SHRI SHIVAJI EDUCATION SOCIETY, AMRAVATI'S

SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

NAAC Accredited by Grade A with CGPA 3.13 (3rd Cycle)
UGC awarded status of College with Potential for Excellence (2nd Phase)
ISO 9000:2015 Certified College
Idenified by DST , Govt. Of India for FIST & Sant GadgeBaba Amravati University as Lead College

4TH Cycle
Assessment & Accreditation by NAAC

Criterion-I
CURRICULAR ASPECTS

Curriculum Enrichment

QlM – 1.3.1

Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Contents

Accredited by NAAC with 'A' grade with a CGPA of 3.13
UGC Awarded College with Potential for Excellence ISO 9000:2015 certified College
Identified by DST for FIST and SGB Amravati University as Lead College

Shri Shivaji Science College

Shivaji Nagar, Morshi Road, Amravati - 444 603 M.S.

❖*Founder* : Dr. Panjabrao Alias Bhausaheb Deshmukh
❖*President* : Hon. Shri Harshwardhan P. Deshmukh
❖*Principal* : Dr. G. V. Korpe

E-mail : shivajiscamt.office@gmail.com
Web Site : www.shivajiscamt.org
(O) 2660855; *(Fax)* 2665485;(R)2551400

Ref. No.: SSSC/6471/IQAC/2021 Date: Nov. 22nd, 2021

Declaration

The information, reports, true copies of the supporting documents, numerical data, etc. furnished in this file is verified by IQAC and found correct.

Hence this certificate.

H. S. Lunge
IQAC Coordinator
Shri Shivaji Science College
Amravati

G. V. Korpe
Chairman IQAC and Principal
Shri Shivaji Science College,
Amravati

Syllabus on Environment and Sustainability

Syllabus on Environment and Sustainability

Environmental Studies

42

27. ENVIRONMENTAL STUDIES

Total Marks : 100

PART-A

SHORT ANSWER PATTERN **25 Marks**

1. The Multidisciplinary nature of environmental studies

- Definition, scope and importance.
- Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Envionmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental lesislation.
- Public awareness. (7 lecture hours)

3. Human Population and the Environment

- Population growth, variation among nations.
- Population explosion - Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV / AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies. (6 lecture hours)

******

43

PART-B

ESSAY TYPE WITH INBUILT CHOICE 50 Marks

4. Natural resources :

- **Renewable and non-renewable resources :**
  - Natural resources and associated problems.
    - Forest resources : Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
    - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
    - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
    - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
    - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
    - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
  - Role of an individual in conservation of natural resources.
  - Equitable use of resources for sustainable lifestyles.

(8 lecture hours)

5. Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :-
  - Forest ecosystem
  - Grassland ecosystem
  - Desert ecosystem
  - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lecture hours)

44

6. Biodiversity and its conservation

- Introduction - Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

(8 lecture hours)

7. Environmental Pollution

- Definition
- Causes, effects and control measures of :-
  - Air pollution
  - Water pollution
  - Soil pollution
  - Marine pollution
  - Noise pollution
  - Thermal pollution
  - Nuclear hazards
- Solid Waste Management : Causes, effects and control measures of
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Diaster management : floods, earthquake, cyclone and landslides.

(8 lecture hours)

PART-C

ESSAY ON FIELD WORK 25 Marks

8. Field work

- Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
- Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems - pond, river, hill slopes, etc.

(5 lecture hours)

45

(Notes : i) Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.

ii) Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and

iii) Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

1) Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net **(R)**
3) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
4) Clark R.S., Marine Pollution, Clanderson Press Oxford **(TB)**
5) Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
6) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7) Down to Earth, Centre for Science and Environment **(R)**
8) Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.
9) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural Histroy Society, Mumbai **(R)**
10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ. Press 1140p
11) Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
12) Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
13) Mhaskar A.K., Matter Hazardous, Techno-Science Publications **(TB)**
14) Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. **(TB)**
15) Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
16) Rao M.N. & Datta A.K.,1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
17) Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18) Survey of the Environment, The Hindu **(M)**
19) Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science **(TB)**

46

20) Dr. Deshpande A.P., Dr. Chudiwale A.D., Dr.Joshi P.P. & Dr. Lad A.B. : Environmental Studies, Pimpalapure & Company Pub., Nagpur.
21) डॉ. विठ्ठल घारपुरे : पर्यावरणशास्त्र, पिंपळापुरे ॲन्ड कंपनी पब्लिशर्स, नागपूर.
22) Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media **(R)**
23) Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications **(TB)**
24) Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.

(M) Magazine

(R) Reference

(TB) Textbook

25) Environmental Studies : R.Rajgopalan, Oxford Uni. Press, New Delhi, 2005
26) Environmental Chemistry and Pollution by Dr.N.W.Ingole, D.M.Dharmadhikari, Dr.S.J.Patil, Dasganu Prakashan, Nagpur.

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M.Sc. Sem-I to IV
(Botany)

Prospectus No. 2017126

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

अभ्यासक्रमिका
विज्ञान पारंगत परिक्षा (वनस्पतीशास्त्र)
सत्र- १ ते ४

PROSPECTUS
OF
MASTER OF SCIENCE EXAMINATION
IN
BOTANY
Semester - I & III, Winter 2016
Semester - II & IV, Summer 2017.

2016

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tudy of toxicity of fungi in relation to seed germination, and seedling bnormality.

'ultivation of Mushroom.

lemonstration on biodegradation of organic waste.

'isit to Mushroom industry, Pharmaceutical industries & athological study center.

olation of Soil fungi by soil plate (War cup) and serial dilution Walkman) method.

olation and identification of Rizosphere mycoflora.

olation of external and internal seed borne mycoflora by blotter nd Agar Plate method. Cereals, pulses, oil seeds, fruit seeds.

lonographic study of locally available plant diseases caused by ngi (atleast 10).

tudy of locally available crop plant diseases caused by Bacteria ive)

tudy of locally available plant diseases caused by viruses & hytoplasma (Five)

lemonstration of morphological & physiological changes in disease lants.

lemonstration of Koch's Postulate.

Q.5) Spotting (Specimen/Slide)
(01 - bacterial disease; 01-viral diseases, 01- Phytoplasmal disease; 01-Fungal disease, 01- Spore slide).....10 Mraks

Q.6) Viva-Voce 05 Marks

M.Sc. PART-II BOTANY

Semester – IV

PAPER - XIII: PLANT ECOLOGY

Unit I : Basic concepts and scope.

1.1 Concept, Classification and scope of ecology; Holocoenotic Environment.

1.2 Ecological factors: Climatic, Edaphic, Biotic; Law of limiting factors.

1.3 El -Nino and global warming.

1.4 Ozone layer, Ozone Depletion and its consequences.

Unit II: Population and Community Dynamics

2.1 Population characteristics; population dynamics, carrying capacity, various parameters and measurements.

2.2 Community concept; characteristic features of communities, analysis of communities (analytical and synthetic characters.)

2.3 Community coefficients; Ecotone and edge effects; ecological niche.

Unit III: Vegetation Development

3.1 Types and mechanism of ecological succession.

3.2 Plant Formation; Association, Consociation and Society.

3.3 Evolution of Ecosystem and oxygenic development.

Unit IV: Ecosystem Organization.

4.1 Structure and Functions of Ecosystem.

4.2 Abiotic and biotic components; decomposers role in ecosystem.

4.3 Primary productivity (methods of measurements, global pattern and controlling factors)

4.4 Energy Dynamics; Energy flow in Ecosystem, Trophic organization, ecological efficiencies; Ecomodelling.

Unit V: Ecosystem Functional aspects.

5.1 Biogeochemical cycles C, N, P, S; mineral cycles (Pathways, processes and budgets)

5.2 Ecosystem stability concepts, natural and anthropogenic disturbances.

5.3 Major Biomes of the world.

5.4 Terrestrial Biodiversity; Vegetation types of world and India, hot spots.

Suggested readings:

1) Krebs, C.J. 1989. Ecological Methodology. Harper and Raw, New

10) Mular - Dombuis, D. and Ellenberg, H. 1974. Aims and Methods of Vegetation Ecology, Wiley, New York.
11) Charis Park - Environment - Principles and applications, Roultedge - London & New York.
12) Smith, R.L. 1996. Ecology and Field biology, Harper Collins, New York.
13) Begon, M., Harper, J.L. and Townsend, C.R. 1996. Ecology, Blackwell Science, Cambridge, U.S.A.
14) Odum, E.P. 1971. Fundamentals of Ecology. Saunders, Philadelphia.
15) Odum, E.P. 1983. Basic Ecology, Saunders, Philadelphia.
16) Barbour, M.G., Burk, J.H. and Pitts, W.D. 1987. Terrestrial Plant Ecology. Benjamin / cummings Publication Company, California.
17) Kormondy, E.J. 1996. Concepts of Ecology. Prentice Hall of India Pvt.Ltd., New Delhi.
18) Chapman, J.L. and Reiss, J\M.J., 1988. Ecology: Principles and Applications. Cambridge University Press. Cambridge, U.K.
19) Moldan, B. and Billharz,S. 1997. Sustainability indicators. John Wiley & Sons, New York.
20) Treshow, M. 1985. Air Pollution and Plant Life. Wiley Interscience.
21) Heywood, V.H. and Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press.
22) Brady, N.C. 1990. The Nature and Properties of Soils, MacMillan.
23) Chandel, K.P.S., Shukla, G. and Sharma, N. 1996 - Biodiversity in Medicinal and Aromatic Plants in India : Conservation and Utilization. National Bureau of Plant Genetic Resources, New Delhi.
24) Walter, K.S. and Gillett H.J., 1998. 1997 IUCN Redlist of Threatened Plants. IUCN, The World Conservation Union, IUCN, Gland, Switzerland and Cambridge, UK.

Random sampling method (Abundance, Density, frequency, basal cover, canopy cover etc) and determination of quantitative characters by belt transect, line transect method and study of biological spectrum.

24) **Field Survey-** A survey of a part of the town or city should be carried out by the entire class in batches. Individual students will select one avenue / road and locate the tree planted on a graph paper. They will identify the trees, mention their size, canopy shape, blossoming and fruiting period and their status (healthy, diseased, infected, mutilated, misused or dyeing) and report whether or not the conditions in which they are surviving are satisfactory. The individual reports will be combined to prepare a large map of the area, which can be used for subsequent monitoring either by the next batch of students / teachers / local communities / NGO's / or civic authorities.

25) The purpose is to make the students aware of the kinds of trees and value in urban ecosystem and ecological services.

26) To prepare ombrothermic diagram for different sites on the basis of given data set and to comment on climate.

27) To find out the relationship between two ecological variables using correlation and regression analysis.

39) To estimate chlorophyll content in SO2, fumigated and unfumigated plant leaves.

40) To estimate rate of carbon dioxide-evolution from different soils using soda lime or alkali absorption method.

41) To study environmental impact of a given developmental activity using checklist as a EIA method.

42) Visit to different forest areas to study ecosystem, bio diversity and biocomplexity. Visit to Molecular Biology laboratories.

Semester – IV

PAPER–XIV: ENVIRONMENTAL ECOLOGY

Unit I: Basic Concepts

1.1 Concept of Environment and its Scope; Lithosphere, Hydrosphere, Biosphere.

1.2 Energy resources; (i) Renewable and non-renewable (ii) Forest types in India and Maharashtra.

1.3 Environmental impact assessment.

1.4 Green House gases; their sources, trend and role.

1.5 Consequences of climate change.

Unit II: Environmental pollution

2.1 Definition types and sources.

2.3 Air pollution; Natural and man made sources of air pollution, primary and secondary pollutants, toxicity and its impact on environment.

2.4 Soil Pollution: courses of soil pollution, impacts of soil pollution on quality and soil biota.

2.5 Effect of solid waste disposal on soil.

Unit III: Water Pollution.

3.1 Distribution of water and water scarcity.

3.2 Major water pollutants

3.3 Sources of water pollution

3.4 Consequences of water pollution

3.5 Water pollution indicators.

3.6 Bioaccumulation and Biomagnifications of toxic elements in food chain.

Unit IV: Conservation strategies

4.1 Principles of conservation; extinction, environmental status of plants based on IUCN.

4.2 Strategies for conservation, International efforts and Indian initiation.

4.3 Wetlands, Mangrove and coral reefs with respect to conservation of biodiversity.

4.4 Disaster management.

Unit V: Sustainable Management.

5.1 Concept of sustainable development.

5.2 Impact of urbanization; Wasteland development.

5.3 General account of legislative measures for sustainable development and management

(i) Water Act, Prevention and control 1976.

(ii) Environmental Protection Act, 1985

(iii) Wildlife Protection Act, 1972; WWF.

5. William P. Cunningham and Masy Ann Cunninghan, Principle of Environmental Science. Inquisity and applications, Tata McGraw Hill Pub. Co.Ltd., New Delhi.
6. Charis Park - Environment - Principles and applications, Roultedge - London & New York.
7. Smith, R.L. 1996. Ecology and Field biology, Harper Collins, New York.
8. Muller-Dombois, D., and Ellenberg, H. 1974. Aims and Methods of Vegetation Ecology, Wiley, New York.
9. Begon, M., Harper, J.L. and Townsend, C.R. 1996. Ecology, Blackwell Science, Cambridge, U.S.A.
10. Ludwig, J. and Reynolds, J.F. 198. Statistical Ecology, John Wiley & Sons.
11. Odum, E.P. 1971. Fundamentals of Ecology. Saunders, Philadelphia.
12. Odum, E.P. 1983. Basic Ecology, Saunders, Philadelphia.
13. Barbour, M.G., Burk, J.H. and Pitts, W.D. 1987. Terrestrial Plant Ecology. Benjamin / cummings Publication Company, California.
14. Karmondy, E.J. 1996. Concepts of Ecology. Prentice Hall of India Pvt.Ltd., New Delhi.
15. Chapman, J.L. and Reiss, J.M.J., 1988. Ecology: Principles and Applications. Cambridge University Press. Cambridge, U.K.
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17. Treshow, M. 1985. Air Pollution and Plant Life. Wiley Interscience.
18. Mason, C.F. 1991. Biology of Freshwater Pollution, Longman.
19. Hill, M.K. 1997. Understanding Environmental Pollution. Cambridge University Press.
20. Brady, N.C. 1990. The Nature and Properties of Soils, MacMillan

Laboratory Exercises:

1. Study of rainguage and measurement of rainfall
2. To study hygrometer and measurement of relative humidity.
3. Measurement of minimum and maximum temperature.
4. Measurement of Soil temp by dry wet bulb method.
5. To study pH meter and estimation of pH of water and soil

Chemistry

SANT GADGE BABA AMRAVATI UNIVERSITY GAZETTE - 2017 - PART TWO - 50

NOTIFICATION

No. : 29/ 2017 Date : 27/04/2017

Subject : I) Continuation of Prospectus No.2015125 prescribed for M.Sc. (Chemistry) (Sem-I to IV) for the Session 2017-18.
II) Additional chances for the failure students of M.Sc.Sem-I & II (Che.)

I) It is notified for general information of all concerned that the Prospectus of M.Sc. (Chemistry) Part-I & II (Sem-I to IV) bearing No.2015125 prescribed for the Academic Session 2016-17 shall continue for M.Sc. (Chemistry) Part- II (Sem-III & IV) for the session 2017-18 along with the new syllabi for M.Sc. (Chemistry) Part-I (Sem-I & II). The syllabi for M.Sc. (Chemistry) Part-I (Sem-I & II) printed on page Nos.1-26 be substituted by the **Appendix-A** appended with this Notification."

II) The authorities further provided two additional chances for the failure students of M.Sc. Sem-I & II (Chemistry) after implementation of the aforesaid new syllabi.

Sd/-
(Dr.A.P.Deshmukh)
Registrar
Sant Gadge Baba Amravati University

Appendix-A

Syllabus Prescribed for M.Sc. Semester-I & II (Chemistry) to be implemented from the Academic Session 2017-18
Semester I
Paper-I
Inorganic Chemistry-I

60hrs (4hrs/week). 12hrs/unit 80 Marks

Unit-I : **A) Stereochemistry and Bonding in Main Group elements:** **6L**
VSEPR theory: Prediction of shapes of irregular molecules and ions like SbF_4^-, SF_5^-, SeF_3^-, ICl_2^-, IF_4^-, IOF_4^-, NH_2^-, NH_4^+, I_3^-, PCl_2^-, PCl_6^- etc. Drawbacks, bent rule, energitics of hybridization, d-orbital participation by non-metals, example showing pπ-pπ, pπ-dπ and dπ-dπ bonds.
B) Molecular Orbital Theory: **6L**
Molecular orbital representation of polyatomic molecules with special reference to CH_4, NH_3, H_2O, PF_5, SF_6, B_2H_6 and CO and delocalised molecular orbital of ozone, carbon dioxide, nitrite, nitrate and benzene.

Unit-II : **A) Metal-ligand bonding:** **6L**
Recapulation of CFT, splitting of d orbitals in octahedral, square planar, tetrahedral, square pyramidal and trigonal bipyramidal complexes, Jahn-Teller distortion, spectrochemical series, nephelauxetic series, measurement of CFSE in weak/strong ligand fields, structural consequences of crystal field effects, variation of lattice energy and heats of hydration across 1st row transition metal ions, stabilization of unusual oxidation states and ionization energies, structure of mineral spinels. Limitations of crystal field theory.

B) Molecular orbital theory of coordination compounds: **6L**
Theoretical failure of ionic model of CFT. Experimental evidences in support of metal ligand orbital overlaps. Adjusted crystal field theory (ACFTor LFT), Composition of ligand group orbitals, (SALC principle), molecular orbital energy diagrams of octahedral, tetrahedral, square planar complexes including both σ and π bonding; angular overlap model. Comparison of CFT, LFT and MOT.

Unit-III : **Boron hydrides & Metal Cluster:** **12L**
Boron hydrides: Classification, nomenclature, structure, bonding and topology of boranes, 4-digit coding (s,t,y,x) numbers for B_2H_6, B_4H_{10}, B_5H_9, B_5H_{11} and B_6H_{10} and their utilities. Chemistry of diboranes. Acquaintance with metalloboranes, Carboranes and Metallocarboranes. Preparation, structure and bonding in Non-carbonyl metal clusters viz. Binuclear $(Re_2Cl_8)^{2-}$, Trinuclear ('$ReCl_3)_3$, Tetranuclear $(W_4(OR)_6)$ and Hexanuclear $(Mo_6Cl_6)^{4+}$ ions. Preparation, properties and structures of Zintl anions & cation of the metal Ge, Sn, Pb, Sb, Bi.

Metal clusters: Occurrence of metal-metal bonds, binuclear, trinuclear, tetranuclear, and octahedral clusters. Synthesis, properties and bonding, of carbides, sulphur-nitrogen (SN) compounds, peroxo compound of boron, carbon and sulphur, oxy acids of nitrogen, Isopoly and Heteropoly acids.
Macrocyclic Complexes: Types of macrocyclic ligands-design and synthesis by coordination template effect,di & poly-nuclear macrocyclic complexes, application of macrocyclic complexes

Unit-V : GREEN CHEMISTRY : 12L

Designing a green synthesis: Choice of starting material, choice of solvents. Basic principle of green chemistry: Prevention of waste by products, Maximum incorporation of the reactants (starting material and reagents) into the final products. Rearrangements reaction, Addition reaction, substitution, elimination reaction, Prevention or minimization of hazardous products. Designing of safer chemical. Synthesis involving basic principles of green chemistry, some examples-Synthesis of styrene, Synthesis of urethane, Free radical bromination ,Synthesis of paracetamol, Synthesis of Ibuprofen.

Microwave induced green synthesis: Oxidation of Toluene, Synthesis of Chalcones, Fries rearrangement, Diels Alder reaction, Hydrolysis of benzyl chloride. Aqueous phase reactions: Heck reaction, Benzoin condensation, Michael Reaction Bio Catalyst in organic synthesis, Ionic Liquids as Green Solvents.

Books Suggested-

1. Advanced organic chemistry –Reaction mechanism and structure. Jerry March, John Wiley.
2. Advanced organic chemistry- F.A. Carey and R.J. Sunberg, Plenum.
3. A Guidebook to mechanism in organic chemistry-Peterskyes, Longman.
4. Structure and mechanism in organic chemistry-C.K. Gold, Cornell University Press.
5. Organic chemistry, R.T. Morrison Boyd. Prentice Hall
6. Modern organic chemistry-H.O. House, Benjamin.
7. Principal of organic chemistry-R.O.C. Norman and J.M. Coxon, Blackie Academic and Professional.
8. Reaction mechanism in organic chemistry-S.M. Mukharji and S.P. Singh, Macmilan.
9. Stereochemistry of organic compounds- D. Nasipuri, New age international.
10. Stereochemistry of organic compounds- P.s.kalsi, New age international.
11. Frontier orbitals and organic chemical reactions-I. Fleming.
12. Orbital Symmetry – R.E.Lehr & A.P. Marchand.
13. Reactive intermediate in organic chemistry-N. S. Isaacs.
14. Stereochemistry of carbon compounds- E.L.Eliel.
15. Physical organic chemistry-J. Hine.
16. Name reaction in organic chemistry –Surrey.
17. Advanced organic chemistry – L.F.Fieser and M. Fieser.
18. Vol.I & II organic chemistry - I. L. Finar.
19. Modern organic chemistry- J.D. Roberts and M. C. Caserio.
20. The search for organic reaction pathways (Longmann), Peter Skyes.
21. Organic chemistry 5th Edition (McGraw Hill), Pine.
22. Organic chemistry (Willard Grant Press Botcon), John Mcmurry.
23. A Textbook of organic chemistry- R.K. Bansal.
24. New trends in green chemistry –V.K. Ahluwalia & M. kidwai, Anamaya publishers New Delhi.
25. Fundamentals of photochemistry-KK Rohatgi & Mukharji
26. Photochemistry-Cundau & Gilbert
27. Aspects of organic phoptochemistry-WM horspoot
28. Photochemistry-JD calvert
29. Photochemistry-RP Wayne R. M. Acheson : An introduction to chemistry of heterocyclic compounds (Interscience).
30. Pericyclic Reactions and organic photochemistry
31. Green Solvents for organic synthesis: V. Ahluwalia& R. S. Verma
32. Eco Friendly Synthesis of fin Chemicals: Roberto Ballini
33. Essentials of molecular photochemistry, A. Gilbert and J. Baggott. Blackwell Scientific Publication.
34. Molecular photochemistry, N.J. Urro, W. A. Benjamin

Paper - VII
Physical Chemistry - II

60hrs (4hrs/week). 12hrs/unit **Total Marks 80**

Unit-I : Chemical Dynamics :

A) Kinetics of Complex reactions: Chain reaction (H2+Br, ® 2 HBr thermal and photo chemical reaction), Homogeneous catalysis (acid-base and enzymes), oscillating reactions (Belousov-Zhabotinsky reaction, Lotka-Volterra mechanism, the brusselator and the oregonator). 6L

B) Fast reactions: General features of fast reactions, Stopped flow method, relaxation method, Nuclear magnetic resonance method, Flash Photolysis, Numericals. 6L

Unit-II : Quantum Chemistry :

A) Construction of M.O.by LCAO for H2+ ion, Calculation of energy levels from wave functions, physical picture of bonding & anti-bonding wave functions, concept of orbitals and their characteristics. 6L

B) Hybride orbitals sp, sp2, sp3;Calculationof coefficient of A.O. used in hybride orbital;Huckel theory of Conjugated systems, bond order & charge density calculations. Applications to ethylene, butadiene, cyclopropenyl radical, cyclo- butadiene. Numericals. 6L

Unit-III : **Macromolecules:**
A) Definition of macromolecule (Polymer), types of polymers, Random coils, configuration and conformation of macromolecules, electrically conducting molecular wires, fire resistant, liquid crystal polymers, kinetics of polymerization, mechanism of polymerization. stability of biological polymers, Application of polymers. 6L
B) Number average & mass average molecular mass, molecular mass determination by Osmometery, Viscometry, Ultracentrifugation, light scattering & size-exclusion chromatography method, Numericals 6L

Unit-IV : **Electrochemistry :**
A) Electrochemistry of solutions: Debye-Huckel-Onsager treatment and its extension. Ion solvent interactions.. Bio-electrochemistry, Introduction, threshold membrane phenomenon, Nernst - Plank Equation, Hodges Huxley equation, core conductor models, electrocardiography. 6L
B) The rate of charge transfer, the Butler-Volmer equation, the low overpotential limit the high overpotential limit, Tafel plot. Voltammetry, Concentration polarization, experimental techniques, corrosion, Types of corrosion, corrosion inhibitors , Corrosion monitoring. and prevention methods. Numericals. 6L

Unit-V : **Statistical Thermodynamics :**
A) Thermodynamic probability, most probabale distribution. Maxwell-Boltzmann distribution law Fermi-Dirac statistics, distribution law and applications to metals. Bose-Einstein statistics - distribution law and application to helium. 6L
B) Partition function- Translational, rotational, vibrational and electronic partition functions, calculations of thermodynamic properties in terms of partition functions. Applications of partition functions. Numericals. 6L

List of Books:

1. Physical chemistry by P.W.Atkins & dePaula 7th Edition
2. Molecular reaction Dynamics and chemical reactivity, R.D.Levine and R.B. Benstin, Oxford University Press. 1987.
3. Physical Chemistry by Alberty and Silby, Jolly Wiley
4. Adsorption and Catalysis by solids, by D.K.Chakraburti, Wiley Eastern, 1990
5. The Theory of Adsorption and catalysis, by A. Clark, Academic press, 1970
6. Micells Theoretical and applied aspects, by V.Moroy. Plenum
7. Modern Electrochemistry by A.K.N.Raddy
8. Theoretical electrochemistry by D.LAntropov, Mir Publisher WJ2
9. Electrochemistry by J. Dvorak, J. Koryta, V. Bohackova.
10. Introduction to radiation chemistry by J.W.T. Spinks and RJ.Woods

Paper VIII

Optical Methods and Environmental Chemistry

60hrs(4hrs/week), 12hrs/Unit **80Marks**

Unit-I : **Optical Method** **12L**
Spectrophotometry and Colorimetry: Brief introduction of topic,Application of spectrophotometric metods for study of composition of coloured complex ,Multiple analysis, Pk value of indicator etc. Photometric titrations. Applications of quantitative and qualitative analysis, problems.
Principles, Plane polarized and circularly polarized rays, optical rotation, optically active molecules, optical rotator dispersion. Circular dichroism: fundamentals, relationship between ORD and CD curves, methods of measurements, investigation of optically active compounds.
Theory, instrumentation and applications of fluorimetry, Nephelometry, turbidimetry, Polarimetry & Refractometry.

