DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./Syllabus/93/2014

It is hereby notified for information of all concerned that, on the recommendations of the Ad-hoc Boards and Dean, Faculty of Science, the **Academic Council at its meeting held on 08-07-2014** has accepted the following revised syllabi as mentioned against their nomenclature for **B.Sc. & M.Sc. under the Faculty of Science** :-

Sr. No.	Revised Syllabus		Semester
[1]	B.Sc. Environment Science	[Optional]	I & II
[2]	B.Sc. Sericulture	[Optional]	I & II
[3]	B.Sc. Automobile Technology	Degree Course	I & II
[4]	B.Sc. Workshop Technology	Degree Course	I & II
[5]	B.Sc. Refrigeration & Air Conditioning	Degree Course	I & II
[6]	B.Sc. Forensic Science	Degree Course	III & IV
[7]	B.Sc. Polymer Chemistry	[Optional]	III & IV
[8]	B.Sc. Environment Science	[Optional]	III & IV
[9]	M.Sc. Plant Breeding & Molecular Genetics		III & IV

This is effective from the **Academic Year 2014-2015** and onwards.

These **syllabi are available on the University Website.**

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/SU/B.SC. & M.SC./
2014/16264-463
A.C.S.A.I.No.462[18].

Date:- 12-08-2014.

* * * * * * * * * * * * *

Director,
Board of College and
University Development.

..2..

:: [2] ::

Copy forwarded with compliments to :-

1] **The Principals, affiliated concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University.

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above all syllabi on University Website.**

Copy to :-

1] The Controller of Examinations,

2] The Superintendent, [B.Sc. Unit],

3] The Superintendent, [M.Sc. Unit],

4] The Superintendent, [Eligibility Unit],

5] The Programmer [Computer Unit-1] Examinations,

6] The Programmer [Computer Unit-2] Examinations,

7] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,

8] The Public Relation Officer,

9] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

-=**=-

S*/-120814/-

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Syllabus of

B.Sc. Second Year

Semester – III & IV

Environmental Science [Optional]

Effective from Academic Year 2014-2015

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

B.Sc. (Environmental Science) in Semester Pattern.

B.Sc. IInd year

Year	Semester	Course Code	Paper Number	Paper Title	Marks
IInd Year	IIIrd	EVS-231	Paper-VII	Solid waste, Soil and Noise pollution	50
		EVS-232	Paper-VIII	Environmental Microbiology	50
		EVS-233	Paper-IX	Lab course-III (Practical based on EVS-231)	50
		EVS-234	Paper- X	Lab course-IV (Practical based on EVS-232)	50
	IVth	EVS-241	Paper-XI	Air pollution	50
		EVS-242	Paper-XII	Water management	50
		EVS-243	Paper-XIII	Lab course-V (Practical based on EVS-241)	50
		EVS-244	Paper-XIV	Lab course-VI (Practical based on EVS-242)	50

B.Sc.II year, Semester III

EVS-231 (Paper-VII) : Solid Waste, Soil and Noise Pollution

Unit-I : Solid Waste :- Introduction,
Classification of solid waste,
Types of solid waste (Domestic, Industrial and Biomedical and Hazardous waste),
Sources of solid waste,
Concept of segregation at source.

Unit-II: Solid Waste Management:
3-R's: Reduce, Reuse, and Recycle of solid waste,
Collection of garbage,
Disposal methods : Sanitary land filling, Disintegration, Incineration,
Eco-friendly techniques: Composting and Vermicomposting.

Unit-III: Soil:
Importance of organic fertilizers,
Soil microbiology,
Standards or soil quality required for various crops,
Soil pollution cause and remedies,
Conservation of soil,
Soil erosion.

Unit-IV: Noise:
Introduction, Definition,
Standards prescribed for Nose in Indian context.
Characteristics of sound,
Noise measurement, db meter.

Unit – V: Noise pollution:
Sources of Nose Pollution,
Mechanism of hearing,
Effect of noise,
Noise Pollution control (at Industrial, commercial and Residential places).

EVS-232 (Paper-VIII) : Environmental Microbiology

Unit-I : Introduction:-

a). Definition, Branches of Microbiology,
(Industrial, Medical, Mycology, Environmental microbiology),
History of Microbiology.

b). Kingdon Protista :
Concepts and classification of :
- Prokaryotes (Bacteria and Cyanobacteria)
- Eukaryotes (Algae, Fungi and Protozoans)

Unit-II: Bacteria:

- Morphology and general characters,
- Classification of bacteria based on temperature, pH, oxygen requirement, Carbon and energy source.
- Growth of bacteria.

