DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi as mentioned against their names in the Faculty of Science as under** :-

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

All concerned are requested to note the contents of the 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/SCI./
2015/3761-4160
Date:- 16-06-2015.

★
★
★
★
★
******

Director,
Board of College and
University Development.

..2..

Copy forwarded with compliments to:-

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

Copy to :-

1] The Controller of Examinations,
2] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
3] The Superintendent, [B.Sc. Unit],
4] The Superintendent, [M.Sc. Unit],
5] The Programmer [Computer Unit-1] Examinations,
6] The Programmer [Computer Unit-2] Examinations,
7] The Record Keeper.

-=**=-

S*/-160615/-

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Syllabus of

B.Sc. (Environmental Science) (optional)

IIIrd Year

In

Semester Pattern

Effective From

Academic Year 2015-2016

(June 2015 onwards)

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

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

B.Sc. IIIrd year

Year	Semester	Course Code	Paper Number	Paper Title	Marks
IIIrd Year	Vth	EVS-351	Paper-XV	Water Pollution	50
		EVS-352	Paper-XVI	Treatment Technology	50
		EVS-353	Paper-XVII	Lab course-VII (Practical based on EVS-351)	50
		EVS-354	Paper- XVIII	Lab course-VIII (Practical based on EVS-352)	50
	VIth	EVS-361	Paper-XIX	Toxicology	50
		EVS-362	Paper-XX	Industrial Safety and Hazardous Waste	50
		EVS-363	Paper-XXI	Lab course-IX (Practical based on EVS-361 & 362)	50
		EVS-364	Paper-XXII	Lab course-X (Project work, Industrial visit Report, Study tour Report & Seminar)	50

B. Sc. IIIrd Year (Theory); Semester –V

ENV-351 (Paper: XV) : Water Pollution

Unit I: Introduction : Water Pollution

Meaning of the terms: Potability, Sewage, Affluent, Effluent, Sample, Contamination, Eutrophication, Pollution, Pollutants.

Sources of water pollution: Domestic, Industrial, Agricultural.

Unit II: Types of water pollution – Introduction, Sources and Effects of pollutants on aquatic Flora and Flora

a) Freshwater pollution: Rivers, Ponds and Lakes.
b) Ground water pollution
c) Marine water pollution

Unit III : Analysis of water :

- **Physical parameters:** Colour, Taste, Odour, Total Solids, Suspended Solids, Dissolved Solids, Turbidity
- **Chemical parameters:** pH, Hardness, Chlorides, Residual chlorine, Dissolved Oxygen, Biological Oxygen Demand, Chemical Oxygen Demand, Oil and grease, Ammonia, Nitrates, Nitrites, Sulphates, Phosphates

Unit IV: Biological parametres:

- Planktons, Algae,
- MPN/100 ml, IMViC Test, SPC,
-

Unit V : Quality of water :

- Meaning of pure water
- Standards of Potable water
-

ENV- 352 (Paper: XVI) : Treatment Technology

Unit I: Introduction –

Wastewater, Definition,

Types and Sources of waste water,

Need of wastewater treatment ,

Collection of waste water

Unit II: Principle, working mechanism, advantages and disadvantages of following Sewage treatment methods:

Preliminary treatment :

- Grit Chamber
- Skimming Tank
- Screening

Primary treatment:

- Sedimentation (Clarifier)
- Coagulation (Chemical Precipitation Tank)

Unit III: Secondary treatment (Biological treatment) :

- Aerobic : - Trickling filter
  -Activated sludge
  -Oxidation Ponds and Lagoons
- Anaerobic : -Septic tank
  -Sludge digestion and Disposal

Unit IV: Tertiary treatment or Chorination :

- Aim, Need, Dose of chlorine,
- Ozonization

Unit V: Water Purification method:

- Collection of raw water
- Sedimentation
- Coagulation
- Filtration
- Disinfection

EVS - 353 (Paper - XVII) : Lab course-VII (Practical based on EVS-351)

