book of Angiosperms – Pande B P
- 30) Taxonomy of Angiosperms – Vasistha P.C.
- 31) Trees: Their natural history – Thomas, P
32. Wildlife Biology-Dasniann
33. Wildlife in India-Saharia
34. Book of Indian Animals –Prater
- 35 Wildlife Management Technique – Giles.
36. Fundamentals of Wildlife Management – Rajesh Gopal
37. Manual of wildlife Techniques in India –J.B. Sale and K. Berkneiller.
38. Guide to India's wildlife-A.N. Jagannath Rao.
39. Tigers-Kailash Sankhala
40. Wildlife in India - E.P. Gee
41. Threatened Animals in India – B.K.Tikader.
42. Biodiversity. by E.O. Wilson, National Academy Press. 1988
- 43 Biodiversity Status and Prospects by Tandon.
44. Biodiversity and Biotechnology by Ray Biodiversity and its significance by Y.A. Abrol
45. An introduction to Biodiversity by Prithipalsingh.
46. Modern pattern of Biodiversity conservation by Chauhan.

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