Unit II : **Flame Emission and atomic spectrometry:** **12L**
Flame photometry: Elementary theory of flame photometry. Instrumentation and experimental techniques. Interferences, analytical techniques and applications. Atomic absorption spectrometry (AAS): introduction, principles, Advantages of AAS over FES, Instrumentation, Flame atomization. Hallow cathod lamps, interferences and applications. Comparison of atomic absorption with atomic emission methods.

UNIT-III : **WATER POLLUTION :** **12L**
Origin of wastewater, types, water pollutants and their effects. Sources of water pollution, domestic, industrial, agricultural soil and radioactive wastes as sources of pollution. Objective of analysis, parameter for analysis colour, turbidity, total solid, conductivity, acidity, alkalinity, hardness, chloride, sulphate, fluoride, silica, phosphates and different forms of nitrogen. Heavy metal pollution, public health significance of Cadmium, Chromium, Copper, zinc Lead, Manganese, Mercury and Arsenic.General survey of instrumental technique for the analysis of heavy metals in aqueous systems. Oxygen content of water and aquatic life. Measurments of DO, BOD, COD and their significance as pollution indicators. Pesticides as water pollutants and analysis. A brief idea of coagulation and flocculation.

Unit IV : **AIR POLLUTION** **12L**
Sources and sinks of gases pollutants, classification of air pollutants, effect of air pollutants on living and non-living things. Sources of air pollution, air quality standards and sampling. Analysis of air pollutants (CO, CO_2, NOx, SOx, H_2S ,NH_3 and Hydrocarbons and particulates). Green house effect, acid rain, ozone depletion and their consequences on environment. Effects of air pollution, photochemical smog and monitoring of air pollution.

Unit-V : Soil Pollution and Pesticide Analysis **12L**

Chemistry of soil, soil irrigation by effluents. Agricultural pollution, role of micronutrients in soil, trace element analysis in soil

Pesticides and pollution. Sources of pesticide residue in the environment, classification of pesticides, pesticide degradation by natural forces, effect of pesticide residue on life. Analytical techniques for pesticide residue analysis. DDT problem.

Radiation pollution-Classification and effects of radiation. Effects of ionizing radiation on Man. Effect of nonionizing radiation on life. Radioactivity and nuclear fall out, protection and control from radiation.

List of Books

1. Analytical chemistry- Problems and Solution- S. M. Khopkar, New Age International Publication.
2. Day & Underwood: Quantitative Analysis.
3. Findley: Practical Physical Chemistry:
4. Vogel A Text book of Quantitative inorganic Chemistry, ELBS, London.
5. Strouts Galfillal: Analytical Y. Lyalikov: Physocochemical Analysis
6. S. M.Khopkar:Basic concep in Analytical Chemistry
7. Meites and Thomas: Advance Analytical Chemistry. (Mc Graw Hill)
8. **H.H.Willard ,L.L.Merritt and J.A.Dean: Instrumental Methods of Analysis (Van Nostrand).**
9. **B. L. Krayer, H. H. Willard. L. Merrit, J. A. Dean & F. A. Settle: Instrumental Methods of Analysis (CBS Publishers, Delhi, 1986)**
10. R. D. Brown Instrumental Methods of Chemical Analysis ,McGraw Hill
11. **L. R. Shyder & C. H. Harvath: An Introduction to Separation Science (Wiley Interscience).**
12. **Environmental chemistry, S. E. Manahan, Lewis Publishers.**
13. Environmental chemistry, Sharma & Kaur, Krishna publishers.
14. Environmental chemistry, A. K. De, Wiley Eastern.
15. Environmental Pollution Analysis, S. M. Khopkar, Wiley Eastern.
16. Environmental Toxicology, Ed. J. Rose, Gordon and Breach Science Publication.
17. Elemental Analysis of Airborne Particles, Ed. S. Landberger and M. Creatchman, Gordon and breach Science Publication.
18. Atmospheric pollution, W. Buch, McGraw Hill, New York.
19. Fundamentals of Air Pollution, S. J. Williason, Addison – Wesley Publishers.
20. Analytical Aspect of Environmental chemistry, D. F. S. Natush and P. K. Hopke. John Wiley & sons. New York.
21. Analytical chemistry- Problems and Solution- S. M. Khopkar, New Age.
22. Environmental Chemistry, J.W.Vanloon, Oxford University Press.
23. E. Stocchi: Industrial Chemistry, Vol-I, Ellis Horwood Ltd. UK.
24. R.M. Felder, R.W. Rousseau: Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi.
25. J. A. Kent: Riegel's Handbook of Industrial Chemistry, CBS Publishers, New Delhi.
26. S. S. Dara: A Textbook of Engineering Chemistry, S. Chand & Company Ltd. New Delhi.
27. K. De, Environmental Chemistry: New Age International Pvt., Ltd, New Delhi.
28. S. M. Khopkar, Environmental Pollution Analysis: Wiley Eastern Ltd, New Delhi.
29. S.E. Manahan, Environmental Chemistry, CRC Press (2005). • G.T. Miller, Environmental Science 11th edition. Brooks/ Cole (2006).
30. A. Mishra, Environmental Studies. Selective and Scientific Books, New Delhi (2005).

Semester II

Practical - III

Physical Chemistry

Total Hours: 90 hrs. (9 Hours per week) **Total Marks: 100**

Use of Computer Programs 5 terms of practicals:

Treatment of experimental data, X-Y plots, programs with data preferably from physical chemistry practicals. Students will operate two packages I) MS-Word and II) MS-Excel.

Part-A

1. Determination of radius of molecules of glycerol by viscometry.
2. Determine the viscosity of unknown mixture of two liquids by viscometry (ethyl alcohol + water)
3. Study the influence of ionic strength on the solubility of $CaSO_4$ and hence to determine thermodynamic solubility product and mean ionic activity.
4. Determine rate constant of reaction between potassium persulphate and potassium iodide having equal concentration of reacting species.
5. Investigate the autocatalysis reaction between $KMnO_4$ and oxalic acid and calculate the energy of activation.
6. Investigate the solubility of three component system and hence draw a tie line on binodal curve.
7. Study the variation of solubility of $Ca(OH)_2$ in pressure of NaOH solution. Hence determine solubility product at room temperature.
8. Determination at surface excess of amyl alcohol by capillary rise method.
9. Part-B
10. Determine Hammett constant of a given substituted benzoic acid by pH measurement.
11. To determine the hydrolysis constant of active hydrochloride by pH measurement.
12. To determine pH of butter solution using quinhydrone electrode.
13. Determination of pK value of aid-base indicator (methyl red, methelene blue and bormo cresol) by spectrophotometrically.
14. Determination of standard electrode potential of Zinc and Copper.
15. To find the strength of HCl and Acetic acid in given mixture potentiometrically.
16. To find the strength of mixture of halides by titrating it against $AgNO_3$ solution potentiometrically.
17. To determine the hydrolysis constant of aniline chloride by emf method.

The Practical examination will be based on the Inorganic Chemistry.

Time: 6-8 hours (one day examination) Marks: 100

I) Exercise -1 (Synthesis/Radicals)	- 40 Marks
II) Exercise-2 (Estimation)	- 40 Marks
III) Record	- 10 Marks
IV) Viva- Voce	- 10 Marks
Total	-100 Marks

Books Suggested-

1. Synthesis and Characterization of Inorganic Compounds, W. L. Jolly, Prentice Hall.
2. Inorganic Experiments, J. Derck Woollins, VCH.
3. Practical Inorganic Chemistry, G. Marrand, B. W. Rockett, Van Nostrand.
4. A Text Book of Quantitative Inorganic Analysis, A. I. Vogel
5. EDTA Titrations. F. Laschka
6. Instrumental Methods of Analysis, Willard, Merit and Dean (CBS, Delhi).
7. Inorganic Synthesis, Jolly
8. Instrumental Methods of Chemical Analysis, Yelri Lalikov
9. Fundamental of Analytical Chemistry, Skoog D.A. &West D.M Holt Rinehart &Winston Inc.
10. Experimental Inorganic Chemistry, W.G.Palmer, Cambridge.

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Environmental Science

B.Sc. Sem IV

4S- ENVIRONMENTAL POLLUTION

UNIT I : **Air pollution** – Classification, sources of air pollution, major air pollutants, types of air pollution, effects of air pollutants on plants, , effects of air pollutants on human, effects of air pollutants on materials, status of air pollution in India. (15 Lectures)

UNIT II : **Water pollution** – Definition, sources of water pollution, major pollutants, types of water pollution – fresh water (rivers, streams, ponds, lakes and underground water resources), marine water (coastal and estuarine), effects of water pollution on plants,animals and human beings, eutrophication, water pollution status in India, drinking water quality standards. (15 Lectures)

UNIT III : **Land pollution** – Definition , causes of soil pollution. major soil pollutants, effects of soil pollutants on plants and animals, nutrients in soil (NPK), domestic, municipal, industrial, and agricultural wastes and their relation with soil degradation , soil salination (15 Lectures)

UNIT IV : **Noise pollution** – Definition, sources, effects of noise pollution, psychological and physiological effects of noise pollution, unit of noise, monitoring of noise pollution, noise pollution standards, techniques of measurements of noise pollution, Indian scenario of noise pollution. (15 Lectures)

UNIT V : **Radiation pollution** – Definition, sources, major radioactive isotopes, nuclear fusion & fission reactions, units of radiations, application of radioactive isotopes in various field, effects of radioactive pollution, effects of nuclear weapons, radioactive fallout, health and environmental effects of radioactive fallout. (15 Lectures)

UNIT VI : **Major Environmental Issues :**

(A) **Global Warming** - causes, consequences and control measures.

Ozone depletion - mechanism, consequences and control measures.

M.Sc. Environmental Science

M.Sc. Environmental Science Prospectus No. 20131212

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

विज्ञान विद्याशाखा
(FACULTY OF SCIENCE)

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(पर्यावरणशास्त्र)

PROSPECTUS
OF
MASTER OF SCIENCE IN
ENVIRONMENTAL SCIENCE
Semester -I & III , Winter 2012
Semester-II & IV, Summer-2013

2012

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Distribution of Practical Marks (6 Hrs)

Q.1	Major experiment based on Environmental Chemistry -	20 Marks
Q.2	Minor Experiment based on Environmental Chemistry (any two)-	20 Marks
Q.3	Experiments on Instrumental Techniques -	20 Marks
Q.4	Experiments on Biostatastics -	20 Marks
Q.4	Viva-voce	10 marks
Q.5	Practical Record	10 marks
	Total Marks	**100 Marks**

SEMESTER II

PAPER V : BIOINFORMATICS IN ENVIRONMENTAL ANALYSIS

Unit I : **Biostatistics** :- Introduction to statistics population, sample primary and secondary data- collection of primary data graphical and diagrammatic representation of data. Measures of central tendency mean, median and mode.

Measures of dispersion range, standard deviation, raw and central moments, skewness and kurtosis (definitions only). Concept of probability classical and relative frequency definitions of probability.

Unit II : Concept of random variable, probability mass function, probability density function, and probability distribution function (definitions only). Binomial, Poisson and normal distribution (definitions and statements of properties)examples

Principle of test squares-. persons coefficient of correlation and statement of its properties and examples. Concept of simple linear regression-examples.

Unit III : Test of Significance :- concept of simple random sampling; random sampling and stratified random sampling; concept of testing of hypothesis; critical region-two types of errors; level of significance; large sample; tests for single mean and difference of means; single proportion and difference of proportion. Chi-square test for goodness of fit and for independence of attributes, students t-test for single mean

and difference of means and F-test for equality of variances. Concept of ANOVA-examples on one way and two way classification

Unit IV : Environmental System analysis and modeling :- Approaches to development of models, linear, simple and multiple regression models, validation and forecasting models, population growth and interaction model Lotka voltrra model, Leslie's matrix model, point sources stream pollution model, box model, Gauss ion plume model.

Unit V : Computer Programming: - Computer organization, computer generation and classifications, structure, function, capabilities and limitations of computers, computer packages, DOS, MS-Office (MS Word, MSPowerPoint, MS-Excel) for data input & output Developmentof different environmental models by simple computerprogramming. Internet access to generate the environmental data.

Recommended Books:

1. Biostatistics; A Foundation for Analyses in Health Sciences :- Wayne W. Daniels : Wiely International.
2. Statistical Methods :- Snedecor and Cockran (Seeond Ed.) (Prentice-hall) India, S.P. Gupta.
3. Computer Programming in Fortan IV:- Rajaraman V. Prentic1982
4. An Introudction to Biostatistics :- Sunder Rao, PH1.
5. Biostatistical Analysis :- Zar, Jerrold H. (1998) Prentice Hall, N.J.
6. Staistics for Engineering and Scientists :- Walpole, R and Myers (1995) 5th Edn. Mac Millan, N.Y.
7. Environmental Statistics and Data Analysis :- Wayne, R. ott (1995) CRC Press.
8. The statistical sleuth :- Ramsay & Schafer (1997) Dunbury Press.
9. Fundamentals of Computers :- V. Rajaraman.
10. Computer techniques in Env. Sci:- Ouellette.
11. DOS 6.0 Secret :- Ainsbary.
12. DOS 6.0 :- Kamin.
13. Elements of Practical Statistics ;- S.K. Kolhapur.
14. Applied Regression. Analysis :- Droper A. and Smith G. (1981).
15. Statistical Methods for engineers and Scientist:- Bethea, R.M. Duran, B.N. and Bonlion. T.L. (1975).
16. Fundamentals of Applied Statistical :- S.C. Gupta and V.K. Kappor.
17. Elements of Statistics :- Donald R. Byrkit.

PRACTICAL III: LABORATORY EXERCISE BASED ON PAPER V AND VI

A. **Experiments on Environmental Microbiology :**

1. Microscopy - a) Use of compound microscope b) Calibration of microscope
2. Staining Techniques - a) Monochrome staining b) Negative Staining c) Gram Staining d) Special Staining Methods
3. Slide culture techniques for examination of fungi / actinomycetes.
4. Estimation of total viable counts in water and soil samples.
5. Preparation and sterilization of microbial media.
6. Determination of total bacterial and fungal count from garbage piles in housing colonies.
7. Determination of most probable number (MPN) in water samples.
8. Staining of bacterial suspension by simple staining method (monochrome)
9. Staining of bacterial suspension by Hooker's modification or by Gram's staining.
10. Study of microorganisms by Standard Plate Count (SPC) methode.
11. Isolation of bacteria from water, soil, decaying matter.
12. Isolation of fungi from soil/ water/ decaying matter.
13. Identification and classification of bacteria.
14. Study of allergenic and non allergenic pollen grains.
15. Study of laboratory instruments used for microbiological study.
16. Study of preparation of sterilization of culture media.
17. Determination of MPN from drinking water resource for potability.
18. Determination of hydrogen sulfide (H2S) from sewage sample.

B. **Experiments based on Biostatistics :**

1. To find out mean, mode and median of given data.
2. To find out probability of occurrence and relative frequency of dominant species.
3. To study the random variables in community.

4. Applications of chi-square and t-test for the given data.
5. To study the concept of ANNOVA.
6. Calculation of standard deviation from data.
7. Calculation of variance from data.
8. Calculation of standard error (SE) from data.
9. Problems on correlation coefficient.
10. Problems on probability.
11. Problems on t- test.
12. Problems on ANOVA.
13. Problems on chi-square test.
14. Problems on Regression equation.

C- **Experiments on Computer**

1. MS-Word
2. MS-Power Point.
3. MS – Excel
4. Use of internet.

Distribution of Practical Marks (6 Hrs)

Q.1 Major Experiment on Environmental Microbiology	20 Marks
Q.2 Twon minor Experiment on Environmental Microbiology	30 Marks
Q.3 Two Experiments on Biostatistics -	20 Marks
Q.4 Two Experiments on Computer.	20 Marks
Q. 5. Viva-voce -	05 Marks
Q.6. Practical record.	05 Marks
Total Marks -	**100 Marks**

PAPER VII : AIR AND NOISE POLLUTION

Unit I : Air pollution: Definition, natural and man made sources of air pollution, stationary and mobile sources, primary and secondary pollutants, transport and diffusion of pollutants, emission and ambient standards, vehicular pollution and urban air quality. Air pollutants: Sulfur oxides (SOx); nitrogen oxides (NOx), carbon monoxide, total suspended particulate matter, respirable particulates, photo-chemical oxidants, specific pollutants (Hydrogen sulphide,

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particulate fluoride, formaldehyde and volatile organic compounds), chemical composition of SPM photochemical smog, peroxy acyl nitrates (PAN), benzo-a-pyrene (BAP) formations, atmospheric sinks.

Unit II : Global air pollution problems: Green house effect (green house gases: CO2, CH4, N2O, CFC's, water vapor concentration, alternatives for CFC's, fire extinguishers), global warming and climate change, ozone layer depletion (ozone depleting processes, ozone hole, environmental effects and strategies for ozone layer protection), acid rain.

Unit III : Effects of air pollution and air monitoring instruments: Human health, plants, animals and microbes, archeological monuments and aesthetics, Orsat apparatus, high volume air sampler and source monitors Status of Air pollution in India..

Unit IV : Air pollution meteorology: Wind speed, direction and their vertical profiles, turbulence (mechanical and thermal), atmospheric stability characteristics and classes, Plume behavior, , wind-valley effects, land/sea breeze-effects, heat island effect, mixing height-boundary layer definition, temperature inversions, factors affecting on dispersion of air pollutants,

Unit V : Noise pollution: Properties of sound waves, sound level meters, definition of noise, industrial community noise factors, effects of noise on human beings, hearing mechanism, audiometric tests, , effects on human performance, , noise standards and guidelines, permissible noise levels for occupational exposures, noise pollution control and abatement measures.

Recommended Books:

1. Magill, Holden and Ackdey, Air Pollution Hand Book, Mc-Graw Hill, New Delhi (1998)
2. R. K. Trivedi & P. K. Goel, An Introduction to Air Pollution, TechnoScience Publications, Jaipur (1995)
3. C.S.Rao, Environmental Pollution Control Engineering, New Age International Publication New Delhi (2001)
4. A. Sharma & A. Roychaudhari, The Deadly Story of Vehicular Pollution in India, CSE New Delhi (1996)
5. Wahi S.K., Agnihotri A. K., and Sharma J.S.,Environmental Management, Willey Eastern Ltd., New Delhi. (1992)

16

6. G.N. Pandey, and G.C. Carney, Master Gillbert M., Introduction to Environmental Engineering and Science, Prentice Hall, New Delhi (2000).
7. E. Robart Alley and Associates, Air Pollution Control Hand-book,Mc-Graw Hill, New Delhi (1998)

PAPER VIII : WATER POLLUTION

Unit I : Characteristics of water and wastewater: Physical, chemical, and biological characteristics of water and wastewater, physiochemical and bacteriological sampling and analysis of water quality, quality standards, (BIS, WHO, CPCB and US Environmental Protection Agency), water quality indices: definition, types, applications and significance, water quality for industrial and bathing purpose, prevention and control of water pollution, sewage treatment plant.

Unit II : Sources of water pollution: Sources of water pollution from urban, industrial, agricultural and natural waters, interaction in aquatic system, , sources of marine pollution, criteria for disposal of pollutants in marine ecosystem, coastal management.

Unit III : Pollution potential of industrial effluents (Process, sources and characteristics): Effluent characteristics- (temperature, concentration and volume). Nuclear/thermal power stations, agriculture, sugar, food processing, chemical, tanneries, pulp and paper, oil and petroleum, textile and electroplating industries.

Unit IV : Water resources and environment: Phytoplankton, zooplankton and macrophytes in aquatic ecosystem, global water balance, origin and composition of sea water, types of water: surface, ground water, brackish and marine water, human use of surface and ground water, exploration of ground water, ground water table, aquifers, design, construction and maintenance of wells and infiltration galleries.

Unit V : Consequences of water pollution: Biological uptake of pollutants and their effects on land, vegetation, animals and human health, bio-deterioration, bioaccumulation, biomagnifications and eutrophication, infectious microbial agents in water system and their consequences on human health. Bio-indicators: Specific pollutants in aquatic system and their speciation, behavior, toxicity .