Unit-III: Viruses:

-Morphology, General characters of viruses,
- Distribution (Animal , Plant and Bactriophage viruses).

Unit-IV:

a) Pure culture :
Concept, Preparation and Preservation,

b) Control of microorganism : - Sterilization and disinfection
- Physical agents (Heat, Radiation, Filters),
- Chemical agents (Acid, Ethylene oxide, Alcohol and heavy Metals)

c) Definition and concept of vaccinations :
Antigen and Antibodies as preventive measures against microbial diseases

Unit – V: Diseases caused by contaminated water:

- Introduction and Sources
- Water borne bacterial diseases with their causal organism, symptoms, prevention and control measures: Cholera, typhoid, Shigellosis.

EVS-233 (Paper-IX) : Lab Course III
(Practical based on EVS-231)

1. Collection and preservation of soil samples.
2. Determination of Lime by titration method.
3. Determination of organic carbon from soil samples by Ignition / Walkey method.
4. Determination of Electrical Conductivity of soil samples.
5. To study the pH of solid waste and soil.
6. Determination of NPK of Solid waste / soil samples.
7. To study the water holding capacity of soil.
8. Measurement of Noise by Noise meter (dB meter)
9. Demonstration/ Preparation of vermicompost bed for organic solid waste.
10. To study the percentage composition of degradable and non bio-degradable waste.
11. Determination of total acidity of soil sample.
12. Determination of total alkanility of soil sample.

EVS-234 (Paper-X) : Lab Course IV
(Practical based on EVS-232)

1. To study the principle and applications of instruments used for microbiological study- Incubator, Inoculation chamber, Microscope.
2. To study the morphological characters of bacteria by Simple staining method
3. Study of bacteria by Grams staining method.
4. Study of bacteria by negative staining method.
5. IMVIC Test (Faecal and non Faecal coliforms)
6. Qualitative analysis of water by MPN technique.
7. Identification of bacterial growth by Streak plate, Pour plate and Spread plate method.
8. Motility of bacteria by hanging drop technique.
9. Sterilization of culture media.
10. Preparation of pure culture.
11. Membrane technique (Demonstration)
12. Study of standard plate count (SPC).

Reference books: for paper EVS-231 (Paper -VII) Solid waste ,Soil and Noise pollution

1. Soil Conservation-Norman Hudson, IInd Ed, and English language book Soc.
2. Soil and Water Conservation-Resurges, Standard Pub.And distributor.
3. Soil Pollution and Soil Organism-P.C.Mishra, Ashish Pub. Home.
4. Wealth from Waste-S.C.Bhatia (Vol.II), Atlautic Pub.
5. Environmental Chemistry-B.K.Sharma
6. Environmental Science –S.C.Santra, New central book agency.
7. A text book of Environmental studies-D.K.Asthana and Meera Asthava.
8. Ecology and Environment-P.D.Sharma, Rastogi Pub.
9. Fundamentals of Ecology-E.P.odum.
10. Environmental Science-Kannighan and Saigo, W.C.B. Pub.
11. A Text book Environmental Studies-G.R.Chatwal and Harish Sharma, Himalaya Pub.
12. Fundamental concepts in Environmental Studies.- Mishra, S.Chand Pub.
13. Environmental Studies –Erich Bharucha, UGC Pub.
14. Municipal Solid Waste management by Bandela N.N. and Tare.

Reference books: for paper EVS-232 (Paper -VIII) Environmental Microbiology

1. Fundamentals of Microbiology- Pelczer Pub.
2. Elements of Microbiology-Pawar and Daginawala (Vol.I,II)
3. Microbiology-P.D.Sharma.
4. Environmental Microbiology- Vijay Ramesh , M.J.P.Pub.
5. Role of Microbes in Management of Environmental Pollution-edited by R.Tiwari.
6. Practical Microbiology-R.C. Dubey, D.K.Maheshwari, S.Chand Pub.
7. Elements of Bio-technology-B.D.Singh.
8. Soil Microbiology-Pawar and Daginwale

B.Sc.II year, Semester IV

EVS-241 (Paper-XI): Air Pollution

Unit-I : Introduction to air pollution:-

Definition, Composition and Chemistry of Earth atmosphere,
Sources and classifications of air pollutants:
Sources of air Pollutants,
Classification of air pollutants,
Factors affecting air pollution.