1. Study of sampling techniques.
2. Study of preservation of water samples.
3. Determination of BOD of water sample.
4. Determination of COD of water sample.
5. Determination of Suspended solids of water sample.
6. Determination of Dissolved Solids of water sample
7. Determination of Total Solids of water samples.
8. Determination of Oil and Grease in polluted water.
9. Determination of free CO_2 in water sample.
10. Estimation of abundance of Phytoplanktons from water samples.
11. Quantitative techniques in aquatic microbiology-SPC
12. The presumptive, confirmatory and completed tests for determination of sewage contamination.
13. Determination of Water Quality Index (WQI)

EVS- 354 (Paper - XVIII) : Lab course-VIII (Practical based on EVS-352)

1. Estimation of Sulfate from water sample.
2. Estimation of Phosphates from water samples
3. Estimation of Nitrates from water sample
4. Estimation of Nitrites from water sample
5. Estimation of Ammonia in water samples
6. Determination of Conductivity of water sample
7. Jar test demonstration
8. Determination of Chlorine by chloroscope
9. Determination of Redox Potential of water samples
10. Determination Hydrogen Sulphide in sewage sample.
11. Determination of Dissolved Oxygen from polluted water sample by using azide modification.
12. Determination of turbidity from given water sample.

Reference books: for paper EVS-351 (Paper -XV) : Water Pollution

1. Environmental Science ; By S.C. Santra, New Central Book Agency Pvt. Ltd. New Delhi.
2. A Text Book of Environmental Studies; By D. K. Astana, S. Chand and Company LTD. New Delhi.
3. A Text Book of Environmental Science; By R. N. Trivedy, Anmol Publications Pvt Ltd.
4. Water Supply and Sanitary Engineering ; By S. C. Rangawala, Charotar Publication House Anand.
5. Environmental Studies ; By Dr. K. Mukkanti , S. Chand and Company PVT. Ltd., New Delhi.

Reference books: for paper EVS-352 (Paper -XVI) : Treatment Technology

1. Water and Waste Water Engineering ; By R. C. Rangwala
2. Water and Waste Water Engineering (Vol-II); By Fair/ Geyer/ Ocun.
3. A Test book of Sanitary Engineering; By Vinayak Gharpure.
4. Waste Water Engineering; By Metcalf and Eddy. Inc. Publications.
5. Chemical and Biological Methods for Water Pollution; By R. K. Trivedy and P. K. Goyel, Enviro Publication, Post Box No. 60 Karad.
6. Methodology for Water Analysis; BY m. s. Kodarkar, IAAB Publications, Hyderabad.2006.
7. Water and Waste Water Analysis; by NEERI Publications, Nagpur.

B.Sc. IIIrd year, Semester VI

EVS- 361 (Paper - XIX) : Toxicology

Unit I : Introduction

Toxicology: Definition, Concept of Toxicology, Movement of toxicants in the Environment, Classification of toxic substance i.e. Toxic gases, Organic Poison, Inorganic Poison.

Unit II :- a) Factors affecting Toxicity :

- Chemical factors: Polarity, Molecular weight, Nature of Chemical,
- Biological factors: Sex, Age, Body weight, Heredity and Genetic characters.

b) Dose-response relationship.
c) Acute exposure and Chronic exposure.

Unit III :- Occurrence, Pollution sources, uses, effect and remedial measures of :

a) Gases – CO, CO_2, H_2S, SO_2, NO_2.
b) Heavy metals- As, Pb, Hg, Cu

Unit IV :- Environmental Toxicant - Occurrence, Sources, Their Effect and Remedial measures of:

a) Toxicants in water - Hydrocarbons in water,
b) Toxicant in soil – Pesticides.
c) Toxicant in air- Atmospheric lead.

Unit V :- Carcinogenic, Chemistry of Carcinogenic compounds, Carcinogens, Mutagens and Teratogens; Cancer causing agents - Drugs, Tobacco, Narcotic.

Unit VI : Toxicity assessment method , Lethal concentration (LC), Lethal dose (LD).

EVS- 362 (Papr -XX) : Industrial Safety & Hazardous Waste

Unit I : Introduction

Introduction to safety and safety management
Need for integration of safety, Health and environment (S,H & E)
Conman safety tips - Personal protection, Lockout, Accident prevention signs, Occupational noise, Fire safety, Ladder safety.