Recommended Books:

1. Principles of Remote Sensing: A.N. Patel and S. Singh, Scientific Publishers (India), Jodhpur (1999).
2. Remote Sensing of the Environment: J. R. Jensen, Pearson Education Inc, Delhi(2003).
3. Remote Sensing for Environment and Forest Management: A. Mehrotra and R.K. Suri, Indus
4. Publishing Co., New Delhi (1994).
5. Remote Sensing for Large Wildfires: E. Chuvieco, Springer, New York (1999).
6. Introduction to Geographic Information System: Chang, Kangtang, Tata McGraw Hill, New Delhi (2002).
7. Geographic Information System: R. Ram Mohan Rao and A. Sharieff, Rawat Publication, New Delhi, (2002).
8. Textbook of Remote sensing and GIS (Third edition, 2006) by M. Anji Reddy BS Publication, Hyderabad
9. Fundamentals of remote sensing (Second edition, 2005) by George Joseph Universities press (India) Private Ltd., Hyderabad.
10. Remote sensing and image interpretation (Fifth edition, 2007) by Thomas M. Lilesand, Ralph W. Kiefer, Jonathan W. Chapman Wiley India publication, New Delhi .
11. Remote sensing of the environment (2000) John R. Jensen, Dorling Kindersley India Pvt. Ltd,
12. Current sciences special issue remote sensing for national developmentVolume 61 numbers 3 and 4 August 1991

PRACTICAL V : LABORATORY EXERCISE BASED ON PAPER IX AND X :

A. **Experiments based on Computer and Statistical Applications :**

(1) Basic Program for standard deviations.
(2) Basic Program for BOD/ COD/Hardness
(3) Use of Excel program for data manipulations, functionas and formulae, chart & graphs.
(4) Use of MS-Word for creating document, tables, and graphs.

B. **Experiments based on G.I.S. :**

(1) Interpretation of aerial photographs.
(2) Use of GIS software for Environmental Studies.
(3) Determination of height of the object in aerial photographs.
(4) Interpretation of Satellite Images
(5) Analysis of aerial photographs by using stereoscope (3 P)
(6) Indexing of Topo sheet.
(7) To study the conventional signs and symbols from Toposheet.
(8) Interpretation of Topo sheet.
(9) To study of conventional signs and symbols from weather map.
10) Interpretation of weather map.

C. Experiments based on Terrestrial-pollution:

(1) To Estimate the effect of Exhaust gases on chlorophyll content in different plants.
(2) Analysis of Physical Parameters of Solid Waste.
(3) Analysis of Chemical characteristics of Solid Waste
(4) To compare chemical characteristics of soil by rapid tests.
(5) Study on physical characteristics of soil.
(6) Determination of organic matter by walkley and Black method from soil.

Distribution of Practical Marks (Duration - 6 Hrs)

Q.1 Any one major Experiment based on terrestrial pollution	20 Marks.
Q.2. Any one minor Experiment based on terrestrial pollution	10 Marks.
Q.3 Any one Experiment based on Computer and Statistical Applications	15 Marks
Q.4 Any one major Experiment based on Geographical Information systems (GIS)	20 marks
Q.5 Any one minor Experiment based on Geographical Information systems (GIS)	15 marks
Q.6. Viva-voce	10 Marks
Q.7. Practical record	10 Marks
Total Marks -	**100 Marks**

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Unit III : Effects of solid wastes: Effects of mining and transportation activities, odour nuisance and occupational hazards, health hazards, social and aesthetic impacts of terrestrial pollution, interaction of terrestrial pollution with air and water pollution, agricultural land and their effects on environment,

Unit IV : Pollution from production methods: Environmental effects of nuclear, thermal and hydel power production methods pollution from oil, coal, wood and agro-residues burning, food and chemical manufacturing industries, agro industries, fertilizers and pesticides, petroleum production, acid plants.

Unit V : Management of solid wastes: Physical methods such as open dumping, sanitary landfill, ocean dumping, incineration, chemical methods such as pyrolysis, biological methods such as composting and vermi-composting, management of hazardous wastes, modern trends in solid waste management, recycling of waste materials, waste minimization technology.

Recommended Books:

1. A. D. Bhide and B.B. Sundersen, Solid Waste Management in Developed Countries, INSDOC, New Delhi (1983)
2. Sinha R. K., Sinha A. K., Saxena V. S., A Book on Waste Management, INA, Shri publishers, Jaipur (2000)
3. Robert A. Corbitt, Standard Handbook of Environmental Engineering, Mc-Graw Hill, (1989)
4. E. D. Enger, B.F. Smith, Environmental Science - a study of interrelationships. 5th Edn. W.C.B. Publ., London. (1995)
5. D. Botkin and E. Keller, Environmental Science - Earth as a Living Planet. John Wiley and Sons, Inc., New York, (1997)
6. Pollution control in process industry – S. P. Mahajan
6. Global air pollution – Brijman
7. Environmental pollution and management – L. Mohan
8. Environmental analysis – P. R. Trivedy and Gurdeep Ray
9. Soil pollution and soil organism – P.C. Mishra

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PAPER X: REMOTE SENSING, GIS AND COMPUTER APPLICATIONS

Unit I : Introduction to remote sensing: Definition, Historical perspective, Electromagnetic radiations(EMR), EMR spectrum, Radiation laws, Black body and real body radiation, Hemispheric reflectance, Transmittance, Absorbance,. Application of remote sensing in environmental studies: Land use / land cover; Wastelands; Forest, Forest fires; Water resources, Disasters; Wildlife habitat, Vegetation .

Unit II : Interaction of electro magnetic radiation (EMR) and remote sensing: With earth surface: reflection, transmission, spectral signatures. With the atmosphere: scattering, absorption, refraction, Types of remote sensing, Characteristics of remote sensing, Platforms and orbits: ground based, air borne, space borne Orbits: geostationary satellites and polar-orbiting satellites Sensors: MSS and TM scanners in landsat series, HRV scanners in spot series, LISS,

Unit III : Aerial photography: Definition, Photogrammetry, Flight lines of vertical aerial photography, Types of aerial photography, Types of films, , Aerial photo interpretation.

Applications of Remote Sensing:, , Geologic and Soil Mapping, Agricultural applications, Forestry applications, , Water Resource applications, Urban and Regional Planning application, Wetland Mapping, ,.

Unit IV : Computer and statistical applications: History, characteristics and classification of computers, Application of computers;, Main parts of PC, , Basic elements and tools of statistical analysis, probability, Chi-square test, Arithmetic, geometric and harmonic means; Linear equations, Tests of hypothesis and significance.

Unit V : Geographical information system (GIS): GIS: definition, capabilities and advantages, History of GIS, Objectives of GIS, Elements of GIS, Data model: Raster and vector data model, Data structures: relational, hierarchical and network data structures, Use of GIS in environmental management Components of GIS, GIS Workflow, GIS Categories, Levels/ Scales of Measurements

Recommended Books:

1. Gerard Kiely, Environmental Engineering Vol. I, II,& III Liptak, Tata McGraw Hill, New Delhi.(1998)
2. A.K. De, Environmental Chemistry. 2nd edn., 1990, Wiley Eastern Ltd., New Delhi.
3. Nancy J. Sell, Industrial Pollution Control, John Willey and Sons, Inc., New York (1992)
4. S.S. Dara A Text Book of Environmental Chemistry and Pollution Control, S. Chand, and Co. Ltd., New Delhi. (1995)
5. P.K. Goal and K. P. Sharma, Environmental Guidelines and Standards in India, Techno science Pub. Jaipur, India (1996)
6. G. R. Pathade, and G. K. Goal, Environmental Pollution and Management of Waste Water by Microbial Techniques, A. B.D. Pub. Jaipur India (2001)
7. S. N. Jogdand, Environmental Biotechnology (Industrial Pollution Management) Himalaya Pub. House Delhi. (1995)

PRACTICAL IV : LABORATORY EXERCISE BASED ON PAPER VII AND VIII

A. Experiments based on Air and Noise Pollution :

(1) Study of Micrometeorological equipments.
(2) To study principle, components and working operation of Respirable dust sampler.
(3) To study principle, components and working operation of stack monitoring kit.
(4) Measurement of Noise levels.
(5) Determination of NOx from ambient air.
(6) Determination of SOx from ambient air.
(7) Determination of RPM and TSPM from ambient air.

B. Experiments based on Water Pollution :

(1) Determination of CO2 & O2 by Orsat apparatus.
(2) Determination of oil / grease in water.
(3) Determination of Inorganic Phosphorus in water.
(4) Estimation of chlorides in water sample by Mohr's method.
(5) Estimation of Residual chlorine in water sample by iodometric method.
(6) Estimation of sulphate in water sample by turbidimetric method.
(7) Estimation of ferric and ferrous ions present in water.

(8) Estimation of Nitrate in water.
(9) Determination of chemical oxygen demand (COD) in waste water.
(10) Determination of Biological Oxygen demand (BOD) of waste water.
(11) Determination of total acidity CO2 in Water.

Distribution of Practical Marks (6 Hrs)

Q.1	Any one Major Experiment on Water Pollution	20 Marks
Q.2	Any one Major Experiment on Air Pollution	20 Marks
Q.3	Any one minor Experiments on Water pollution	15 Marks
Q.4	Any one minor Experiments on air pollution	15 Marks
Q.5	Any one minor Experiments on noise pollution	15 Marks
Q.6	Practical Record.	05 Marks
Q.7	Viva Voce	10 Marks
	Total Marks -	**100 Marks**

SEMESTER III

PAPER IX : TERRESTRIAL POLLUTION

Unit I : Composition and Sources of solid waste: Ashes, residues, slag, grit, debris, dirt, masonry, garbage, rubbish, trash, dead animals, abandoned vehicles, industrial waste, agro-waste, sewage treatment residues. Urban and rural, agricultural and industrial, demolition, , textile, paper and allied products, chemical and agro-chemical, petroleum refining, rubber and plastic products, leather, primary metals, steel plant, ordnance factories, hospitals.

Unit II : Collection, transportation and characterization of solid wastes: Waste storage devices, , collection equipments, alley, curb, backyard, block and curbside collections, transportation equipments, transfer station, long distance transports, processing of solid wastes for disposal, general properties, physical, chemical and biological properties of solid wastes, Bulkiness, combustibility, solubility.

PAPER XI : ENVIRONMENTAL IMPACT ASSESSMENT AND AUDIT

Unit I : Environmental impact assessment (EIA): Definition of EIA and EIS, , Concepts, scope and objectives of EIA; National Environmental Policy Act (NEPA, 1969); EIA guidelines-1994 (Notification of Government of India).

Unit II : Impact assessment methodologies: Definition and concept of impact; Types of impacts (Negative & Positive: Primary & Secondary; Reversible and Irreversible;); Impact identification; Methods for impact identification: Matrices, networks and checklists, Advantage & disadvantages of EIA methodologies.

Unit III : Components of EIA: Environmental Setting; Baseline data; Prediction and evaluation of impacts; Environmental management plan and monitoring, Baseline information, Prediction, evaluation and mitigation of impacts on socioeconomic, air water, soil and noise environment. Public participation in EIA: Decision making, Public participation in environmental decision making, Objectives and techniques for public participation, Advantages and disadvantages of public participation.

Unit IV : Preparation and writing of EIA: For water resources, Dams and irrigation projects; Mining and Infrastructural projects etc., eco – labeling eco-marks, ecotourism, eco-feminism, Eco-regulation, eco-accountability, green management, green products, green claims, eco wars.

Unit V : Environmental auditing: Notification and guidelines for Environmental audit; Scope, applicability and objective of environmental audit; procedure of environmental auditing; Designing and implementation of audit tools – pre audit activities – on site activities – post audit activities – Environmental statement – benefits of environmental audit – EA scenario in India – submission of Environmental Audit report in MoEF format.

Recommended Books:

1. Environment Impact Assessment: Larry W. Canter, Mc-Graw Hill Inc., New York (1996).
2. Introduction of Environmental Impact Assessment: John Glassion, Rikay Therival and A. Chadwick, UGC Press Ltd., London (1994).
3. Methods of Environmental Impact Assessment: Peter Morris, Ricky Therivel, UGC Press Limited, London (1994).

4. Environmental Impact Assessment & Management: Daya Publishing House, New Delhi (1998).
5. Using Environmental Management system to improve profits: B. Pearson, BFP Little and M. J. Brierley, Graham & Thotrman, Kluwer Academic Publisher Group, London(1992).
6. A monograph on Environmental Audit: The Institute of cost and works Accounts of India, New Delhi (1994)
7. Handbook of Environmental Impact Assessment (Vol. I): Judith Petts, Blackwell Science, USA (1999).
8. Handbook of Environmental Impact Assessment (Vol. II): Judith Petts, Blackwell Science, USA (1999).
9. Environmental Impact Assessment: A. Eillpin.
10. Environmental Impact Assessment and Management: H. Kumar (1998).
11. Environmental Impact Assessment of Tehri Dam: V. Govardhan.
12. Practical guide to Environmental Impact Assessment: Belly Bowers and Marriott (1977).
13. Environmental Impact Assessment: A. K. Shrivastava APH Publication 2003.
14. Law of Intellectual Property: Dr. S. R. Mysani Asia Law House (2nd Edition) Law Book Sellers, Publishers and Distributors Hyderabad.
15. Environmental Impact Assessment, L. W. Canter, McGraw Hill publication, New Delhi.
16. Proceedings Indo-US workshop on environment impact analysis and assessment (1980) NEERI, Nagpur.
17. Environment & Social impact assessment, Vlcany, F., Bronsetin DA (1995), John Wiley & Sons, New York.
18. EIA – A Biography, B. D. Clark, B. D. Bissel, P. Watheam.
19. Second world congress on engineering and environment 1985, Institution of engineers.

PAPER XII : POLLUTION CONTROL TECHNOLOGY

Unit I : Air Pollution Control Methods :- Need for control methods.Particulate emission control gravitational settling chambers,cyclone separaters, fabric filters, Electrostatic precipitators,wet scrubbers. Control of gaseous pollutants – So2, Nox,Co, Co2 PAN & Hydrocarbons modifications of operating conditions. Modification of design conditions. Automobile pollution control - control at source, fuel tank, carburetor, crankcase Exhaust emissions, Indian scenario.

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Unit II : Sewage and Industrial Waste Water Treatment :- The need for waste water treatment: Treatment of waste water – Primary treatment (Sewage)-screens, grit chambers and oil separation & primary sedimentation. Primary treatment (industrial waste water) – segregation, equalization, neutralization, sedimentation, flotation & Oil separation. Secondary treatment principal of biological treatment – waste stabilization ponds – Aerated lagoon, - Activated sludge process- trickling filters. Sludge treatment and disposal, preliminary operations- sludge thicker-sludge digesters, sludge conditioning- dewatering methods – sludge drying beds, vacuum filtration – filter process, centrifugation – sludge disposal methods.

Unit III : Advanced waste water treatment :- Removal of suspended solid, dissolved solids, nitrogen removal-phosphorous removal - Adsorption-refractory organics and their treatment – Reuse and recycle of waste water. Operation, monitoring & designig of Effluent treatment plants, including preliminary, primary, secondary and tertiary treatment for the industries Viz-Sugar, Pulp & Paper, Dairy, Textile, Distillery, fertilizer & petrochemical industries. Concept of common effluent treatment plant (CETP) and Public owned treatment plant (POTP).

Unit IV : Radiation and Noise Pollution Control Measures:- Types of radiations, sources of radiations, biological effects of radiations, Nuclear energy scenario,. The nuclear dilemma. Introduction to noise pollution. The decibel scale – physiological,psychological effects of noise – Noise measurement Noise control criteria, Equipments for noise measurement – Noise control in industries.

Unit V : Solid Waste Management: - Need of Solid Waste management, types of solid waste, biodegradable, refractory, and inorganic, industrial solid waste, pulp and paper, sugar, thermal power station, food processing, textile, urban and agricultural. Solid waste treatment compaction, dewatering, briquette, size reduction,. Solid waste disposal methods solid waste reuse : Recycling and incineration pyrolisis, biogas generation, solid waste as a source of raw material i.e. light weight bricks from fly ash, composting etc. Management of urban solid waste.

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Recommended Books:

1) Air Pollution :-H.C.V.Rao, 1990.
2) Air Pollution & Control:- P. Pratapmouli G.N. Vekatasubbayya, Divya Jyothi. Prakashan, Jodhapur 1989.
3) Fundamentals of Air Pollution:- 2nd Ed. Arthur C.stern Acad. Press1984.
4) Pollution Control in Process Industries:- S.P. Mahajan, Tata Mc.Graw Hill Publications. New Delhi.
5) Meterology of Air Pollution:- R.S. Scores 1990. Ellis Hardood publication.
6) Air Pollution :- M.N. Rao, Mc Graw Hill 1993.
7) Waste Water Engineering, treatment, Disposal and reuses:- Metcalf and Eddy.
8) Water Supply & Sanitary Engineering :- R.C. Rangwala.
9) Introduction to Waste Water treatment process. :- Ramalho R.S.
10) Environmental Engineering :- Arcadvo. P. Sincero& Gregorial A.Sincero Prentice Hall of India Pvt. Ltd.
11) Ecotechnology for pollution control and environmental management:- R.K. Trivedy and Arvind Kumar Enviro. Media.
12) Water and Waste Water Technology:- Mark J. Hammer Joh Witeyt Sons.
13) Waste Water Engineening :- J.R. White.
14) Environmental Pollution and Engineering:- C.S. Rao.
15) Environmental Engineering:- M. Narayanrao.
16) Solid Waste Management in developing Country:- A.D. Bhide.
17) Integrated Solid Waste Management :- George Techbanogl Theisen and Vigsl
18) Industrial Waste Water Treatment :- M.N. Rao & A.K.Dutta. Oxford 4 IBH Publ. House 1987.
19) A Treatise or Rural, Muncipal and Industrial water Management:- KVSG Murali Krishna.
20) Sewage Disposal and Air Pollution Engineering:- S.K. Garg 1990Khanna. Publication.
21) Water Supply and Sanitary Engineering:- G.S. Bridie & J.S. BridesDhanpat Rai & Sons. 1993 6th Ed.
22) Water treatment specification:- Frank rose Mc growl Hill 1985.

3. Text book of modern Toxicology:- David A. Wright and Pamela Welbourn Cambridge University Press 2002.Ernest Hodgsen and patricia E.levi Appleton and Lange Stamford etc U.S.A.1995.
5. Basic Toxicology:- Frank C. Lu, Homisphere publishing Corporation, New York, Washington 1993.
6. Essentials of Toxicology:- Loomis TA, Leae Fabiger.
7. Toxicology:-Hayes.
8. Principles of toxicology:-Cassarett and Doulls.
9. Environmental Engineering:- M.Narayanrao.
10. Solid Waste Management in developing countries:-A.D.Bhide
11. Integrated Solid Waste Management:-George Tehbanoglous Theisen and Vigil.
12. Guide lines for setting up operating facility:-Hazardous waste management CPCB Manual, 1998.
13. Environmental Pollution and Toxicology:-S.P.Ray, Chaudhari, D.S. Gupta.
14. Environmental Engineering designing approach:-Arcadia P. Sincero Gregoria A.Sincero Prentice hall of India Pvt. Limited.
15. Encyclopedia of Environmental control technology (9 Vols. Set):- Paul N.Cheremisinoff Technip Book International.
16. Principal of Environmental Toxicology:-Ian C.Shaw & John Chadwick; Taylor and Frances
17. Environmental Toxicology And Chemistry. :- Donald G. Crosty 1998
18. Environmental Toxicology : - David A. Wright & Pamela Welbourn Cambridge University Press 2002.
19. Text book of modern toxi.:- Ernest Hodgsen & Patricia E. levi Appleton & Cange stamfend etc U.S.A 1995.
20. Basic Toxicology:- Frack C. Lu, Homisphere publishing Cerporation, New York, Washington 1993.

PAPER XIV : INDUSTRIAL HYGIENE AND SAFETY

Unit I : Industrial safety: History and development of safety movement, Need for safety, Safety legislation: Acts and rules, Safety policy: safety organization and responsibilities and authorities of different levels, Accident sequence theory, Causes of accidents, Accident prevention and control techniques, Plant safety inspections, Job safety Analysis and investigation of accidents, Role of safety committee and its formation, Safety awareness programme: motivation, education and training.

Unit II : Risk assessment and management: Checklist procedure, Preliminary hazard analysis, What if analysis, Failure mode effect analysis, Hazard and operability (HAZOP) studies, Hazard analysis techniques: Fault tree analysis, Event tree analysis, General outline of DOW index, Risk estimation and management, Major hazard control, On-site and Offsite emergency preparedness.

Unit III : Specific hazards: Identification of hazard, machine guarding, safety with hand tools/ portable power tools, Pressure vessel hazards and their control, Safety in material handling: hazards and safe Practices, safety with storage of materials, Electrical hazards: classification, safe work practices, Chemical hazards: laboratory safety, bulk handling of chemicals, Fire and explosion hazards, Fire detection, Prevention ,control, and extinguishments, Industrial layout, Industrial waste management.

Unit IV : Industrial hygiene: Environmental stresses: physical, chemical, biological and ergonomic stresses, Principles of industrial hygiene, Overview of control measures. Permissible limits. Stress, Exposures to heat, Heat balance, Effects of heat stress, Control Measures. Chemical agents, IS/UN classification, Flammables, Explosives, Water sensitive chemicals, Oxidants, Gases under pressure, Chemicals causing health hazards: irritants, asphyxiates, anesthetics, systemic poisons and carcinogens, Chronic and acute exposure, Routes of entry, , Occupational exposure limits, Engineering control measures, Principles of ventilation.

Unit V : Occupational health: Concept of health and occupational health, , Occupational and work related diseases, Levels of prevention, History of occupational health, Characteristics of occupational diseases, Essentials of occupational health service, personal protective equipments (respiratory and non-respiratory)

Recommended Books:

1. Frank Lees Book on loss prevention in process industry, vol. 1 & 2.
2. Industrial safety / safety management – K.G. Mistry
3. Safety Management – Grimandi and siemens.
4. Safety supervision – Peterson
5. Eleventh edition of NSC, USA
6. IS 14489 On Safety Audit
7. Factories Act 1948

8. Environmental Protection & Law – H. V. Jadhav & V. M. Bhosale
9. Law Science & Environment – R. P. Ananad
10. Instrumental Methods of chemical analysis – Willard Merrit Dean.
11. Analytical Spectroscopy – Chhatwal
12. Analytical Instrumentation – NEERI Publication
13. Analytical Chemistry – Kennedy
14. Instrumental Method –Sharma
15. A text Book of Quantitivative Inorganic Analysis – A. L. Vogel
16. International Environmental Policy emergence and Dimension by L. K. Caldwel 1990.
17. Industrial Safety and pollution control handbook: National Safety Council and Associate publishers Pvt. Ltd, Hyderabad(1993).
18. Handbook of Environmental Health and Safety: Herman Koren and Michel Bisesi, Jaico Publishing House, Delhi (1999).
19. Environmental Toxicology and Chemistry: Donald G Crosby Oxford University Press, USA (1998).
20. Handbook of Environmental Risk Assessment and Management: Peter Calow, Blackwell Science Ltd. USA (1998).
21. Principals of Environmental Toxicology: Ian C. Shaw and John Chadwick, Taylor and Francis, USA (1998).
22. The Factories Act-1948, Government Printing Press, Civil lines, Delhi (1994).
23. Risk Assessment and Environmental Management: D. Kofi Asvite-Dualy, John Willey & Sons, West Sussex, England (1998).
24. Introduction to Environmental Engineering & Science: Gilbert M. M., Pearson Education, Singapore (2004).

PAPER XV : NATURE, CONSERVATION AND ENVIRONMENTAL MANAGEMENT

Unit I : Biodiversity and resource conservation:, Strategies for biodiversity conservation, Causes and Impacts of depletion in biodiversity; Endangered and threatened plant and animal species, Importance and need of conservation, Mineral resources, Forest resources, Water resources; Environmental impact of resource exploitation, Wasteland reclamation, Wetland conservation; Watershed management, Rain water harvesting.