Unit-II: Effect of air pollution:

a) On human health, Vegetation, Historical monuments and on Materials.
b) Episodes : London smog,
Bhopal Disaster,
Los Angeles,
Chernobyl disaster

Unit-III: Air sampling and analysis:

Principle and Functioning of: High Volume Air Sampler,
Sedimentation,
Tilak Air Sampler,
Ambient air quality Monitoring : SO_x, NO_x, SPM, RSPM

Unit-IV: Pollution control methods:

Sedimentation, Filters,
Cyclone,
Electrostatic Precipitator,
Scrubbers.

Unit-V: Air Pollution Act 1981

Air pollution standards – Indian ambient air quality standards and United States Standards

EVS-242 (Paper-XII): Water Management

Unit-I: Water resources:

- Global Water Balance (GWB)
- Surface water sources : Lakes, Streams, Rivers
- Underground water sources : Infiltration galleries, Infiltration wells.
- Types of Lake, (Oligotrophic, Mesotrophic and Eutrophic)

Unit-II: Uses of Water and Water Supply:

- Uses : Domestic, Industrial, Agricultural, Recreational, etc.
- Types of Water : Fresh and Marine.
- Patterns of Drinking water supply

Unit-III: Restoration of Water :

- Rain Water harvesting,
- Roof Water harvesting,
- Watershed management.

Unit-IV: Management :

- Self purification of rivers,
- Integrated Water Resource Management (IWRM),
- Integrated Lake Basin Management (ILBM)
- Stockhom Water Prize,
- Water Act 1974

Unit-V: Case Study :

- Aurangabad Municipal Water Supply.
- Water Purification Treatment Plant at Pharola, Aurangabad.
- Nath sagar reservoir (Jaikwadi dam).

EVS-243 (Paper-XIII): Lab Course V

(Practical based on EVS-241)

1. Study of various equipments used in air pollution.
2. Detection and identification of Pollen grains.
3. Dust fall measurement by sedimentation method (tiles).
4. Detection of SO_2 gas and its effect on plants.
5. Detection H_2S gas and its effect on plants.
6. Detection of NH_3 gas and its effect on plants.
7. Measurement of atmospheric temperature by maximum and minimum thermometer.
8. Preparation of PDA.
9. Detection and Identification of fungal spores/ colonies by PDA.
10. Study of various sampling techniques (Rotorod, High volume, Volumetric)
11. Demonstration of HVAS (High Volume Air Sampler).
12. Determination of SPM and RSPM by using High volume Air Sampler.

EVS-244 (Paper-XIV): Lab Course VI

(Practical based on EVS-242)

1. Study of instruments used in water analysis :-
   pH meter, Conductivity meter, Turbidity meter,colorimeter.
2. Study of penetration of light in water reservoir by Secchi disk.
3. Determination of pH and temperature of water sample.
4. Determination for total Alkalinity of water sample.
5. Measurement of Rain fall by Rain gauge meter.
6. Determination of residual chlorine from treated water by titration.
7. Determination of total Acidity of water sample.
8. Determination of Dissolved oxygen content from water.
9. Determination of Hardness from ground water.
10. Determination of Chlorides from water / waste water sample.
11. Study of primary productivity of water body.
12. Study of endangered species i.e. wild animals (any five).

Reference books: for paper EVS-241 (Paper -XI) Air Pollution

1. M.N.Rao, Air Pollution-Tata MC Graw Hill,Pub.-Comp. Wd, New Delhi
2. A.C. Stern (air Pollution)- Academic press
3. Air Pollution – V.P.Khudesia
4. Air Pollution –B.K.Sharma
5. APHA-std. methods (20^{th} edition) APHA Pub.
6. Encyclopedia of Env. Pollution –Chatwal and others, S.Chand and comp., New Delhi.
7. Environmental Chemistry- A.K. De , Wily Eastern LTD.
8. Air Pollution control - NEERI, Nagpur
9. Pollution control in press industries S.D. Mahajan
10. Env pollution control engineering – C.S.Rao (2010) New Age International Publication.

Reference books: for paper EVS-242 (Paper -XII) Water Management

1. Water and West water engineering (Vol.II) Fair / Gryger
2. West Water Engineering Metcalf and Eddy
3. Water and Waste Water Engineering-R.C.Rangwala
4. Water and Water Pollution – Handbook, vol.Eiaccio, D.L.(1977)
5. Environmental Science: S.C. Santra, (New Central Book agency Pvt.ltd.)
6. A text book of Environmental Studies: D.K.Asthana (S.Chand and Camp Ltd.)
7. A text book of Environmental science : R.N.Trivedy (Anmol Pub.Pvt.Ltd)
8. Water supply and sanitary engineering : S.C.Rangwala (Charotar Pub.House Anand)
9. Environment studies : Dr.K.Mukkanti (S.Chand and camp.Ltd.)

-=**=-