Unit II : Industrial Safety:
Introduction
Hazard Checklist - House keeping (Meaning & methods), Machine hazards, Fire hazards, Protective equipments, Electrical equipments, Tools.
General Safety Rules.

Unit III : Safety Management

- Safety management- Principles of safety management
- Fire preservation,- Accident prevention (Principle, Basic terms)

Unit IV : Hazardous Waste

Definition,
Sources of hazardous waste,
Classification of hazardous waste - Biomedical waste, Radioactive waste, Chemical waste,
Household hazardous waste,
Characteristics of hazardous waste - Ignitability (flammable),
Reactivity, Corrosively, Toxicity

Unit V : Disposal of hazardous waste
Recycling, Neutralization, Incineration, Pyrolysis,
Hazardous waste Landfill.

Unit VI : Effects of hazardous waste, Bhopal Gas Tragedy

EVS- 363 (Paper-XXI) : Lab Course-IX (Practical based on EVS-361 & 362)

1. Estimation of Zn from provided contaminated water sample.
2. Determination of iron content from contaminated water.
3. Estimation of Pb from provided contaminated water.
4. Estimation Cu from provided contaminated sample.
5. Estimation Mn from provided contaminated water sample
6. Effect of pesticides on seed germination.
7. Effect of Heavy metals of seed germination.
8. To study the effects of gaseous pollutant SO_2 on plant (Leaves and flowers).
9. To study the effect of gaseous pollutant H_2S on plant (Leave and flowers).
10. To study the bioaccumulation of heavy metals and pesticides in living organisms.
11. Qualitative detection of pesticides from waste water.
12. Estimation of Hg from provided contaminated water.

EVS - 364 (Paper-XXII) : Lab Course- X (Project work, Industrial visit Report, Study tour Report & Seminar)

Project work, industrial visit report and seminars.

i) **Project report** : One project has to be completed during the third year as a part of practical paper of sixth semester Lab course X. The project work is to be allotted during the fifth semester beginning along with the allotment of guides. As a part of project work, a field observations or the experimental work with specific aims and objectives can be given to the candidates. The data collection and preparation of review article on any specific topic by referring recent scientific literature can be a part of project work. The project report is to be submitted in triplicate before the semester end theory and practical examination of sixth semester. There will be 30 marks to the project report out of total 50 marks.

ii) **Industrial Visit report** : at least one industrial visit is to be arrange during each semester. The industrial visit report is to be submitted along with project report.

iii) **Study tour report** : The study tour is to be arrange for understanding environment in total. The participation in study tour and industrial visit is compulsory. The study report is to be submitted.

iv) **Seminar presentation** :

Reference books: for paper EVS-361 (Paper - XIX) : Toxicology

1. Environmental Toxicology; by M Satake; Y. Mido; and M.S. Sethi.
2. Environmental Chemistry , by H. Kaur.
3. Environmental Chemistry, by A. K. De.
4. Medical Jurisprudence and Toxicology, by Parekh.
5. Environmental Science , by Botkin and Killer.
6. A Text Book of Modern Toxicology, by Ernest Hodgson , A JOHN WILEY & SONS, INC., PUBLICATION, New Jersey.
7. Basic Toxicology, by Frank C. Lu, Homisphere Publishing Corporation, New York.

Reference books: for paper EVS-362 (Paper - XX) : Industrial Safety & Hazardous Waste

1. Industrial Safety Management- Hazard Identification and Risk Control, by Deshmukh L. M. , Tata McGraw Hill Publishing Company Ltd. New Delhi.
2. Industrial Safety, Health and Environment System, by Jain R. K. and Rao Sunil, Khanna Publishers, New Delhi.
3. Eco-Informatics- Wealth from Waste, Vol-III, by S. K. Agrawal, A. P. H. Publishing Corporation, New Delhi.
4. Fundamentals of Environmental Science, by Dhaliwal G.S. , Sanga G. S. and P.K. Ralhan., Kalyani Publisher , New Delhi.
5. Environmental Science, by S. C. Santra., New Central Book Agencey,Pvt. Ltd. , Kolkata.
6. Fundamentals of Industrial Safety and Health., by K. U. Mistry. Siddhartha Prakashan, Ahmedbad.