Unit II : Environment Biotechnology: Vermiculture technology- Role of earthworm, process of vermin composting, applications; Bio-fertilizer technology- Definition, classification importance, prospects; Fermentation Technology- Bioreactor, pretreatment and purification, materials of the bioreactor,

Unit III : Non-conventional energy sources and their programs in India: Biogas, Wind Mill (wind farm, Advantages and limitation, wind energy), Solar energy (SPV,ST), Geothermal energy, Nuclear energy, Hydro power (small hydal project), Tidal power

Unit IV : ISO 14000: Definition, Standards (14001), TC-207, EMAR and EMAS, TAG. ISO 9000, ISO 14001, Relation between ISO 14001 and ISO 9000, Certification, Accreditation and Registration, Preparation for ISO 14000

Unit V : **Sustainable Development:** Concepts of sustainable development; definition of sustainable development, Principles of sustainable development; barriers to sustainable development – health aspect of sustainable development; practices of sustainable development in India;

Industrial and urban environmental problems in India:

Industrial development – impact on resources depletion and pollution (case studies), environmental problems of urbanization.

Recommended Books:

1. Biodiversity: K. C. Agrawal, Agro Botanical Publishers, New Delhi, India (1996),
2. Environmental Biology: S.N. Prasad, Campus Books International, New Delhi (2000),
3. Fundamentals of Biotechnology: S.S. Purohit and S.K. Mathur, Agro Botanical Publishers, New Delhi, India. (1990).
4. Environmental Biology: K. C. Agrawal, Agro Botanical Publisher, New Delhi, India. (1993).
5. Compendium of Environmental Statistics: Central Statistical Organization, Dept. of State. Ministry of Planning and Programme Implementation, Govt. of India. (1997).
6. Environment Pollution and Development: Prof. Chandra Pal, Mittal Publications, New Delhi (1999).
7. Environmental Guidelines and Standards in India: P. K. Goel and K. P. Sharma, Techno science Publications, Jaipur, (1996).
8. Global Environmental Chemistry: D. C. Parashar, C. Sharma and A

P. Mitra, Narosa Publishing House (1998).
9. Environmental Challenges and the Universities: AIN (1994).
10. Environment and Development: I. S. Grover and A. K. Thukval, Scientific Publishers, Jodhpur (1998).
11. CEE towards a green future – CEE Ahamedabad 1999.
12. Waste minimization – Prasal Modak
13. Towards an agro-ecosystem policy for India – A Damodharan
14. Environmental economics for sustainable development – Kumar
15. Ecology and economics: an approach to sustainable development –Sengupta
16. Environment, Development and sustainability – Bhaskar Nath
17. Water technology management challenges and choices – A.K.

PAPER XVI: ENVIRONMENTAL POLICIES AND LEGISLATION

Unit I : **Environmental education programme :-** Definition and background of environmental education, need and objectives of environmental education, Role of environmental education in the formal education, – role of various organization Govt. and non-Govt. shairing concerns in Env. Education.

Unit II : **Environmental Education :**

Traditional methods of environmental education . Methods of education for sustainable development , . Current problems in environmental education: Environmental education at various levels. Teachers training programe. Recent methods of environmental education.

Unit III : **Global environmental Controversies:**

Environmental movements and peoples responses; social, political and economic issues in the controversies over natural resources, silent valley, Narmada Project, Almatti dam project, Sardar Sarovar project, Tehri dam, Koyna dam, , , impact of Mahtura refineries on Taj Mahal.

Unit IV : **Environmental Awareness and Conservation strategies:-** Stockholm conference, Earth summit, Agenda-21 (Rio,1992) Johansburg 2002), World commission on environment and development (WCED). World water council (WWC), World health organizations (WHO) ISI, EPHA, United Nations Environmental Programme (UNEP), International Union for conservation of Nature and Natural Resources (IVCN) World wide fund for Nature (WWF)

Unit V : **Environmental Laws:-** Wild life protection Act, 1972, amended 1991. Forest (Conservation) Act, 1980, Indian forest Act (Revised) 1982, Air (Prevention and Control of Pollution) Act,1981 as amended by Act, 1987 and rule 1982. Motor Vehicle Act, 1988. The Water (Prevention and Control of Pollution) Act, 1974 as amended up to 1988 and rules 1975. The Environ (Protection) Act, 1986 and rules 1991. Public Liability Insurance Act, 1991 Hazardous waste management and handling. Rules 1989 as amended up to 2003.

Recommended Books:

1. Hand Book of Env. Laws, Acts, Rules, Guidelines, Compliance and Standard Vol. 1 & 2: R. K. Trivedy Environmental Edition: 1st 1996.
2. Pollution control Acts, Rules and notifications issued there under: Central Pollution Control Board April. 1995.
3. Environmental Protection and the Laws: C. N. Mehta, 1991.
4. Legal aspects of Environmental Pollution and its Management: Ed. S. M. Ali, 1992.
5. International Environmental Policy Emergence and Dimensions: by L. K. Caldwel 1990.
6. Lal's Commentevis on water, Air pollution laws along with the environmental (Protection) Act and rules 1986, 3rd Rd. 1992: Law Publisher India.
7. Universal Environment and Pollution law manual: S. K. Mohanty 1998.
8. Pares Distn. Environmental Laws in India: (Deep, Lated Edn).
9. Environmental Problems, protection and control Vol I & Vol II Ed: Arun Kumar.
10. Hand book of Env. Laws, Acts, Rules, Guidelines, Compuliances and Standards VoL. 1 & 2 :- R.K. Trivedy Enviromedia Edition: 1st 1996
11. Pollution control Acts, Rules, and notifications issued there under: - Central Pollution Control. Board Aprill. 1995.
12. Environmental Protection and the Law's:- C.N. Mehta, 1991.
13. Legal aspects of Environmental Pollution and its Management:- Ed.S.M. Ali, 1992.
14. International Environmental Policy Emergence and Dimensions:- by L.K. Caldwel 1990.
15. Lel's Commentenes on water, Air Pollution laws along with the environmental (Protection) Act, and rules, 1986, 3rd Ed. 1992:- Law Publisher India.

16. University Environment and pollution law manual:- S.K. Mohanty 1998.
17. Environmental Governance (the Global Challenge):- Lamont C. Hempel Affiliated East-West Press Pvt. Ltd. New Delhi.
18. Declaration of :- The stockhdm conference, Rio, Rio +5 and Rio+10.
19. Constitution of India [Referred articles from Part III, Part IV and Part IV A].
20. Praes Distn. Environmental laws in India :- (Deep. Deep, Lated edn.)
21. Environmental problems, protection and control Vol I and II Ed.:- Arun Kumar 1999.
22. Universal Environment pollution law Manual.:- S.K. Mohanty 1998.

PRACTICAL VII: LABORATORY EXERCISE
BASED ON PAPER XIII TO XVI :

A. Experiments on Environmental Toxicology / environmental education

(1) Effects of radiation on Microbial genetic system.
(2) Designing of protocols to evaluate pollutants toxicity.
(3) To study absorption and accumulation of heavy metals by aquatic flora.
(4) Study of Bio-accumulation of pesticides in aquatic fauna.
(5) To collect the data of natural resources from local area.
(6) To collect the data of practices for waste management from your local area.
(7) To collect the data of environmental education awareness among the local people.
(8) Case study of daily waste collection practices in house hold.

B. Experiments on Industrial Hygiene and Safety :

(1) To determine the ambient air quality in Industrial belt.
(2) Study of noise and dust pollution in flour mills.
(3) Design of settling tank.
(4) Design of Aeration tank.
(5) To study Environmental Status of Thermal Power Plant.
(6) Construction of wind rose and study of wind profiles.

C. Experiments on Natural Resource Management :

(1) Identification and observation of Hot spot (Water Scarity Area)

(2) Study of a forestation programme of social forestry.
(3) To study the water shade management practices from local area.
(4) To study the water harvesting practices from local area and prepare flow chart.

Distribution of Practical Marks :

Q.1)	One major experiment on Environmental Toxicology/ Environmental education	20 Marks
Q.2)	One minor Experiment on Environmental Toxicology/ Environmental education	15 Marks
Q.3)	Experiments on Industrial Hygiene and Safety	20 Marks
Q.4)	Experiment of Natural Resource Management	25 Marks
Q.5)	Viva-voce	10 Marks
Q.6)	Practical record	10 marks
	Total Marks-	**100 Marks**

PRACTICAL VIII: PROJECT Total marks – 100.

Project topic on Environmental protection and nature conservation :

The students are expected to study the local environmental problems related to the following aspects during their Project work.

a. Urban Environmental Problems.
b. Quality of water resources.
c. Watershed management
d. Biodiversity study and its conservation
e. Quality of soil parameters.
f. Ecotourism
g. Wildlife management.
f. Bioremediation.
g. Health effects of pollution.
h. Environmental and socio-economic impacts of various human activities.
i. Environmental health, hygiene and sanitation.
j. Environmental microbiology.

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Geology

NOTIFICATION

No. 56 / 2019

Date: 27/6 /2019

Subject : I) Introduction of new syllabi for the subject Geology at B.Sc. Part-III (Sem. V & VI) level, which to be implemented from the academic session 2019-20.
II) Introduction of new syllabi for B.Sc. Part-III (Semester-V & VI) Computer Science / Computer Application/ Information Technology/Computer Application(Vocational)which to be implemented from the academic session 2019-20.

I) It is notified for general information of all concerned that the authorities of the University has introduced new syllabi for the subject Geology at B.Sc. Part-III (Sem. V & VI) level, which to be implemented from the academic session 2019-20. Hence, the page Nos. 42 to 46, appearing in prospectus No. 2016123 be substituted respectively by the **"APPENDIX-A"**, which is appended with this notification.

II) It is notified for general information of all concerned that the authorities of the University has introduced new syllabi for B.Sc. Part-III (Semester-V & VI) Computer Science / Computer Application/ Information Technology/Computer Application(Vocational), which to be implemented from the academic session 2019-20. Hence, the page Nos. 88 to 97, appearing in prospectus No. 2016123 be substituted respectively by the **"APPENDIX-B"**, which is appended with this notification.

Sd/-
(Dr. T.R.Deshmukh)
Registrar,
Sant Gadge Baba Amravati University

APPENDIX-A

SYLLABI PRESCRIBED FOR B.SC. FINAL TO BE IMPLEMENTED FROM THE A.S. 2019-20
SEMESTER- V
5S : GEOLOGY
ECONOMIC GEOLOGY AND MINERAL EXPLORATION

UNIT I : Economic geology: Introduction, purpose and scope; Metallic and non metallic minerals, ore, ore deposits, gangue minerals, tenor and grade of the ore; Processes of ore formation, types of deposits, distribution of mineral deposits in space and time, metallogenic epochs and provinces, geological thermometers: Classifications of mineral deposits, magmatic concentration deposits, contact metasomatic deposits.

UNIT II : Sedimentary deposits, hydrothermal deposits (cavity filling and replacement), evaporation deposits, colloidal deposits, residual and mechanical concentration deposits, oxidation and supergene sulphide enrichment deposits, metamorphic and metamorphosed deposits.

UNIT III : Mineralogy, properties, uses, origin, mode of occurrence, types of deposits, geological and geographical distribution in India of the metallic mineral deposits like gold, iron, copper, lead, zinc, manganese, aluminium and chromite.

UNIT IV : Mineralogy, properties, uses, origin, mode of occurrence, types of deposits, geological and geographical distribution in India of non-metallic deposits like asbestos, mica, gypsum, barite, magnesite and limestone. Properties, classifications, origin, uses, geological and geographical distribution of coal deposits of India. Origin and migration of oil, oil trap and its types, geological and geographical distribution of Petroleum deposits of India.

UNIT V : Mineral exploration and prospecting, definition and scope, surface methods of exploration and their applications, sub surface methods of exploration like, gravity, magnetic, electrical, seismic, radiometric, geochemical and geobotonical methods and their applications in Geology.

UNIT VI : Guides and controls of ore localization, sampling-Its types, calculations and computation of grade and ore reserves, geochemical cycle and dispersal; Strategic, critical and essential minerals.

Practicals

A. Identification of ore minerals by Physical properties (40 to 60 specimens)
B. Identification of industrial Minerals by physical properties (20 to 30 specimens)
C. Exercises showing major metallic and non metallic minerals on India map (6 to 10 maps)
D. Exercises on calculations on grade and ore reserves (6 to 10 problems)
E. Laboratory exercises in solving exploration problems (8 to 10 problems)

(1980) Industrial Minerals and Rocks of India. Allied Publishers, New Delhi.
6. Howel, B.F. (1959) Introduction to Geophysical prospecting. McGraw Hill.
7. Lowrie, W. (1997) Fundamentals of Geophysics. Cambridge University Press.
8. Sen, A.K. and Guha, P.K. (1993) a handbook of Economic Geology. Dynamic printers, Kolkata.
9. Banerjee, D.K. (1992) Mineral resources of India. The World Press Pvt. Ltd., Kolkata.
10. Sharma, N.L. and Ram, K.S.V. (1964) Introduction to India's Economic minerals, Dhanbad Publishers.
11. Dobrin, M.B. (1952) Introduction to Geophysical Prospecting. McGraw Hill.
12. Park, C. F. and MacDiamid, R.A Ore Deposits. Freeman and company, Saint Francisco.
13. Sinha and Sharma . Mineral Economics.
14. Krishnaswamy, S. (1979) India's Mineral Resources. Oxford IBH, Pub. Co. New Delhi.
15. Prasad Umeshwar. Economic deposits of India. CBS Publishers, New Delhi.

SEMESTER – VI
6S : GEOLOGY
HYDROGEOLOGY, REMOTE SENSING, ENGINEERING GEOLOGY AND GEOLOGICAL SKILL

UNIT I : Concept of hydrology, hydrogeology and ground water, Hydrologic cycle and its components, Occurre and distribution of ground water, Water Table; Aquifer and its types – confined, unconfined and se confined; Properties of aquifer- porosity, permeability, specific yield, safe yields, storage coeffici storativity and transmissivity.

UNIT II : Recharge and discharge, Cone of depression, Influent and affluent seepages, Springs and its types. Gro water Provinces of India. Geophysical investigations for groundwater exploration, Groundwater and w quality services, Hydrochemical parameters of ground water (Acidity, Alkalinity, Hardness, Conductivity). Recharge through wells and its types. Rain water harvesting,

UNIT III : Aerial photographs and its types, Satellite imageries. Methods of studying aerial photographs in the for stereo-pairs and mossaic. Pocket and mirror stereoscopes, Overlap and sidelap, Drift and crab. Photogeo and elements of photorecognition- tone, texture, shape, size, pattern; Scale of photograph and ver exaggeration. Guidelines for lithological, structural and geomorphic interpretations. Application photogeology. "Introduction and scope of photogeology".

UNIT IV : Concept of remote sensing, types of remote sensing systems (active and passive), Elements of passive re sensing system (data acquisition and data analysis); applications of remote sensing in studying the na resources like minerals, ground water, soil and forests. Satellites and Satellite data - introduction and history, types of satellites, information obtained with reference to latest IRS & LANDSAT satellites. Se – types and their applications.

UNIT V : Engineering Geology – introduction, scope and significance; engineering properties of rocks - sp gravity, porosity, crushing strength, compressive strength, and tensile strength. Tunnels - termino geological conditions for tunnel sites, tunnels in folded rocks and bedded rocks. Dams – termino geological conditions for the selection of dam, Types of dams - Masonary dams (Gravity buttress and types), earthen dams. Landslides - causes, types and prevention of landslides.

UNIT VI : Geological skill developement - Role of geological expertise in local natural resources investig exploration and mining, beneficiation of minerals; Rocks and minerals thin section making, engineering services, Environmental services, . Soil quality testing and conservation services, Labo and Research Technician. Geoheritage.

PRACTICALS: SEMESTER – VI

1. Plotting of ground water provinces on outline map of India.
2. Problems on determination of aquifer parameters, ground water table maps.
3. Interpretation of aerial photographs and satellite imageries.
4. Field work : Field work is an Integral part of Geology Syllabus. Every student should attend field work short duration and submit field diary, geological specimen collected and a report.

Microbiology

B.Sc. Sem V

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10.	Measuring Cylinders	Corning/ Borosil/ Vensil	1000 ml graduated	1 No.
			500 ml graduated	1 No.
			100 ml graduation	5 Nos.
			50 ml capacity with gradnation	5 Nos.
			10 ml capacity graduation	3 Nos.
11.	Standard Volumetric Flasks	Corning/ Borosil/ Vensil	1 Lit. capacity	3 Nos.
			500 ml capacity	5 Nos.
			250 ml capacity	12 Nos.
			100 ml capacity	20 Nos.
12	Beakers	Corning/ Borosil/ Vensil	1 Lit. capacity	5 Nos.
			500 ml capacity	30 Nos.
			250 ml capacity	30 Nos.
			100 ml capacity	50 Nos.
13.	Conical Flasks	Corning Borosil Vensil	500 ml capacity	30 Nos.
			250 ml capacity	30 Nos.
			100 ml capacity	30 Nos.
			50 ml capacity	30 Nos.
14.	Reagent	Emkay	2 Lit. capacity	5 Nos.
			1 Lit. capacity	5 Nos.
			500 ml capacity	100 Nos.
			250 ml capacity	100 Nos.
15.	Dropping Bottle.	Emkay	100 ml capacity	10 Nos.
16.	Flat Bottom Round Flask	Emkay	500 ml capacity	20 Nos.
17.	Funneis	Emkay	2.5" diameter	20 Nos.
			3" diameter	20 Nos.
			6" diameter	3 Nos.
18.	Glass Tubings		1/2 mm.	1 kg.
19.	Glass Rods		1/2 mm.	1 kg.

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MISCELLENIOUS:-

1.	Propipettes	Any make	Able to hold any pipettes from 0.1 ml to 10 ml capacity Rubber or Plastic.	5 Nos.
2.	Test tube Stands	Tarson	To hod 12 Tubes	20 Nos.
3.	Burette stands	--- ---	Metal rod and base with tarson clamp.	20 Nos.
4.	Rubber Crock		To fit in concial flasks of all capacity.	20 each
5	Procelain Giazed tiles		6x6"	20 Nos.
6.	Mortor and Pestal	---	6" diameter	1 Nos.

B.SC. FINAL (SEMESTER-V)
17 : MICROBIOLOGY

The examination shall comprise of two theory papers, one in each semester and one practical in each Semester. Each theory paper will be of 3 hours duration and carry 80 marks. The internal assessment will carry 20 marks. The following syllabi is prescribed on the basis of six lectures per week and 6 practical periods per batch per week. Each theory paper have been devided into 6 units. There shall be one question on each unit, will internal choice and for each of 12 marks and one compulsory question covering all the syllabus of semester V(8 marks).

5S MICROBIOLOGY
(Environmental Microbiology and Bioinstrumentation)

Unit-I : Microbial Associations and Air Microbiology

A. Microbial Associations : Definition and examples of positive(Mutualism, Commensalism, Synergism), negative (Antagonism,Competition, Parasitism) and neutral association.

B. Air Microbiology

a) The atmosphere and its layers.

b) Different types of microorganisms in air.

c) Techniques for microbiological analysis of air:

i) Solid impingement devices

ii) Liquid impingement devices.

d) Airborne diseases : Etiology, symptoms and prevention.

e) Control of microorganisms in air.

Unit-II : Microbiology of Soil.

a) Microorganisms in soil.

b) Rhizosphere.

c) Decomposition of plant and animal residues in soil.

d) Definition, formation, function and microbiology of humus and compost.

e) Biological Nitrogen fixation : Type of nitrogen fixing microorganisms, factors affecting and mechanism of symbiotic and non-symbiotic nitrogen fixation. Process of nodulation, nitrogenase complex, recombinant DNA and nitrogen fixation, legume inoculants.

f) Cycles of elements in nature :

i) Carbon cycle : CO2 fixation, organic carbon degradation.

ii) Nitrogen cycle : Proteolysis, amino acid degradation, Nitrification, Denitrification, Degradation of nucleic acids.

iii) Sulphur cycle

Iv) Phosphorus cycle.

v) Biofertilizers, biological pest control.

Unit III : Water Microbiology

a) Planktons : Definition, types, factors affecting growth of planktons, methods of enumeration, beneficial and harmful activities of planktons.

b) Control of plankton problems

c) Eutrophication and its control.

Unit IV : Assessment of Water Quality and Treatment

Bacteriological analysis of water:

i) Significance of bacteriological analysis of water.

ii) Collection and handling of water sample from various sources.

iii) Indicators of excretal pollution.

iv) Multiple tube dilution technique, MPN.

v) IMViC classification of coliform.

vi) Membrane filter technique for coliform and faecal Streptococci.

vii) ICMR and WHO Bacteriological standards of drinking water.

Unit V : A) Water Treatment

a) Self purification of water : Various zones and factors responsible for self purification.

b) Treatment of water : Aeration, Coagulation, Flocculation, Sedimentation and Filtration.

c) Slow and Rapid sand filters : Construction, mechanism of filtration, differences.

d) Methods of chlorination : Plain, super chlorination, ammoniachlorine treatment, Break-point chlorination

B) Waste Water Treatment

a) Aims of sewage treatment, composition of sewage.

b) Muncipal sewage treatment plant.

c) Preliminary treatment (seiving and Grit chamber)

d) Primary treatment(sedimentation)

e) Secondary treatment (Aerobic)

i) Trickling filter

ii) Activated sludge process

iii) Oxidation pond

f) Anaerobic sludge digestion

Zoology

M.Sc. Sem II

M.Sc.I : Zoology

Semester – II

PAPER VIII

ENVIRONMENT AND ECOLOGY

Unit-I :

1.1. The Environment:

1.1.1 Physical environment;

1.1.2 Biotic environment;

1.1.3 Biotic and abiotic interactions.

1.2. Habitat and niche:

1.2.1 Concept of habitat and niche; niche width and overlap; fundamental and realized niche; resource partitioning; character displacement.

1.3. Population ecology: Characteristics of a population; population growth curves; population regulation; life history strategies (r and k selection); concept of metapopulation, demes and dispersal, interdemic extinctions, age structured populations, Diversity Index: Simpson's index, Shannon's index

1.4. Species interactions: Types of interactions, interspecific competition, herbivore, carnivores, pollination, symbiosis.

Unit II :

2.1. Community ecology:

2.1.1 Nature of communities; community structure and attributes;

2.1.2 Levels of species diversity and its measurements;

2.1.3 Edges and ecotones.

2.2. Ecological succession: Types; mechanisms; changes involved in succession; concept of climax.

2.3. Ecosystem:

2.3.1 Structure and function; energy flow and mineral cycling (CNP);

2.3.2. Primary production and decomposition;

2.3.3. Structure and function of some Indian ecosystems;

2.3.3.1. Terrestrial (forest, grassland).

2.3.3.2. Aquatic (fresh water, marine, estuarine).

2.4. Biogeography:

2.4.1. Major terrestrial biomes;

2.4.2. Theory of island biogeography;

2.4.3. Elementary idea of, bioigeographical zones of India.

Unit III :

3.1. Environmental Pollution-

3.1.1. Sources nature and effects of air pollutants

3.1.2. Sources nature and effects of Water pollution

3.1.3 Biodegradation and bioremediation

3.1.4 Biotechnological methods for Management of pollution

3.2. Global climate change; Global warming, Global dimming,

3.3 Biodiversity-statuses;

3.3.1. Monitoring and documentation;

3.3.2. Major drivers of biodiversity change;

3.3.3. Biodiversity management approaches,

3.3.4. Economics of Biodiversity

Unit-IV :

4.1 Conservation biology:

4.1.1. Principles of conservation; major approaches to management, Indian case studies on conservation/management strategy:

4.1.2. Sanctuaries and National Parks,

4.1.3. Project Tiger,

4.1.4. Biosphere reserves.

4.2 Toxicology

4.2.1. Metabolism & effects of Organochlorine, organophosphate and carbamate pesticides

4.2.2 Metabolism & effects of alkaloids, barbiturates, alcohol & cyanides.

4.2.3. Metabolism & effects of heavy metal salts.

4.2.4. Formation & effects of free radicals.

4.2.5. Biochemistry of Detoxification – Phase I & phase II reactions.

COP Ecotourism and Wild Life Photography

GUIDELINES TO PREPARE THE SYLLABUS FOR CERTIFICATE COURSE IN ECO-TOURISM & WILD LIFE PHOTOGRAPHY UNDER THE CAREER ORIENTED PROGRAMME

UNIT I ENVIRONMENT & ECOLOGY.

1.1 Environment : Defination, Classification

1.2 Natural Resources : Defination, Classification, Types (Renewable & Non renewable)

1.3 Ecology : Defination, principles, scope of ecology, Ecological factors.

1.4 Community ecology : Defination, species diversity, ecological niche, ecotons.

1.5 Population ecology : Defination, Characteristics, Inter specific relationship, Naturalism, commensalisms, parasitism, predation, competition.

UNIT II ECOSYSTEM

2.1 Ecosystem, definition, components, structures.

2.2 Food Chains

2.3 Ecological pyramids

2.4 Energy flow models

2.5 Ecological indicators

UNIT III ECOTOURISM

3.1 Ecotourism : Defination & Scope of ecotourism.

3.2 Potential of ecotourism in Vidarbha region.

3.3 Tiger Reserve : Melghat, Pench, Tadoba.

3.4 Sanctuaries & National parks – Navegaon, Nagzira, Katepurna, Bor, Tipeshwar.

3.5 Forts, Caves & Temples : Narnala, Gawilgarh, Salbardi, Muktagiri, Markanda.

UNIT IV		GUIDE TRAINING :
	4.1	Communication skills
	4.2	Tourist rules do's & don'ts
	4.3	Knowledge about interesting facts & interpretation centre.
	4.4	Knowledge about mammals, Birds, Insects & Trees, animal tracks signs,
	4.5	Importance of Guide in Ecotourism.
UNIT V		PHOTOGRAPHY
	5.1	History and Evolution of Camera.
	5.2	Parts of camera, types of camera.
	5.3	Types of lenses.
	5.4	Use of filter, study of aperture and speed.
	5.5	Use of computer in photography.

PRACTICALS

1. Local field visits.
2. Visit to nature reserve, forts, other sites of cultural heritage.
3. Development of a trek route and conducting a trekking activity.
4. Listing of local flora, fauna and describing them.
5. Photography

Syllabus on Professional Ethics

Syllabus on Professional Ethics

Syllabus on Professional Ethics

Computer Software

M.Sc. Sem IV

Unit III : Memory Allocation: Static and dynamic memory allocation,array allocation and access, allocation for strings, structure allocation, common and equivalence allocation. Compilation of expressions.

Unit IV : Compilation of control structures: Control transfers, procedural calls, conditional execution, iteration control constructs.

Unit V : Error detection, indication and recovery. Compilation of I/O statements: Compilation of I/O list, compilation of FORMAT list, the I/O routine, file control.

Unit VI : Code optimization: Major issues, optimizing transformations,local optimizations, program flow analysis, Global optimization, writing compilers

Books:

1. Compiler construction – D.M. Dhamdhere, Macmillan India Ltd.
2. Principles of Compiler Design – Alfred V. Aho, Jeffrey D. Ullman
3. The Theory and Practice of Complier Writing – J.P. Trembly, P.G. Sorenson McGraw Hill Publication
4. Engineering a compiler – K.D.Cooper and Linda Torczon, Elsevier Direct Publ.

Syllabus Prescribed for M.Sc. [Computer Software]

Semester-IV
Paper-4S1-Cyber Security & Digital Forensic

Unit I: Recent amendments in IT Act, internet & web technologies, web hosting and development, attributes in cyberspace and legal framework of cyberspace, hacking, virus, obscenity, pornography, programme manipulation, Copyright, Patent, software piracy, intellectual property rights, trademark, domain disputes, and computer security, etc.

Unit II: Encryption and Decryption methods. Search and seizures of evidence. Investigation of cyber crimes and tools for analysis. Information security: Domains, Common Attacks, Impact of Security Breaches. Protecting Critical Systems (Information Risk Management, Risk Analysis etc) Information Security in Depth Physical security (Data security Systems and network security)

Unit III: Program Security: Secure programs, Non-malicious program errors, Viruses and other malicious code, Targeted malicious code, Controls against program threats File protection mechanism, Authentication: Authentication basics, Password, Challenge response, Biometrics. Network Security: Threats in networks, Network security control, Firewalls, Intrusion detection systems, Secure e-mail, Networks and cryptography, Example protocols: PEM, SSL, IPsec.

Unit IV: Principles of network forensics, Attack Trace back and attributes, Critical Needs Analysis. IDS: Network based Intrusion Detection and Prevention Systems, Host based Intrusion Previnsion System. Cloud Computing-Its Forensic and Security Aspects.

Unit V: Cyber Crime Investigations: Where Evidence Resides on Windows systems, Conducting a Windows investigation, File Auditing and Theft of information, Handling the Departing Employee, Steps in a Unix Investigation, Reviewing Pertinent Logs, Performing Keywords Searches, Reviewing Relevant Files, Identifying Unauthorized User Accounts or Groups, Identifying Rogue Processes, Checking for Unauthorized Access Points, Analyzing Trust Relationships, Detecting Trojan Loadable Kernel Models. Finding Network based Evidence, Generating Session data with TCP Trace, Reassembling sessions using TCP flow and Ethereal.

Unit VI: Open source tools for digital forensics and Registry Forensic- Open source, Open source examination platform, preparing the examination system, using LINUX and Windows as host, Study of Sleuth Kit: Installing Sleuth Kit, Sleuth Kit tools (Volume layer tools, File system Layer tools, Data unit Layer tools, Metadata Layer Tools) Registry Analysis, Understanding Windows Registry and Registry Structure.

Environmental Science

tations, Elsevier Science Publishers, New York. U.S.A.
8. P.K.Gupta Biotechnology.
9. Lea, P.J. and Leegood, R.C. 1999. Plant Biochemistry and Molecular Biology. John Wiley & Sons, Chichester, England.
10. Old, R.W. and Primrose, S.B. 1989 : Principles of Gene Manipulation. Blackwell Scientific Publications, Oxford, U.K.
11. Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue culture, Kluwer Academic Publications, the Netherlands.
12. Devi, P. 2000. Principles and Methods of Plant Molecular Biology, Biochemistry and Genetics, Agrobios, Jodhpur, India.
13. Smith, R.H. 2000. Plant Tissue Culture; Techniques and Experiments. Academic Press, New York.
14. Satyanarayan- Biotechnology.
15. An introduction to industrial Microbiology- Dr. P.K. Sivakumaar & Dr. M.M. Joe & Dr. K. Sukesh- S. Chand publication.
16. Practical Biotechnology and plant tissue culture- Prof. Santosh Nagar & Dr. Madhavi Adhav- S. Chand Publication.
17. Modern practical Botany (Volume-III)- Dr. B.P.Pandey- S. Chand publication.
18. Molecular Biology and Biotechnology- K.G. Ramawat & Dr. Shaily Goyal- S. Chand publication.
19. Comprehensive Biotechnology- K.G. Ramawat & Shaily Goyal- S. Chand publication.
20. Botany for degree students - B.P. Pandey- S. Chand publication.
21. A Textbook of Biotechnology- R.C. Dubey- S. Chand publication

Semester-V
8 : Environmental Science
5S : Environmental Science
(Pollution control technology)

UNIT-I : General approaches of air pollution.

A. Sampling- Ambient and indoor, techniques. Analysis - Cox, Nox, Sox, Spm. Air quality standards, emission standards.

B. Integrated approach of air pollution control: City planning, zoning, source correction methods. National and International steps to control green house gases.

UNIT-II: Air Pollution control Techniques.

A. Control devices : Gravitational settling chambers; cyclone separators; fabric filters; electrostatic precipitators; wet collectors and scrubbers. Combustion-flaring, thermal incineration, catalytic oxidation. Control of other gaseous pollutants-odour, VOCs, oxides of sulphur and nitrogen emissions.

B. Auto Gaseous Emission Control - Control of auto-exhausts emissions. Use of after burners, catalytic converters, engine modifications; tuning, importance of good maintenance and driving habits. Alternative fuels.

Unit-III : Physico-chemical Waste Water Treatment Processes :

A. (i) Physical Process - Screening, grit chamber, aeration, oil and grease removal, sedimentation, coagulation, flocculation.

(ii) Chemical Process - Neutralization, chemical precipitation, adsorption, demineralization.

(iii) Biological Process - Activated sludge process, trickling filter, UASB (upflow anaerobic sludge blanket).

B. Sludge - Origin, nature, type, characteristics, treatment and disposal.

Unit-IV : Solid Waste Disposal

A. Management of municipal solid wastes (MSW): Sources, physical composition and characteristics.

B. Disposal methods; Open-dumping and sanitary landfills. Reduction, reuse and recycling of materials. Optional technologies for processing of MSW: Incineration, gasification, pyrolysis

C. Hazardous wastes: Sources and characteristics. Safe storage, transport. Treatment of hazardous waste- Stabilization. Disposal of hazardous wastes. Introduction to Biomedical waste-Concept & classification.

D. Radioactive waste: sources, classification, health and safety aspects. Management of radioactive wastes.

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UNIT-V : Biomedical and Radioactive Waste Treatment

A. Biomedical - Introduction, concept, classification, treatment and disposal (Pit, composting and Incineration)

B. Radioactive waste - Handling, storage and disposal.

C. Case Studies

UNIT-VI : Indoor Safety

A. Definition and concepts: Precautions in the processes and operations involving explosives, flammables, toxic substances.

B. Health Safety : Respiratory personal protective equipment (RPPE) & non respiratory personal protective equipment (NRPPE). Selection, use care and maintenance of non respiratory protective equipment. NRPPE: head protection , ear protection , face and eye protection , hand protection, foot protection and body protection.

Practical - 5

1. Preparation of windrose diagram of an area.
2. Determination of NO_x, SO_2 in an ambient air.
3. Measurement of Smoke Density.
4. Elemental analysis of sludge.
5. Estimation of organic matter from soil/sludge.
6. Determination of CO_2 in the atmosphere by volumetric method.
7. Determination of energy content of plants by Bomb Calorimeter.
8. Determination of physical parameters of
   i) well water ii) Industrial or given type of effluent
   iii) River Water iv) Sea wa
9. Determination of heavy metals (Fe/ Cr /Cu) by spectrophotometric methods from waste water.
10. Detection/ estimation of Cr (VI) in presence of Cr III
11. Determination of hydrocarbon from fuel gas using Orsat's apparatus
12. Determination of Chemical Oxygen Demand value for industrial waste effluent.
13. Determination of NO_2 from the atmosphere by colorimetric method using high volume sampler
14. Estimation of mixed liquor suspended solids (MLSS) in activated sludge.

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15. Reduction of hardness by ion exchange method.
16. Estimation of fluoride in waste water.
17. Determination of energy content in biomass (Bomb Calorimetry).
18. Estimation of Na^+ and K^+ in water / effluent samples using flame photometer
19. Calibration of air sampling equipments.
20. Noise, illumination, ventilation and heat stress measurements - Industry
21. Preparation of Material Safety Data Sheet for laboratory chemicals.

Note:

1. Visit to Drinking / effluent treatment plant.
2. Industrial visit

Distribution of practical Marks (Duration 6 hours)

1.	Long Experiments (Water & air)-	20
2.	Short Experiment-	10
3.	Study visit-	10
4.	Practical record-	05
5.	Viva-voce-	05
	Total	50

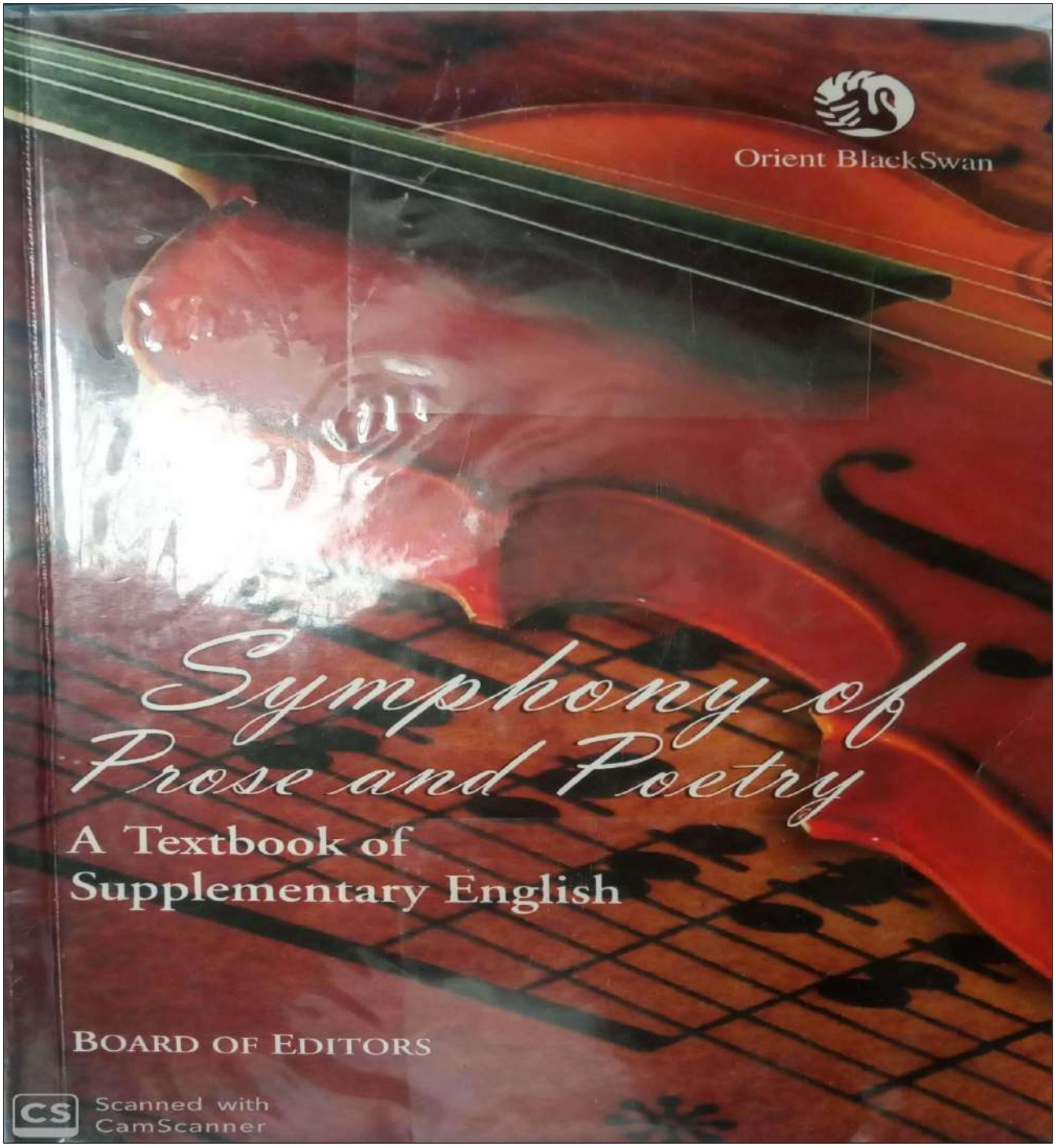
Equipments :-

1) Flame photometer
2) Orsat Apparatus
3) COD Reflux assembly
4) High volume sampler
5) Bomb Calorimeter
6) Noise level meter
7) Lux meter.

Reference Books:

1. Environmental Sciences - Jackson and Jackson
2. Environmental Sciences - Tuckar (1990)
3. Introduction to Environmental Chemistry – A K De
4. Pollution control in process industries – S P Mahajan. Tata McGraw Hill pub. New Delhi
5. Water and Waste water technology – M.J Hammer, John Wiley A & sons, New York 1986.
6. Introduction to wastewater treatment process – R.S Ramalho

Language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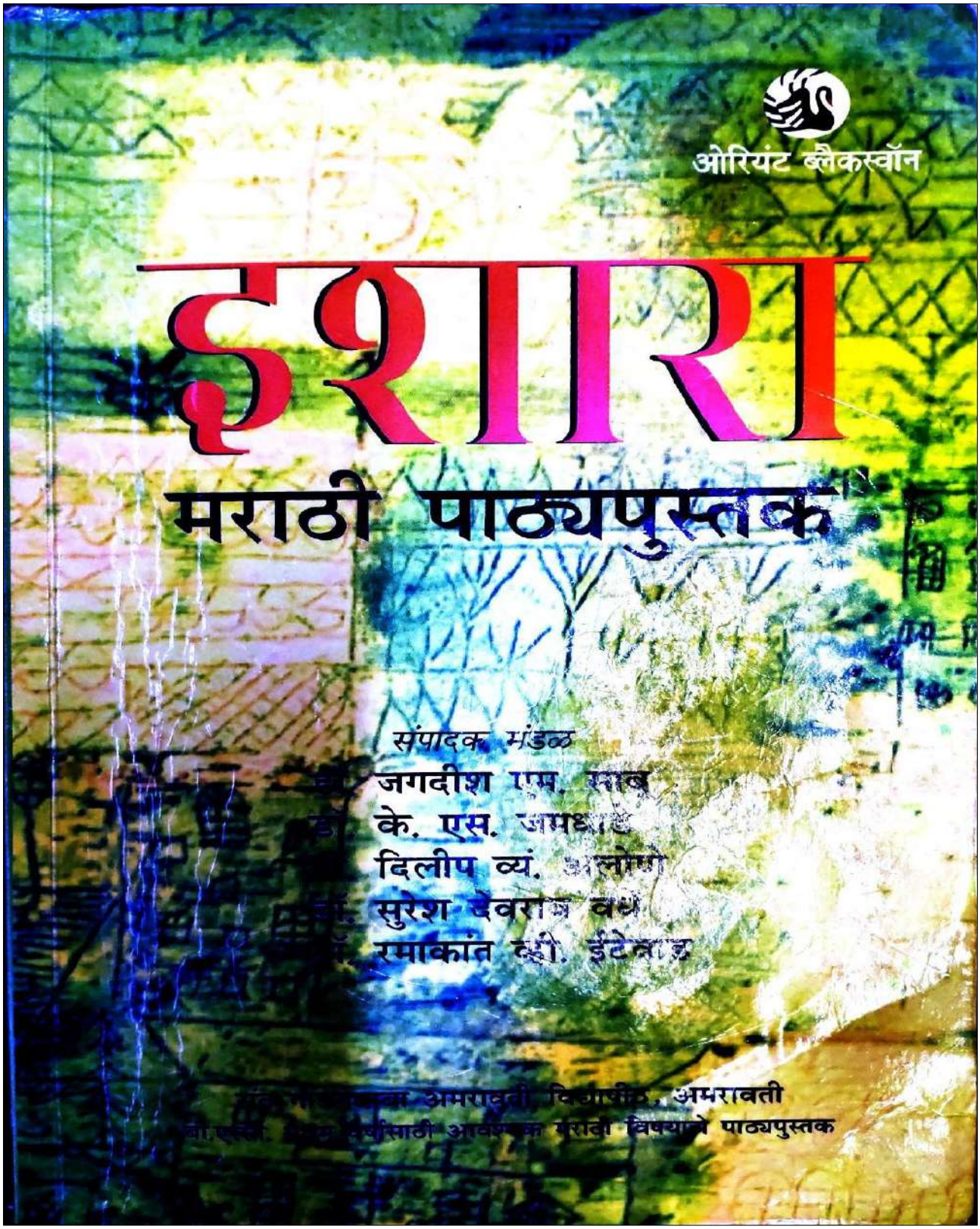
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रमाकांत
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पाठ्यपुस्तक

अनुक्रमणिका

सत्र १

घटक अ (गद्य)

घटक ब (पद्य)

घटक क (व्यावहारिक मराठी)

सत्र २

घटक अ (गद्य)

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Syllabus for Forensic Sciences (Sem I and II)

SANT GADGE BABA AMRAVATI UNIVERSITY,AMRAVATI

SYLLABUS PRESCRIBED FOR GENERAL EDUCATION COMPONENT
B.VOC.PART-I (VOCATION) FORENSIC SCIENCE

SEMESTER – I

General Component Paper - I

SUBJECT CODE: 1 BVCGCFS 1:

ENGLISH AND COMMUNICATIONS SKILL-1

Unit-I) Revising English Grammar: Articles, prepositions, adjectives.
Unit-II) Written Communication: letter writing (customer complaints, general complaints, seeking information, placing orders)
Unit-III) Reading Skills: Scanning and Skimming, reading comprehension, summarizing.
Unit-IV) Communication Skills: language functions(greeting ,taking leave, thanking, apologizing, introducing self)

PRACTIAL: 1 BVCGCFS 5
Practical based on above units

Recommended books:

1. Bhaskaran & Horsburgh, Strengthen Your English, OUP(Unit 1)
2. Patil,Valke,Thorat & Merchant.English for practical purposes.Macmillan (Unit 2,3 &4)
3. Dwivedi & Kumar.Macmillan Foundation English.Macmillan

General Component Paper - II

SUBJECT CODE: 1 BVCGCFS 2: APPLIED COMPUTER SKILL-1

Unit-I) Word Processing:
Introduction, Starting word, Creating document, Structure of Ms-word window and its application, Mouse & keyboard operations, designing a document; formatting-selection, cut, copy, paste, toolbars, operating on text; printing, saving, opening, closing of document; creating a template.
Unit-II) Tables, borders, textbox operations; spelling and grammar check, Mail Merge Envelope and Label, Protection of document; Change the view of document.
Unit-III) Power Point Presentation- Working with Power Point window, Standard Toolbar ,Formatting Toolbar ,Moving the Frame, Inserting Clip Art, Picture ,Slide; Text Styling, Send to Back.
Unit-IV) Entering Data to Graph, Organization Chart, Design Template, Master Slide, animation Setting, Saving and Presentation ,Auto Content Wizard, Package for CD (Pack & Go Feature)

PRACTICAL: 1 BVCGCFS 6
Practical based on above units

Reference Books:

1. Information Technology Concepts by Dr. Madhulika Jain, Shashank & Satish Jain, [BPB Publication,New Delhi.]
2. Fundamentals of Information Technology By Alexis And Mathews Leon[Leon Press,Chennai & Vikas Publishing House Pvt.Ltd. New Delhi]
3. Computer Fundamentals by P.K.Sinha.

B. Voc. FORENSIC SCIENCE

Semester - I Theory

Skill Development Component Paper - I

1 BVCSCFS 3: Basics of Forensic Science-I

Total Marks	Lecture Per Week	Credit
50	3	3

Units with Description	Total Lectures
SEMISTER – I	
UNIT: I – CRIME SCENARIO IN INDIA:	12 Lectures
Introduction to crime and history Sociological aspects of crime and criminals in society Types of crime and its causes – property crimes, public order crimes, violent crimes, cyber crimes, juvenile delinquency Society-Criminal interaction and various types of crimes in India Criminal behavior - Theories and literature studies, criminal inheritance and factors responsible	
UNIT: II – CRIMINOLOGY & LAW:	12 Lectures
Procedures involved in detection of crime – latest evidence based research in detection and prevention of crime Administrative steps towards crime prevention Different agencies involved in crime detection and prevention Indian Police System – State & Central level, The Police Act of 1861, Medico-legal experts, Judiciary system	
UNIT: III – DEVELOPMENTAL GROWTH OF FORENSIC SCIENCE:	12 Lectures
Introduction to Forensic science – nature, need and function Laws and Principles, basics of Forensic Science Historical development and scope of Forensic Science in India	

B. Voc. FORENSIC SCIENCE

Semester I - Practical

1 BVCSCFS 7: Basics of Forensic Science-I-Lab

Total Marks	Lecture Per Week	Credit
50	6	3

Sr. No.	Name of the experiments
1	Collection and Handling of toxicological samples
2	Collection and Handling of Petroleum samples
3	Collection and Handling of biological samples
4	Study of explosion crime scene (e.g. Bomb Blast scene)
5	Collection and Handling of firing crime scene samples
6	Collection and Handling of Hit and run crime scene samples
7	Collection and Handling of fire crime scene samples

Note: Minimum 05 experiments should be conducted.

Skill Development Component Paper - II

1 BVCSCFS 4: Basics of Forensic Chemistry-I

Total Marks	Lecture Per Week	Credit
50	3	3

Units with Description	Total Lectures
SEMISTER - I	
UNIT: I - LIQUID STATE AND SOLUTIONS:	12 Lectures
Liquid state: Free volume of liquid and density measurement, Physical properties of liquid, vapor pressure, surface tension, surfactants, viscosity, molar refraction, optical activity, structure of liquid **Solutions**: Method of exploring concentration of solutions, binary liquids, vapor pressure, composite diagram of binary liquids and solutions, distillation, fractional distillation, vacuum distillation	
UNIT: II - CHEMICAL THERMODYNAMICS AND CHEMICAL KINETICS:	12 Lectures
Chemical thermodynamics and kinetics, first law of thermodynamics, internal energy, enthalpy, second law of thermodynamics, entropy and its significance, free energy and work function (emphasis on definition and significance of final mathematical equation) Rate of reaction, order & molecularity of reaction, first order reaction, half life period of first order reaction, activation energy, temperature dependence of activation energy, explosive reactions. Michel-Mentalis equation significance (emphasis on definition and significance of final mathematical equation)	
UNIT: III - INTRODUCTION OF PERIODIC TABLE :	12 Lecturers
Study of Modern Periodic Table, Long form of Periodic Table, periodic properties, atomic radii, ionization potential, electron affinity, electro negativity, metallic characters, Non- metallic characters and Biological significance of element (Macro and Micro).	

1 BVCSCFS 8: Basics of Forensic Chemistry-I-Lab

Total Marks	Lecture Per Week	Credit
50	6	3

Practical: - Basic of Forensic Chemistry-I

Sr. No.	Name of the experiment
1	To determine coefficient of viscosity of unknown liquid by Ostwald's viscometer (Density measurement is must).
2	To determine surface tension of a given unknown liquid by Stalagmometer (Density measurement is must).
3	To study hydrolysis of methyl acetate catalysed by an acid (Study of first order reaction)
4	**Inorganic micro / semi micro qualitative analysis:** (Min. 5 Mixtures) Semi-micro qualitative analysis of inorganic salt mixture containing two acidic radicals and two basic radicals of same or different groups. At least 5 mixtures to be given: Analysis of basic radicals to be done by using spot test reagents. Following radicals to be given carbonate, nitrite, sulphite, sulphide, chloride, bromide, iodide, nitrate and sulphate, silver(I), Mercury(I) lead(II), copper(II), bismuth(III), cadmium(II), tin(II), arsenic(III), antimony(III), iron(III), chromium(III), aluminium(III), nickel(II), cobalt(II), manganese(II), zinc(II), calcium(II), strontium(II), barium(II), magnesium(II).

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

SYLLABUS PRESCRIBED FOR GENERAL EDUCATION COMPONENT
B.VOC. PART-I (VOCATION) FORENSIC SCIENCE

SEMESTER-II

General Component Paper - I

SUBJECT CODE: 2 BVCGCFS 1:

ENGLISH AND COMMUNICATIONS SKILL-II

Unit-I) Revising English Grammar: modal auxiliaries ,adverbs and adverbial phrases.
Unit-II) Written Communication: Job application, resumes, responding to advertisements.
Unit-III) Reading Skills: Note making, distinguishing facts from beliefs, opinions.
Unit-IV) Communication Skills: Language Functions (asking for information, requesting, agreeing and disagreeing, complimenting and responding to compliments)

PRACTICAL: 2 BVCGCFS 5:
Practical based on above units

Recommended Books :

1) Bhaskaran & Horsburgh, Strengthen Your English, OUP(Unit 1)
2) Patil, Valke, Thorat & Merchant.English for practical purposes.Macmillan (Unit 2,3 & 4)
3) Dwivedi & Kumar.Macmillan Foundation English.Macmillan

General Component Paper – II

SUBJECT CODE: 2 BVCGCFS 2: APPLIED COMPUTER SKILL-II

Spreadsheet Package
Unit-I) Introduction to Ms-Excel, Navigating Toolbars and Operations, Formatting Features-Copying Data between Worksheets; Entering and Editing Cell Entries, Creation of charts, Editing and Formatting Charts.
Unit-II) Goal Seek, Auditing ,Linking, Workbook, Database in Excel(Auto filter, Advance Filter, Sort, Form)Mathematical ,Statistical and Financial Functions in Ms-Excel.
Unit-III) MS-Access-Introduction to database management s ystem. DBMS vs RDBMS.
Unit-IV) Database Administrator (DBA) and its role.

PRACTICAL: 2 BVCGCFS 6:
Practical based on above units

Reference Books:

1) Data Base System concepts By A SilbersChatz By Henry Korth And S.Sudarshan –Mcgraw-Hill ltd. New Delhi] 3rd Edition.
2) Introduction to Data Base Management by NAVEEN PRAKASH [Tata McGrawHill ltd.]
3) Bipin C. Desai,An Introduction to Database Systems,Galgotia Publications.
4) Raghu Ramkrishnan & Johnnes Gerhrke"Data Base Management Systems"Mc Graw Hill International Edition,2000.

B. Voc. FORENSIC SCIENCE

Semester II – Theory

Skill Development Component Paper - I

2 BVCSCFS 3: Basics of Forensic Science-II

Total Marks	Lecture Per Week	Credit
50	3	3

Units with Description	Total Lectures
SEMISTER – II	
UNIT: I - FORENSIC SCIENCE LABORATORIES AND FACILITIES:	12 Lectures
Growth of Forensic Science Laboratories in India – Central and State level laboratories Educational setup in Forensic Science in India Services and functionalities provided by various FSLs Various divisions in the FSL – Ballistics, Biology, Chemistry Documents, Physics, Psychology, Serology, Toxicology	
UNIT: II - CRIME SCENE MANAGEMENT:	12 Lectures
Types of crime scenes – primary, secondary, crime scenes based on size of evidence Crime scene Management – initial response, role of first responding officer, duty management Forensic Scientists, Investigating officers and their assigned role and duties Role of the Police and Judiciaries, Fire Brigade, Medico-legal officers and other experts	
UNIT: III - PHYSICAL EVIDENCE COLLECTION & PACKAGING:	12 Lectures
Physical evidence, types and importance in a criminal investigation Protecting a scene of crime – various steps involved, contamination issues. Recovery and preservation of samples from a crime scene – biological, toxicological, petroleum, explosives, trace items, projectiles and bullets	

B. Voc. FORENSIC SCIENCE

Semester II - Practical

2 BVCSCFS 7: Basics of Forensic Science-II-Lab

Total Marks	Lecture Per Week	Credit
50	6	3

S. No.	Name of the experiment
1	Study of Explosion Crime Scene Sample
2	Collection and handling of Fire-arm crime scene samples
3	Collection and Packaging of Hit and run crime scene samples
4	Collection and Packaging of Arson crime scene samples

2 BVCSCFS 4: Basics of Forensic Chemistry-II

Total Marks	Lecture Per Week	Credit
50	3	3

Units with Description	Total Lectures
SEMISTER – II	
UNIT: I – INTRODUCTION OF ANALYTICAL TECHNIQUES:	12 Lectures
Introduction of Volumetric analysis: Standard solution and primary standard substance, Terms to express concentrations, Acid-base or neutralization titration, Choice of indicators in different acid base titrations, Redox titrations, Indicators used in Redox titrations, **Introduction of Gravimetric analysis**: Steps involved in the estimation of Barium Gravimetrically.	
UNIT: II – INTRODUCTION OF INORGANIC AND ORGANIC CHEMISTRY:	12 Lectures
Empirical and molecular formulae, hybridization, nature of chemical bonding, polarization, hydrogen bonding, Van der walls forces IUPAC nomenclature of alkanes, alkenes, haloalkanes, alcohol, ether, aldehydes, ketones, carboxyhc acids, nitro compounds, Reactive intermediates and related reactions	
UNIT: III – INTRODUCTION OF CHEMICAL COMPOUNDS:	12 Lectures
Heterocyclic Chemistry: Natural products, Petroleum products, insecticides, pesticides etc.	

2 BVCSCFS 8: Basics of Forensic Chemistry-II-Lab

Total Marks	Lecture Per Week	Credit
50	6	3

Practical: Basic of Forensic Chemistry-II

Sr. No.	Name of the experiment
1	Find out exact normality of H_2SO_4 solution using NaOH as an intermediate solution and 0.1 N oxalic acid as a standard solution by preparing 0.1N H_2SO_4 solution.
2	To determine the acid neutralizing capacity (ANC) of an antacid.
3	To determine the strength of oxalic acid by titration with $KMnO_4$.
4	Gravimetric estimation of Ba^{2+} on a $BaSO_4$ by using silica crucible.
5	**Identification of organic compound:** Complete analysis of simple organic compounds containing one or two functional groups and involving following steps: 1) Preliminary examinations 2) Detection of the elements 3) Detection of functional groups 4) Determination of m.p./ b.p. 5) Preparation of derivative and its m.p./ b.p. 6) Performance of spot test if any. Minimum 5 compounds containing different groups should be identified by student: Acids: Oxalic acid, Succinic acid, Benzoic acid, Salicylic acid, Phthalic acid and Sulphanilic acid. Nitro compounds: Nitrobenzene, m-dinitrobenzene. Amides: Benzamide, Urea, Thiourea. Aldehydes : Benzaldehyde, Glucose, Lactose.

On the job Training (OJT)

(Internship / Training / Project)

To learn by training:

- Crime Scenario in India
- Criminology & Law
- Developmental Growth of Forensic Science
- Liquid State and Solutions
- Chemical Thermodynamics and Chemical Kinetics

List of Books: B.Voc. Forensic Science: First Year B.Voc.

Basics of Forensic Science:

1. Analytical Techniques in Biochemistry & Molecular biology By Rajan Katoch
2. Introduction to Forensic Science in Crime Investigation By Dr.(Mrs.) Rukmani Krishnamurthy
3. Henry Lee's Crime Scene Handbook by Henry C Lee
4. Forensic Biology by Shrikant H. Lade
5. Crime Scene Processing and Laboratory Work Book by Patric Jones
6. Forensic Science: An Introduction to Scientific and Investigative Techniques 3rd ed. by Stuart H. James
7. Criminalistics: An Introduction to Forensic Science, 9th ed. By Richard Saferstein
8. Compute Crime and Computer Forensic by Dr. R.K. Tiwari
9. Criminal Profiling: An Introduction to a Behavioral Evidence Analysis, 3rd ed. By Brent E. Turvey
10. Forensic Science in Criminal Investigation and Trial, 4th ed. By B.R. Sharma
11. Handbook of Forensic Psychology by Dr. Veerraghavan
12. Crime Scene Management with Special Emphasis on National level Crime Cases by Dr. Rukmani Krishnamurthy under publishing
13. Text Book of Medical Jurisprudence, Forensic Medicine and Toxicology by Parikh C.K. 13. The Identification of Firearms and Forensic ballistics by Barrard and Gerald

Basics of Forensic Chemistry:

1. Thermodynamics for Chemists by S, Glasstone
2. Principles f Physical Chemistry and Puri, Sharma and Pathania
3. Advanced Inorganic Chemistry by Madan, Malik and Tuli
4. Concise Inorganic Chemistry by J.D. Lee
5. Organic Chemistry by Moris and Boyed
6. Heterocyclic Chemistry by Gupta and Kumar Vol I and Vol II
7. Insecticides with Modes of Action by I. Ishaya and D. Deghilee
8. Natural Products by S.V. Bhat
9. Instrumental Analysis by Skoog, Holler and Crouch
10. Practical Books:
11. Physical Chemistry Parcticals by J.B. Yadav
12. Qualitative Analysis by Vogel

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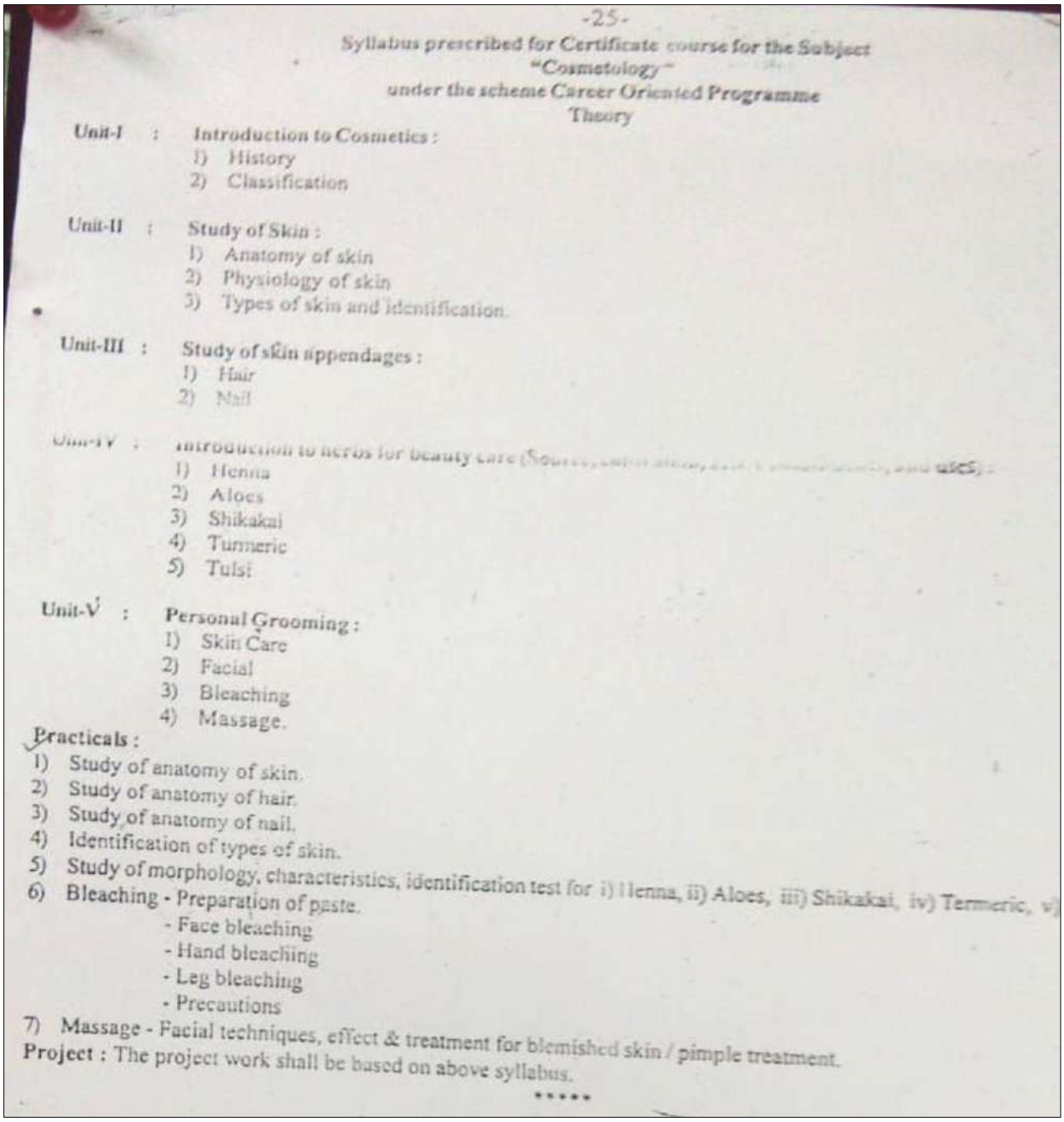
COP Cosmetology



-25-

Syllabus prescribed for Certificate course for the Subject
"Cosmetology"
under the scheme Career Oriented Programme
Theory

Unit-I : Introduction to Cosmetics :
1) History
2) Classification

Unit-II : Study of Skin :
1) Anatomy of skin
2) Physiology of skin
3) Types of skin and identification.

Unit-III : Study of skin appendages :
1) Hair
2) Nail

Unit-IV : Introduction to herbs for beauty care (Source, [illegible] and uses) :
1) Henna
2) Aloes
3) Shikakai
4) Tumeric
5) Tulsi

Unit-V : Personal Grooming :
1) Skin Care
2) Facial
3) Bleaching
4) Massage.

Practicals :
1) Study of anatomy of skin.
2) Study of anatomy of hair.
3) Study of anatomy of nail.
4) Identification of types of skin.
5) Study of morphology, characteristics, identification test for i) Henna, ii) Aloes, iii) Shikakai, iv) Termeric, v)
6) Bleaching - Preparation of paste.
   - Face bleaching
   - Hand bleaching
   - Leg bleaching
   - Precautions
7) Massage - Facial techniques, effect & treatment for blemished skin / pimple treatment.

Project : The project work shall be based on above syllabus.

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COP Clinical Laboratories Technique

SYLLABUS PRESCRIBED FOR CERTIFICATE COURSE IN CLINICAL LABORATORY TECHNOLOGY.

THEORY

Unit I : Anatomy

Anatomical structure and location/distribution of different part of human body with anatomical terms andplanes.

- Gastro-intestinal tract.
- Salivary glands, stomach, intestine.
- Liver, Gall bladder, spleen, pancreas
- Respiratory system
- Kidneys. Urater, Bladder.
- Testes (male genital organ)
- Ovaries. Uterus, Vagina, Urethra.

Unit II: Physiology

- Blood composition and function.
- Normal counts of blood cells and their function.
- Steps of coagulation, anticoagulants
- CSF
- Blood grouping, ABO and Rh typing.

Cardiovascular system.

- Heart structure and function.
- Blood vessels.
- Circulation
- Pulse, Blood pressure, Electrocardiogram.

Respiratory system.:

- Organs of Respiration.
- Transport of O_2 and CO_2 in the blood.

Excretory System:

- Functions of Kidneys.
- Functions of Glomerular tubules.
- Compositionof normal and abnormal urine.

Digestive System :

- Function of stomach, saliva, gastric juice, pancreatic juice.

Endocrine Glands :

- Defination of endocrine glands, name and Hormones secreted.
- Action of hormones.

Reproductive System :

- Sex organs, male and female.
- Testes and ovaries.
- Contraceptives.

Unit III : Elementry Clinical Biochemistry 10 lectures (5+5)

- Elementry knowledge, handling, maintance, and care of analytical instruments.
  a) Centrifuge
  b) Balance
  c) Colorimeter.
  d) Defination, classification and examples of carbohydrates, proteins, and lipids.

Unit IV : Microbiology 20 lectures (10+10)

1. Introduction to Microbiology, Morphological classfication of Bacteira.
2. Cultivation of bacteria acrobic and anaerobic.
3. Culture media, types of media, special media.
4. Sterilization and Disinfection (Physical and Chemical methods)
5. Morphology and Pathogenicity of Staphlococci, Streptococci, Salmonella, Shigella and Vibrio.
6. Morphology, Pathogenicity and methods of isolation of Mycobacte-rium tuberculosis and Mycobacterium leprae.
7. Antimicrobial susceptibility test.
8. Preservation of stock cultures.

Unit V : Haematology and clinical pathology. 20 lectures (10+10)

1. Introduction to Haematology.
2. Collection of blood - ways of collection.
3. Anticoagulants.
4. Red cell count - Haemocytometry.
5. White cell count - TLC
6. Differential white cell count. (DLC)
7. Absolute Eosinophil count.
8. ESR
9. Haematocrit - Packed cell volume (PCV)
10. Haemoglobin estimation.
11. Red cell Indices MCV, MCH, MCHC.
12. Reticulocyte count.
13. Sickel cell preparation.
14. Osmotic Fragility test

15. Preparation of Bone Marrow.
16. Morphology of Normal andAbnormal cells.
17. Coagulation test.
18. Bleeding time, clotting time.
19. Urine analysis (Normal constituents, Physical examination, chemical examination & Microscopic examination.)
20. Stool Examination (Normal and Abnormal constituents.)
21. C.S.F. Examination (Normal and Abnormal Cell counts and different counts.)
22. Semen Analysis : (Physical examination, Mortality and Morphology)
23. Blood grouping and Blood Banking.

PRACTICALS

Anatomy :

1. Study of permanent slides of cells and tissues.
2. Surface marking of body.
3. Skeletal system, bones and joints.

Physiology :

1. Microscope, usage, maintance, cleaning and minor repair.
2. Osmotic fragility test.
3. Identification of RBC under microscope.
4. DLC, Platelets, Reticulocytes.
5. To obtain sample of plasma and serum.
6. Preparation of oxalate, citrate, fluoride and EDTA anti coagulant Bulbs.
7. Haematocrit (PCV)
8. Neubour's chamber, pipettes (RBC/WBC), western green pipettes.
9. Haemoglobin estimation (By Sahli's method)
10. Blood pressure and pulse.
11. Examination of urine glucose and protein.
12. Record/Report writing.

Clinical Biochemistry :

1. Cleaning of Glassware.
2. Maintenance of laboratory instruments and cleaning.
   i. Centrifuge.
   ii. Colorimeter.
   iii. Spectrophotometer.
   iv. Microscope.
3. Estimation of serum Bilirubin, Blood Sugar, Blood Urea, Serum Creatinine, Uric acid, Cholesterol. Serum Acid phosphatase, Alkaline phosphatase, SGOT, SGPT, Serum Sodium/Potassium.
4. Qualitative and Quantitative estimation of urine sugar and protein.
5. C.S.F. protein, and sugar.

Microbiology

1. Gram staining technique.
2. Acid fast staining (Z-N)
3. Motility by hanging drop method.
4. Cultivation of UTI isolates.
5. Culture and sensitivity test (Kirby-Bauer method)
6. Biochemical test (Glucose, Lactose, Mannitol, Indole, MR, V.P.Citrate)

Haematology and Clinical Pathology.

1. Haemoglobin estimation by Sahli's method.
2. R.B.C. count.
3. TLC
4. DLC
5. Platelet count
6. Reticulocyte count.
7. Bleeding time, clotting time.
8. Examination of blood smear (Perpheral smear)
9. Eosinophil count: LE cell test, E.S.R. sickel cell test.
10. Stool examination for ova, cyst, Amoeba, Exudate, fat globule.
11. Routine Urine analysis.
12. Sputum Analysis.
13. Semen Analysis.
14. C.S.F. examination.
15. Bone Marrow smear Preparation.
16. Blood group: ABO and Rhfactor.

Field work / Project work : Project work / field work involving 90 hrs. minimum laboratory work and based on critical study of any one of the topics included in theory or practical should be completed for Certificate course. Project report of above 30 pages be submitted.

COP Astronomy and Astrophysics

CAREER ORIENTED COURSE SYLLABUS

Certificate Course in Astronomy and Astrophysics

Duration: Annual

Theory: 10 credits of 15 hours each

Unit I **History of Astronomy**

- Pre historic astronomy
- Early ideas of heavens
- Astronomy as tool in every day life and basis for religion.
- Contributions by ancient Hindu, Arabic and Greek astronomers or thinkers like Ptolemy, Aryabhatta, Varahmir, Nicolas Copernicus, Johannes Kepler, Galileo Galili, Tycho Brahe, Issac Newton etc.

Unit II **Sky and Coordinate system in Astronomy**

- Aspect of sky at a given place
- Sky conditions for astronomical observations
- Identification of some prominent stars in the night sky
- Spherical coordinate system.
- Latitude and longitude at a place on the earth.
- Celestial coordinate system (RA and Dec).
- Concept of celestial equator, elliptic and equinoxes.
- Precession of equinoxes.
- Astronomical definition of time.
- Visual magnitude system for stars and planets.

Unit III **Sky observations at night**

- Ideal sky for astronomical observations.
- Constellation including Zodiac belt.
- Sky charts.
- Motion of moon.
- Apparent motion of sun.
- Motion of planets.

Unit IV **Astronomical Instruments -I**

- Sextant : Principle of working and its application for measurement of coordinates of stars and planets.
- Binoculars : Principle of working, field of view, magnifying power, resolving power.
- DSLR camera : Principle of working and its features.

Field work/Project work : Field work/Project work based on critical study of any one of the topics included in theory or practical should be completed for the course.

Training : Training at leading research institute in India.

Practical : Perform at least 15 experiments based on theory paper.

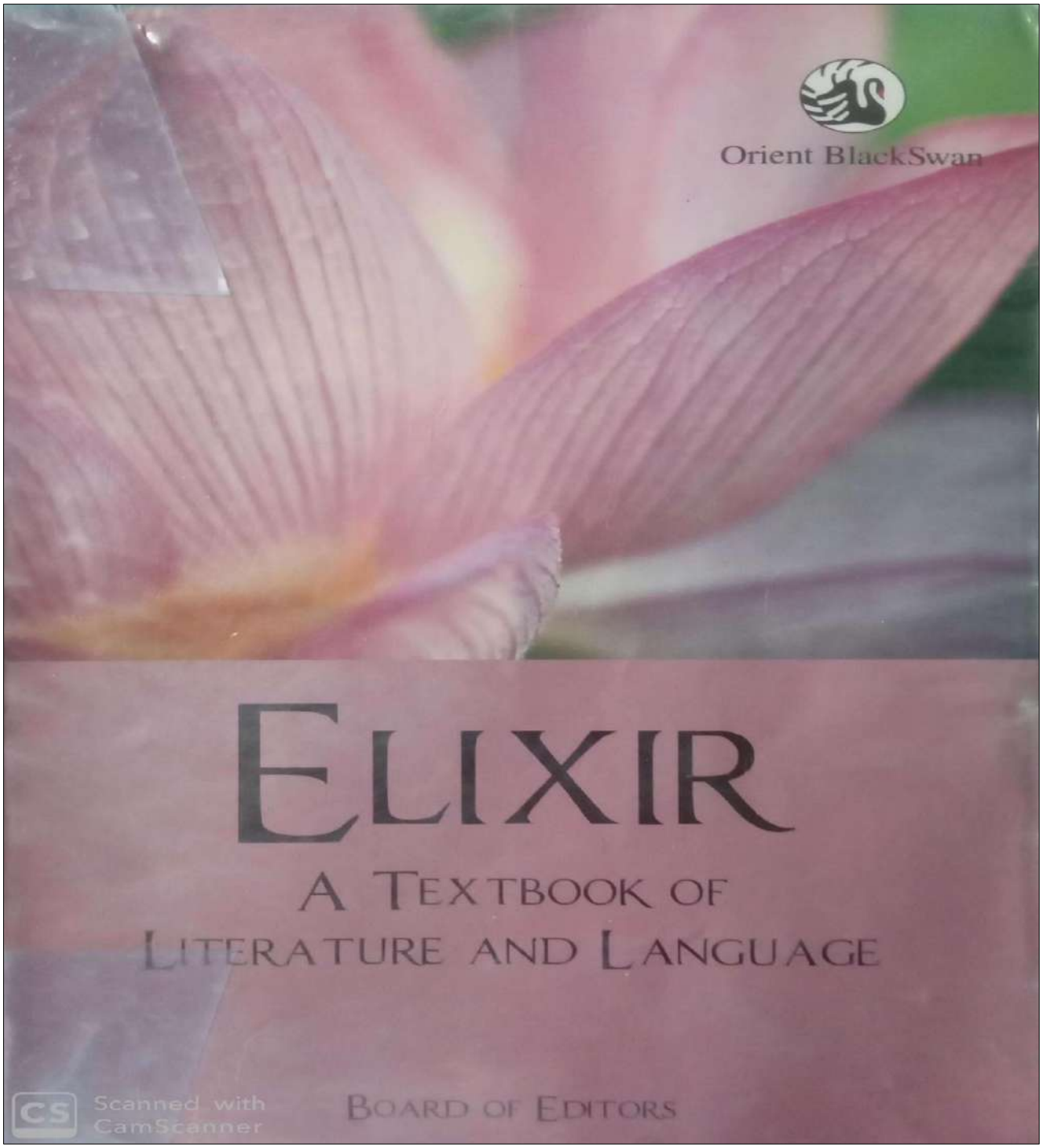
Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Syllabus on Human Values

Syllabus on Human Values

Language


Orient BlackSwan
ELIXIR
A TEXTBOOK OF
LITERATURE AND LANGUAGE
Scanned with CamScanner
BOARD OF EDITORS

Contents

Environmental Science

4S- ENVIRONMENTAL POLLUTION

UNIT I : **Air pollution** – Classification , sources of air pollution, major air pollutants, types of air pollution, effects of air pollutants on plants, , effects of air pollutants on human, effects of air pollutants on materials, status of air pollution in India. (15 Lectures)

UNIT II : **Water pollution** – Definition, sources of water pollution, major pollutants, types of water pollution – fresh water (rivers, streams, ponds, lakes and underground water resources), marine water (coastal and estuarine), effects of water pollution on plants,animals and human beings, eutrophication, water pollution status in India, drinking water quality standards. (15 Lectures)

UNIT III : **Land pollution** – Definition , causes of soil pollution. major soil pollutants, effects of soil pollutants on plants and animals, nutrients in soil (NPK), domestic, municipal, industrial, and agricultural wastes and their relation with soil degradation , soil salination (15 Lectures)

UNIT IV : **Noise pollution** – Definition, sources, effects of noise pollution, psychological and physiological effects of noise pollution, unit of noise, monitoring of noise pollution, noise pollution standards, techniques of measurements of noise pollution, Indian scenario of noise pollution.

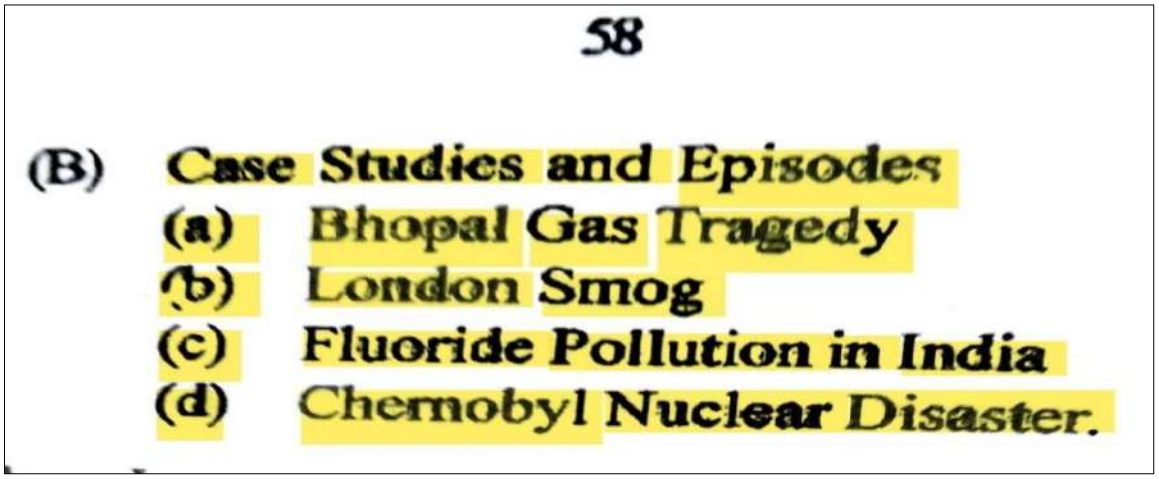
(15 Lectures)

UNIT V : **Radiation pollution** – Definition, sources, major radioactive isotopes, nuclear fusion & fission reactions, units of radiations, application of radioactive isotopes in various field, effects of radioactive pollution, effects of nuclear weapons, radioactive fallout, health and environmental effects of radioactive fallout. (15 Lectures)

UNIT VI : **Major Environmental Issues :**

(A) **Global Warming** - causes, consequences and control measures.

Ozone depletion - mechanism, consequences and control measures.



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(B) Case Studies and Episodes

(a) Bhopal Gas Tragedy

(b) London Smog

(c) Fluoride Pollution in India

(d) Chernobyl Nuclear Disaster.

Sample Case Study: Bhopal Gas Tragedy

Shri. Shivaji Science College Amravati

CASE STUDY ON

Bhopal Gas Tragedy

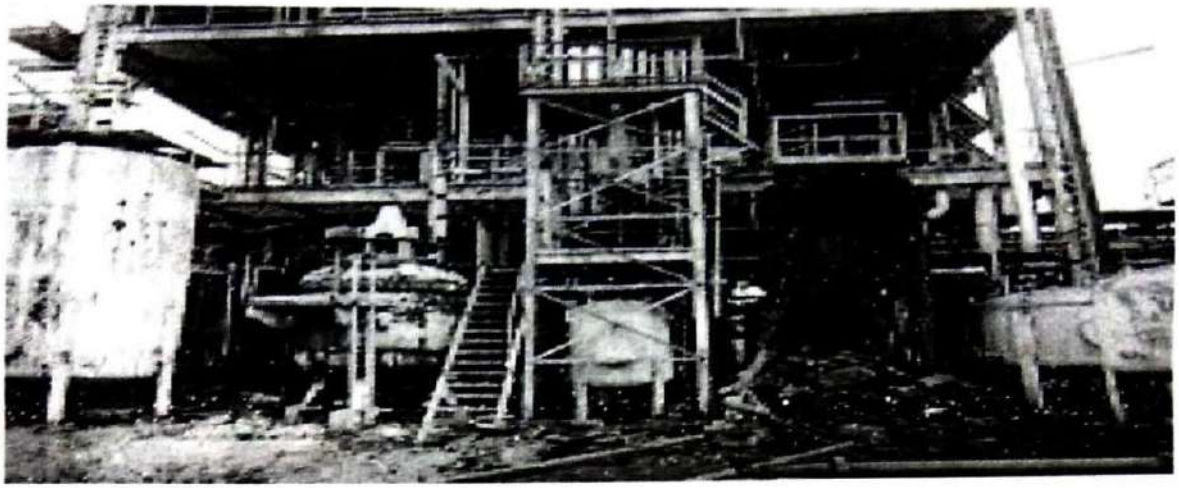
Ku. Shamali N. Deshmukh

Class :- BSC 3rd Year

Case Study Topic :- Bhopal Gas Tragedy

Guided By :- Ingole Madam

BHOPAL GAS TRAGIDY



INTRODUCTION

It occurred on the night of 2–3 December 1984 at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh. Over 500,000 people were exposed to methyl isocyanate (MIC) gas and other chemicals. The toxic substance made its way into and around the shanty towns located near the plant.[2]

Estimates vary on the death toll. The official immediate death toll was 2,259. The government of Madhya Pradesh confirmed a total of 3,787 deaths related to the gas release.[3] A government affidavit in 2006 stated that the leak caused 558,125 injuries, including 38,478 temporary partial injuries and approximately 3,900 severely and permanently disabling injuries.[4] Others estimate that 8,000 died within two weeks, and another 8,000 or more have since died from gas-related diseases.

❖ HISTORY

The Indian government and local activists argue that slack management and deferred maintenance created a situation where routine pipe maintenance caused a backflow of water into a MIC tank triggering the disaster. Union Carbide Corporation (UCC) contends water entered the tank through an act of sabotage.

The owner of the factory, UCIL, was majority owned by UCC, with Indian Government-controlled banks and the Indian public holding a 49.1 percent stake. In 1989, UCC paid $470m ($907m in 2014 dollars) to settle litigation stemming from the disaster. In 1994, UCC sold its stake in UCIL to Eveready Industries India Limited (EIIL), which subsequently merged with McLeod Russel (India) Ltd. Eveready ended clean-up on the site in 1998, when it terminated its 99-year lease and turned over control of the site to the state government of Madhya Pradesh. Dow Chemical Company purchased UCC in 2001, seventeen years after the disaster.

Civil and criminal cases were filed in the District Court of Bhopal, India, involving UCC and Warren Anderson, UCC CEO at the time of the

disaster. In June 2010, seven ex-employees, including the former UCIL chairman, were convicted in Bhopal of causing death by negligence and sentenced to two years imprisonment and a fine of about $2,000 each, the maximum punishment allowed by Indian law. An eighth former employee was also convicted, but died before the judgement was passed. Anderson also died at a nursing home in Vero Beach, Florida on September 29, 2014.

The pre-event phase

The UCIL factory was built in 1969 to produce the pesticide Sevin (UCC's brand name for carbaryl) using methyl isocyanate (MIC) as an intermediate. A MIC production plant was added in 1979.[8][9][10] After the Bhopal plant was built, other manufacturers, including Bayer, produced carbaryl without MIC, though at a greater manufacturing cost. However, Bayer also used the UCC process at the chemical plant once owned by UCC at Institute, West Virginia, in the United States.

The chemical process employed in the Bhopal plant had methylamine reacting with phosgene to form MIC, which was then reacted with 1-naphthol to form the final product, carbaryl. This "route" differed from the MIC-free routes used elsewhere, in which the same raw materials were combined in a different manufacturing order, with phosgene first reacting with naphthol to form a chloroformate ester, which was then reacted with methylamine. In the early 1980s, the demand for pesticides had fallen, but production continued, leading to build-up of stores of unused MIC.

EARLIER LEAKS

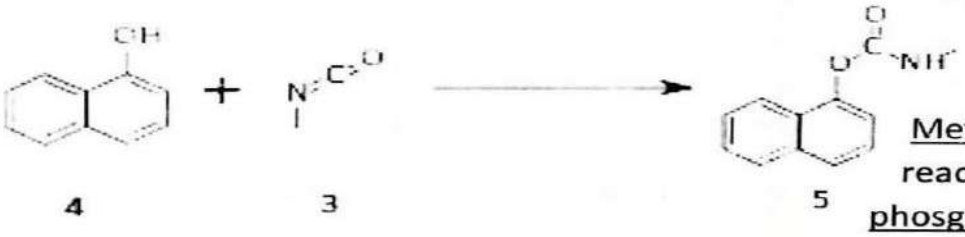
- In 1976, two trade unions complained of pollution within the plant. In 1981, a worker was splashed with phosgene. In a panic, he removed his mask, inhaling a large amount of phosgene gas which resulted in his death the problem as early as 1979, but constructive actions were not undertaken by UCIC at that time. In January 1982, a phosgene leak exposed 2workers, all of whom were admitted to a hospital. None of the workers had been ordered to wear protective

masks. One month later, in February 1982, a MIC leak affected 18 workers. In August 1982, a chemical engineer came into contact with liquid MIC, resulting in burns over 30 percent of his body. Later that same year, in October 1982, there was another MIC leak. In attempting to stop the leak, the MIC supervisor suffered severe chemical burns and two other workers were severely exposed to the gases. During 1983 and 1984, there were leaks of MIC, chlorine, monomethylamine, phosgene, and carbon tetrachloride, sometimes in combination.

Tank 610 in 2010. During decontamination of the plant, tank 610 was removed from its foundation and left aside

REACTION

1 2 3



4 3 5

(1) Methylamine reacts with phosgene (2) producing methyl isocyanate (3) which reacts with 1-naphthol (4) to yield carbaryl (5)

In November 1984, most of the safety systems were not functioning and many valves and lines were in poor condition. In addition, several vent gas scrubbers had been out of service as well as the steam boiler, intended to clean the pipes. Another issue was that Tank 610 contained 42 tons of MIC, more than safety rules allowed for. During the night of 2–3 December 1984, water entered a side pipe that was missing its slip-blind plate and entered Tank E610, which contained 42 tons of MIC. A runaway reaction started, which was accelerated by contaminants, high temperatures and other factors. The reaction was sped up by the presence

exothermic reaction increased the temperature inside the tank to over 200 °C (392 °F) and raised the pressure. This forced the emergency venting of pressure from the MIC holding tank, releasing a large volume of toxic gases. About 30 metric tons of MIC escaped from the tank into the atmosphere in 45 to 60 minutes

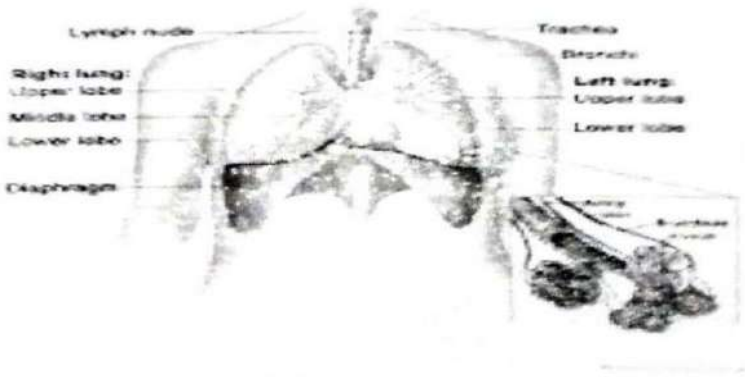
❖ EFFECTS

ACUTE EFFECT

Reversible reaction of glutathione (top) with methyl isocyanate (MIC, middle) allows the MIC to be transported into the body

The initial effects of exposure were coughing, severe eye irritation and a feeling of suffocation, burning in the respiratory tract, blepharospasm, breathlessness, stomach pains and vomiting. People awakened by these symptoms fled away from the plant. Those who ran inhaled more than those who had a vehicle to ride. Owing to their height, children and other people of shorter stature inhaled higher concentrations.

Thousands of people had died by the following morning.



Primary causes of deaths were choking, reflexogenic circulatory collapse and pulmonary oedema. Findings during autopsies revealed changes not only in the lungs but also cerebral oedema, tubular necrosis of the kidneys, fatty degeneration of the liver and necrotising enteritis.[18] The stillbirth rate increased by up to 300% and neonatal mortality rate by around 200%.[

Subsequent legal action

Victims of Bhopal disaster march in September 2006 demanding the extradition of American Warren Anderson from the United States.

Legal proceedings involving UCC, the United States and Indian governments, local Bhopal authorities, and the disaster victims started immediately after the catastrophe. The Indian Government passed the Bhopal Gas Leak Act in March 1985, allowing the Government of India to act as the legal representative for victims of the disaster,[1] leading to the beginning of legal proceedings. In March 1986 UCC proposed a settlement figure, endorsed by plaintiffs' U.S. attorneys, of $350 million that would, according to the company, "generate a fund for Bhopal victims of between $500–600 million over 20 years". In May, litigation was transferred from the United States to Indian courts by U.S. District Court Judge. Following an appeal of this decision, the U.S. Court of Appeals affirmed the transfer, judging, in January 1987, that UCIL was a "separate entity, owned, managed and operated exclusively by Indian citizens in India".[1]

The Government of India refused the offer from Union Carbide and claimed US$3.3 billion. The Indian Supreme Court told both sides to come to an agreement and "start with a clean slate" in November 1988Eventually, in an out-of-court settlement reached in February 1989,

Union Carbide agreed to pay US$470 million for damages caused in the Bhopal disaster. The amount was immediately paid.

Throughout 1990, the Indian Supreme Court heard appeals against the settlement. In October 1991, the Supreme Court upheld the original $470 million, dismissing any other outstanding petitions that challenged the original decision. The Court ordered the Indian government "to purchase, out of settlement fund, a group medical insurance policy to cover 100,000 persons who may later develop symptoms" and cover any shortfall in the settlement fund. It also requested UCC and its subsidiary UCIL "voluntarily" fund a hospital in Bhopal, at an estimated $17 million, to specifically treat victims of the Bhopal disaster. The company agreed to this

❖LONG TERM EFFECT

Some data about the health effects are still not available. The Indian Council of Medical Research (ICMR) was forbidden to publish health effect data until 1994. A total of 36 wards were marked by the authorities as being "gas affected," affecting a population of 520,000. Of these, 200,000 were below 15 years of age, and 3,000 were pregnant women. The official immediate death toll was 2,259, and in 1991, 3,928 deaths had been officially certified. Ingrid Eckerman estimated 8,000 died within two weeks. The government of Madhya Pradesh confirmed a total of 3,787 deaths related to the gas release.

Later, the affected area was expanded to include 700,000 citizens. A government affidavit in 2006 stated the leak caused 558,125 injuries including 38,478 temporary partial injuries and approximately 3,900 severely and permanently disabling injuries.

A cohort of 80,021 exposed people was registered, along with a control group, a cohort of 15,931 people from areas not exposed to MIC. Nearly every year since 1986, they have answered the same questionnaire. It shows overmortality and overmorbidity in the exposed group. However, bias and confounding factors cannot be excluded from the study. Because

of migration and other factors, 75% of the cohort is lost, as the ones who moved out are not followed

A number of clinical studies are performed. The quality varies, but the different reports support each other. Studied and reported long term health effects are:

- Eyes: Chronic conjunctivitis, scars on cornea, corneal opacities, early cataracts
- Respiratory tracts: Obstructive and/or restrictive disease, pulmonary fibrosis, aggravation of TB and chronic bronchitis
- Neurological system: Impairment of memory, finer motor skills, numbness etc.
- Psychological problems: Post traumatic stress disorder (PTSD)
- Children's health: Peri- and neonatal death rates increased. Failure to grow, intellectual impairment, etc.

❖ Missing or insufficient fields for research are female reproduction, chromosomal aberrations, cancer, immune deficiency, neurological sequelae, post traumatic stress disorder (PTSD) and children born after the disaster. Late cases that might never be highlighted are

exothermic reaction increased the temperature inside the tank to over 200 °C (392 °F) and raised the pressure. This forced the emergency venting of pressure from the MIC holding tank, releasing a large volume of toxic gases. About 30 metric tons of MIC escaped from the tank into the atmosphere in 45 to 60 minutes

❖ EFFECTS

ACUTE EFFECT

Reversible reaction of glutathione (top) with methyl isocyanate (MIC, middle) allows the MIC to be transported into the body

The initial effects of exposure were coughing, severe eye irritation and a feeling of suffocation, burning in the respiratory tract, blepharospasm, breathlessness, stomach pains and vomiting. People awakened by these symptoms fled away from the plant. Those who ran inhaled more than those who had a vehicle to ride. Owing to their height, children and other people of shorter stature inhaled higher concentrations.

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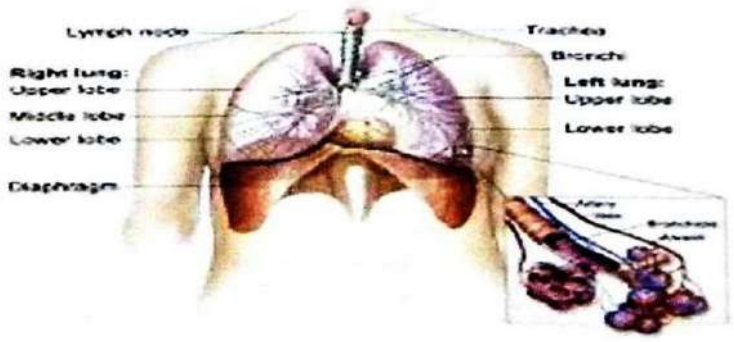

respiratory insufficiency, cardiac insufficiency (cor pulmonale), cancer and tuberculosis.

A 2014 report in *Mother Jones* quotes a "spokesperson for the Bhopal Medical Appeal, which runs free health clinics for survivors" as saying "An estimated 120,000 to 150,000 survivors still struggle with serious medical conditions including nerve damage, growth problems, gynecological disorders, respiratory issues, birth defects, and elevated rates of cancer and tuberculosis.

❖ HEALTH CARE

The Government of India had focused primarily on increasing the hospital-based services for gas victims thus hospitals had been built after the disaster. When UCC wanted to sell its shares in UCIL, it was directed by the Supreme Court to finance a 500-bed hospital for the medical care of the survivors. Thus, Bhopal Memorial Hospital and Research Centre (BMHRC) was inaugurated in 1998 and was obliged to give free care for survivors for eight years. BMHRC was a 350-bedded super speciality hospital where heart surgery and hemodialysis were done. However, there was a dearth of gynaecology, obstetrics and paediatrics. Eight mini-units (outreach health centres) were started and free health care for gas victims were to be offered till 2006.[5] The management had also faced problems with strikes, and the quality of the health care being disputed.[25][26] Sambhavna Trust is a charitable trust, registered in 1995, that gives modern as well as ayurvedic treatments to gas victims, free of charge.[5][27]

When the factory was closed in 1986, pipes, drums and tanks were sold. The MIC and the Sevin plants are still there, as are storages of different residues. Isolation material is falling down and spreading.[5] The area around the plant was used as a dumping area for hazardous chemicals. In 1982 tubewells in the vicinity of the UCIL factory had to be abandoned and tests in 1989 performed by UCC's laboratory revealed that soil and

water samples collected from near the factory and inside the plant were toxic to fish.[28] Several other studies had also shown polluted soil and groundwater in the area. Reported polluting compounds include 1-naphthol, naphthalene, Sevin, tarry residue, mercury, toxic organochlorines, volatile organochlorine compounds, chromium, copper, nickel, lead, hexachloroethane, hexachlorobutadiene, and the pesticide HCH.[5]

In order to provide safe drinking water to the population around the UCIL factory, Government of Madhya Pradesh presented a scheme for improvement of water supply.[29] In December 2008, the Madhya Pradesh High Court decided that the toxic waste should be incinerated at Ankleshwar in Gujarat, which was met by protests from activists all over India.[30] On 8 June 2012, the Centre for incineration of toxic Bhopal waste agreed to pay ₹250 million (US$3.8 million) to dispose of UCIL chemical plants waste in Germany.[31] On 9 August 2012, Supreme court directed the Union and Madhya Pradesh Governments to, take immediate steps for disposal of toxic waste lying around and inside the factory within six months.[32]

A U.S. court rejected the lawsuit blaming UCC for causing soil and water pollution around the site of the plant and ruled that responsibility for remedial measures or related claims rested with the State Government and not with UCC.[33] In 2005, the state government invited various Indian architects to enter their "concept for development of a memorial complex for Bhopal gas tragedy victims at the sit

❖ OCCUPATIONAL AND HABITATION REHABILITATION

Sample Case Study: Nuclear Disaster at Chernobyl

Shri Shivaji Education Society Amravati's

SHRI SHIVAJI SCIENCE COLLEGE,

Shivaji Nagar Amravati-444603 M.S.

CERTIFICATE

Department of - ENVIRONMENTAL SCIENCE

Certified that Ms. Gaurav Shrikrushna. Kende
With college Roll No.**2054** from class BSc.**III rd** year Group **CEZ** has completed the case study work in the subject **Environment Science** for the 5th semister.

Nuclear disaster at Chernobyl

This Day of History

Gereral Interest

1986

On April 26, 1986, the world's worst nuclear power plant accident occurs at the Chernobyl nuclear power station in the Soviet Union. Thirty-two people died and dozens more suffered radiation burns in the opening days of the crisis, but only after Swedish authorities reported the fallout did Soviet authorities reluctantly admit that an accident had occurred.

The Chernobyl station was situated at the settlement of Pripyat, about 65 miles north of Kiev in the Ukraine. Built in the late 1970s on the banks of the Pripyat River, Chernobyl had four reactors, each capable of producing 1,000 megawatts of electric power. On the evening of April 25, 1986, a group of engineers began an electrical-engineering experiment on the Number 4 reactor. The engineers, who had little knowledge of reactor physics, wanted to see if the reactor's turbine could run emergency water pumps on inertial power.

As part of their poorly designed experiment, the engineers disconnected the reactor's emergency safety systems and its power-regulating system. Next, they compounded this recklessness with a series of mistakes: They ran the reactor at a power level so low that the reaction became unstable, and then removed too many of the reactor's control rods in an attempt to power it up again. The reactor's output rose to more than 200 megawatts but was proving increasingly difficult to control. Nevertheless, at 1:23 a.m. on April 26, the engineers continued with their experiment and shut down the turbine engine to see if its inertial spinning would power the reactor's water pumps. In fact, it did not adequately power the water pumps, and without cooling water the power level in the reactor surged.

To prevent meltdown, the operators reinserted all the 200-some control rods into the reactor at once. The control rods were meant to reduce the reaction but had a design flaw: graphite tips. So, before the control rod's five meters of absorbent material could penetrate the core, 200 graphite tips simultaneously entered, thus facilitating the reaction and causing an explosion that blew off the heavy steel and concrete lid of the reactor. It was not a nuclear explosion, as nuclear power plants are incapable of producing such a reaction, but was chemical, driven by the ignition of gases and steam that were generated by the runaway reaction. In the explosion and ensuing fire, more than 50 tons of radioactive material were released into the atmosphere, where it was carried by air currents.

On April 27, Soviet authorities began an evacuation of the 30,000 inhabitants of Pripyat. A cover-up was attempted, but on April 28 Swedish radiation monitoring stations, more than 800 miles to the northwest of Chernobyl, reported radiation levels 40 percent higher than normal. Later that day, the Soviet news agency acknowledged that a major nuclear accident had occurred at Chernobyl.

In the opening days of the crisis, 32 people died at Chernobyl and dozens more suffered radiation burns. The radiation that escaped into the atmosphere, which was several times that

produced by the atomic bombs dropped on Hiroshima and Nagasaki, was spread by the wind over Northern and Eastern Europe, contaminating millions of acres of forest and farmland. An estimated 5,000 Soviet citizens eventually died from cancer and other radiation-induced illnesses caused by their exposure to the Chernobyl radiation, and millions more had their health adversely affected. In 2000, the last working reactors at Chernobyl were shut down and the plant was officially closed.

Introduction

Level 1: Summary

The Chernobyl nuclear power plant is located in Ukraine, 20km south of the border with Belarus. At the time of the accident, the plant had four working reactors.

The accident occurred on 26 April 1986 when operators of the power plant ran a test on an electric control system of one of the reactors. The accident happened because of a combination of basic engineering deficiencies in the reactor and faulty actions of the operators: the safety systems had been switched off, and the reactor was being operated under improper, unstable conditions, a situation which allowed an uncontrollable power surge to occur.

This led to a cascade of events resulting in a series of explosions and consequent fires that severely damaged the reactor building, completely destroyed the reactor, and caused the release of massive amounts of radioactive materials over a ten-day period.

Level 2:Details

The Chernobyl nuclear facility is located in Ukraine about 20 km south of the border with Belarus. At the time of the accident, the plant had four working reactors (units 1, 2, 3, and 4).

The accident occurred in the very early morning of 26 April 1986 when operators ran a test on an electric control system of unit 4. The accident happened because of a combination of basic engineering deficiencies in the reactor and faulty actions of the operators. The safety systems had been switched off, and the reactor was being operated under improper, unstable conditions, a situation which allowed an uncontrollable power surge to occur. This power surge caused the nuclear fuel to overheat and led to a series of steam explosions that severely damaged the reactor building and completely destroyed the unit 4 reactor.

The explosions started numerous fires on the roofs of the reactor building and the machine hall, which were extinguished by firefighters after a few hours. Approximately 20 hours after the explosions, a large fire started as the material in the reactor set fire to combustible gases. The large fire burned during 10 days. Helicopters repeatedly dumped neutron-absorbing compounds and fire-control materials into the crater formed by the destruction of the reactor and later the reactor structure was cooled with liquid nitrogen using pipelines originating from another reactor unit.

The radioactive materials from the damaged reactor were mainly released over a 10-day period. An initial high release rate on the first day resulted from the explosions in the reactor. There followed a five-day period of declining releases associated with the hot air and fumes

from the burning graphite core material. In the next few days, the release rate increased until day 10, when the releases dropped abruptly, thus ending the period of intense release. The radioactive materials released by the accident deposited with gr atest density in the regions surrounding the reactor in the European part of the former Soviet Union.

Level 3: Source

The source document for this Digest states:

I. PHYSICAL CONSEQUENCES OF THE ACCIDENT

7. The accident at the Chernobyl nuclear power station occurred during a low-power engineering test of the Unit 4 reactor. Safety systems had been switched off, and improper, unstable operation of the reactor allowed an uncontrollable power surge to occur, resulting in successive steam explosions that severely damaged the reactor building and completely destroyed the reactor. An account of the accident and of the quantities of radionuclides released, to the extent that they could be known at the time, were presented by Soviet experts at the Post-Accident Review Meeting at Vienna in August 1986 . The information that has become available since 1986 will be summarized in this Chapter.

8. The radionuclide releases from the damaged reactor occurred mainly over a 10-day period, but with varying release rates. An initial high release rate on the first day was caused by mechanical discharge as a result of the explosions in the reactor. There followed a five-day period of declining releases associated with the hot air and fumes from the burning graphite core material. In the next few days, the release rate of radionuclides increased until day 10, when the releases dropped abruptly, thus ending the period of intense release. The radionuclides released in the accident deposited with greatest density in the regions surrounding the reactor in the European part of the former Soviet Union.

A. THE ACCIDENT

9. The Chernobyl reactor is of the type RBMK, which is an abbreviation of Russian terms meaning reactor of high output, multichannel type. It is a pressurized water reactor using light water as a coolant and graphite as a moderator. Detailed information about what is currently known about the accident and the accident sequence has been reported, notably in 1992 by the International Atomic Energy Agency (IAEA) in 1994 in a report of the Massachusetts Institute of Technology , in 1995 by the Ukrainian Academy of Sciences , and in 1991 1996 by the Kurchatov Institut A simplified description of the events leading to the accident and of the measures taken to control its consequences is provided in the following paragraphs. As is the case in an accident with unexpected and unknown events and outcomes, many questions remain to be satisfactorily resolved.

10. The events leading to the accident at the Chernobyl Unit 4 reactor at about 1.24 a.m. on 26 April 1986 resulted from efforts to conduct a test on an electric control system, which allows power to be provided in the event of a station blackout . Actions taken during this exercise resulted in a significant variation in the temperature and flow rate of the inlet water to the reactor core (beginning at about 1.03 a.m.). The unstable state of the reactor before the accident is due both to basic engineering deficiencies (large positive coefficient of reactivity under certain conditions) and to faulty actions of the operators (e.g., switching off the emergency safety systems of the reactor) [G26]. The relatively fast temperature changes resulting from the operatorsâ€™ actions weakened the lower transition joints that link the

zirconium fuel channels in the core to the steel pipes that carry the inlet cooling water [P4Other actions resulted in a rapid increase in the power level of the reactor which caused fuel fragmentation and the rapid transfer of heat from thes fuel fragments to the coolant (between 1.23:43 and 1.23:49 a.m.). This generated a shock wave in the cooling water, which led to the failure of most of the lower transition joints. As a result of the failure of these transition joints, the pressurized cooling water in the primary system was released, and it immediately flashed into steam.

11. The steam explosion occurred at 1.23:49. It is surmised that the reactor core might have been lifted up by the explosion , during which time all water left the reactor core. This resulted in an extremely rapid increase in reactivity, which led to vaporization of part of the fuel at the centre of some fuel assemblies and which was terminated by a large explosion attributable to rapid expansion of the fuel vapor disassembling the core. This explosion, which occurred at about 1.24 a.m., blew the core apart and destroyed most of the building. Fuel, core components, and structural items were blown from the reactor hall onto the roof of adjacent buildings and the ground around the reactor building. A major release of radioactive materials into the environment also occurred as a result of this explosion.

12. The core debris dispersed by the explosion started multiple (more than 30) fires on the roofs of the reactor building and the machine hall, which were covered with highly flammable tar. Some of those fires spread to the machine hall and, through cable tubes, to the vicinity of the Unit 3 reactor. A first group of 14 firemen arrived on the scene of the accident at 1.28 a.m. Reinforcements were brought in until about 4 a.m., when 250 firemen were available and 69 firemen participated in fire control activities. These activities were carried out at up to 70 m abo e the ground under harsh conditions of high radiation levels and dense smoke. By 2.10 a.m., the largest fires on the roof of the machine hall had been put out, while by 2.30 a.m. the largest fires on the roof of the reactor hall were under control. By about 4.50 a.m., most of the fires had been extinguished. These actions caused the deaths of five firefighters.

13. It is unclear whether fires were originating from the reactor cavity during the first 20 h after the explosion. However, there was considerable steam and water because of the actions of both the firefighters and the reactor plant personnel. Approximately 20 h after the explosion, at 9.41 p.m., a large fire started as the material in the reactor became hot enough to ignite combustible gases released from the disrupted core, e.g. hydrogen from zirconium-water reactions and carbon monoxide from the reaction of hot graphite with steam. The fire made noise when it started (some witnesses called it an explosion) and burned with a large flame that initially reached at least 50 m above the top of the destroyed reactor hall [P4].

14. The first measures taken to control the fire and the radionuclide releases consisted of dumping neutron-absorbing compounds and fire-control materials into the crater formed by the destruction of the reactor. The total amount of materials dumped on the reactor was approximately 5,000 t, including about 40 t of boron compounds, 2,400 t of lead, 1,800 t of sand and clay, and 600 t of dolomite, as well as sodium phosphate and polymer liquids [B4]. About 150 t of materials were dumped on 27 April, followed by 300 t on 28 April, 750 t on 29 April, 1,500 t on 30 April, 1,900 t on 1 May, and 400 t on 2 May. About 1,800 helicopter flights were carried out to dump materials onto the reactor. During the first flights, the helicopters remained stationary over the reactor while dumping the materials. However, as the dose rates received by the helicopter pilots during this procedure were judged to be too high, it was decided that the materials should be dumped while the helicopters travelled over

the reactor. This procedure, which had a poor accuracy, caused additional destruction of the standing structures and spread the contamination. In fact, much of the material delivered by the helicopters was dumped on the roof of the reactor hall, where a glowing fire was observed, because the reactor core was partially obstructed by the upper biological shield, broken piping, and other debris, and rising smoke made it difficult to see and identify the core location (see Figure I). The material dumping campaign was stopped on day 7 (2 May) through day 10 (5 May) after the accident because of fears that the building support structures could be compromised. If that happened, it would allow the core to be less restrained from possible meltdown, and steam explosions would occur if the core were to interact with the pressure suppression pool beneath the reactor. The increasing release rates on days 7 through 10 were associated with the rising temperature of the fuel in the core. Cooling of the reactor structure with liquid nitrogen using pipelines originating from Unit 3 was initiated only at late stages after the accident. The abrupt ending of the releases was said to occur upon extinguishing the fire and through transformation of the fission products into more chemically stable compounds

15. The further sequence of events is still somewhat speculative, but the following description conforms with the observations of residual damage to the reactor [S1, S18]. It is suggested that the melted core materials (also called fuel- containing masses, corium, or lava) settled to the bottom of the core shaft, with the fuel forming a metallic layer below the graphite. The graphite layer had a filtering effect on the release of volatile compounds. This is evidenced by a con- centration of caesium in the corium of 35% [S1], somewhat higher than would otherwise have been expected in the highly oxidizing conditions that prevailed in the presence of burning graphite. The very high temperatures in the core shaft would have suppressed plate out of radionuclides and maintained high release rates of penetrating gases and aerosols. After about 6.5 days, the upper graphite layer would have burned off. This is evidenced by the absence of carbon or carbon- containing compounds in the corium. At this stage, without the filtering effect of an upper graphite layer, the release of volatile fission products from the fuel may have increased, although non-volatile fission products and actinides would have been inhibited because of reduced particulate emission.

16. On day 8 after the accident, it would appear that the corium melted through the lower biological shield (LBS) and flowed onto the floor of the sub-reactor region (see Figure I). This rapid redistribution of the corium and increase in surface area as it spread horizontally would have enhanced the radionuclide releases. The corium produced steam on contact with the water remaining in the pressure suppression pool, causing an increase in aerosols. This may account for the peak releases of radionuclides seen at the last stage of the active period.

17. Approximately nine days after the accident, the corium began to lose its ability to interact with the surrounding materials. It solidified relatively rapidly, causing little damage to metallic piping in the lower regions of the reactor building. The chemistry of the corium was altered by the large mass of the lower biological shield taken up into the molten corium (about 400 of the 1,200-t shield of stainless steel construction and serpentine filler material). The decay heat was significantly lowered, and the radionuclide releases dropped by two to three orders of magnitude. Visual evidence of the disposition of the corium supports this sequence of events.

18. On the basis of an extensive series of measurements in 1987 1990 of heat flux and radiation intensities and from an analysis of photographs, an approximate mass balance of the reactor fuel distribution was established (data reported by Borovoi and Sich [B16, S1]). The

amount of fuel in the lower regions of the reactor building was estimated to be 135± 27 t, which is 71% of the core load at the time of the accident (190.3 t). The remainder of the fuel was accounted for as follows: fuel in the upper l vels of the reactor building (38± 5 t); fuel released beyond the reactor building (6.7± 1 t); and unaccounted for fuel (10.7 t), possibly largely on the roof of the reactor hall under the pile of materials dumped by the helicopters.

19. Different estimates of the reactor fuel distribution have been proposed by others. Purvis [P4] indicated that the amount of fuel in the lava, plus fragments of the reactor core under the level of the bottom of the reactor, is between 27 and 100 t and that the total amount of the fuel in the reactor hall area is between 77 and 140 t. Kisselev et al. [K12, K15] reported that only 24± 4 t were identified by visual means in the lower region of the reactor. It may be that most of the fuel is on the roof of the reactor hall and is covered by the material that was dropped on it from helicopters. Only the removal of this layer of material will allow making a better determination of the reactor fuel distribution.

monitored Radiation hazard caused by the Chernobyl accident in inhabited areas of Ukraine can be by transgenic plants.

The genetic impact of the 1986 accident at the Ukraine Chernobyl Nuclear Power Plant (NPP) on populations of living organisms has yet to be fully assessed. Monitoring of the genotoxicity of polluted soils is a key element in the disaster management program. We used Arabidopsis thaliana and Nicotiana tabacum plants transgenic for a reporter gene revealing homologous recombination to study the genetic effects of chronic low-dose radiation stemming f om the soil in inhabited areas of Ukraine where contamination by the accident ranges from 1 to 40 Ci/km2. We noted a significant dose-dependent increase of homologous recombination in plants cultivated in the affected inhabited areas, proving the persistently high genotoxicity of the radioactively contaminated soils.

Discuss 5 safety precautions/design elements used in modern nuclear reactors to avoid disasters in the future?

There are many different types of nuclear reactors, and each one has its own safety and control methods.

You mention Chernobyl's reactor number 4. It was a graphite moderated thermal reactor, of the same basic design as had been used on the K-19, only larger (an RBMK). Graphite moderated reactors are the least "idiot proof" of all the nuclear reactor designs. Unfortunately, Chernobyl was in the Soviet Union. But you can rest easy(?), there are only 3 sites currently operating 11 RBMK reactors in Russia. Graphite moderated reactors were never used as power reactors outside of the USSR. However, the very first man-made reactor was graphite moderated.

After the Chernobyl accident, the RBMK design was modified with 5 additional safety features.

1) The fuel was enriched further to reduce reliance on cooling water as a moderator.
2) More manual control rods were added.
3) More neutron absorbers were added to prevent accidental operation at low-power.
4) The SCRAM was reduced from 18 to 12 seconds.

5) Precautions were put in place to prevent safety systems from being bypassed (which is what happened at Chernobyl).

In the US and other countries, light water moderated thermal reactors are commonly used in power plants. Particularly common are the pressurized water and boiling water types. In these reactors, the water is necessary as a moderator. In fact, the reactor won't operate if the water is removed (boiled out). Therefore, these reactors have a built-in negative feedback. If the reactor power increases too high, it will heat up the moderator, which will lower the density of the water and reduce its moderating efficiency, resulting in decreased power.

Common safety features of a water reactor are:

1a) Independently movable absorber rods which can be quickly and automatically inserted, even in the even of a power failure.

1b) In the event of a real emergency, liquid neutron absorbers can be injected into the reactor.

2) SCRAM times of 4 seconds or less.

all coolant, the reactor vessel would be hot and damaged, but not a meltdown. Putting the reactor vessel in a pool helps to avoid the "hot and damaged".

3) They are loaded with less fuel than is necessary for criticality. Even if they lost 4) Bunker-like containment buildings to contain most of the radiation released in a catastrophe.

5) Lots of indicators and sensors so that the operators know what's happening.

The Three Mile Island accident is perhaps the best example of how safe these reactors are. Even though it lost coolant and had a partial "meltdown", the reactor was recovered, and the radiation was contained. Contrast that with Chernobyl, which had a full meltdown, and a hydrogen explosion and fire which destroyed the reactor building

Sample Project: Environmental Issues

Shri Shivaji Education Society Amravati's

Shri Shivaji Science College,

Shivaji Nagar, Amravati - 444603(M.S.)

Re-accredited by NAAC with A grade (Very Good) with a CGPA of 3.10

"College with Potential for Excellence"

Certificate

Department of Environmental science

Certified that Mr/Ms Ku. Pratiksha Sajanan Vighe *with College Roll No.* 2469 *from (Class/Group)* BSC-III (CEB) *has attended the practical classes and completed the practical work satisfactorily in the subject* Environmental science *for the* VI *semester as prescribed by S.G.B. Amravati University, Amravati / Maharashtra State Board of Secondary & Higher Secondary Education, Pune for the academic year 201 - 201 .*

Date : / /201

1. Allcated

2.

3.

Professor Incharge ***Head***

ENVIRONMENTAL PROJECT

Envolution of Impact of defuses on soil

Contents :-

i Aim

ii Requirement

iii Chemicals

iv Theory (Principle)

v Site location

vi procedure

vii Observation

viii Result

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Principal
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AMRAVATI.

Syllabus on Gender Sensitization

Syllabus on Gender sensitization

Zoology

4.2. Structural abnormalities of human chromosomes and related syndromes:

Deletion, Robertsonian translocation, Cri-du-chat syndrome, Prader -Willi syndrome, Williams syndrome, Wolf-Hirschhorn syndrome

4.3 Human metabolic disorders:

Phenylketonuria, Lesch-Nyhan syndrome, Tay-Sachs disease, Alkaptonuria, Albinism, Congenital adrenal hyperplasia, Emphysemia, Glucose-6-phosphate Dehydrogenase deficiency, Achondroplasia

4.4 Other Genetic Diseases: Sickle cell anemia, Hemophilia, Thalassemia, Cystic Fibrosis, Huntington disease, Alzheimer's disease, Parkinson's disease

Unit-V : 5.1 Mitochondrial DNA and human diseases:

5.1.1. Structure of mitochondrial DNA,

5.1.2. Leber's Hereditary Optic Neuropathy (LHON),

5.1.3. Myoclonic Epilepsy and Ragged Red Fiber Disease (MERRF),

5.1.4. Pearson Marrow-Pancreas Syndrome (PMPS),

5.1.5. Kearn-Sayre Syndrome,

5.1.6. Mitochondrial Neurogastrointestinal Encephalomyopathy (MNGIE),

5.1.7. Sensorineural Hearing Loss

5.2 Genetic Counseling:

5.2.1. Carrier detection,

5.2.2. Fetal analysis (amniocentesis and chorionic villus sampling),

5.2.3. Pedigree analysis

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Activities Conducted for the address cross cutting issues relevant to Environment and Sustainability, Gender Sensitization, Human Values and Professional Ethics

Activities Conducted for the address cross cutting issues relevant to Environment and Sustainability, Gender Sensitization, Human Values and Professional Ethics

Intercollegiate Workshop on Eco-friendly Ganpati Making

Intercollegiate Workshop on Eco-friendly Ganpati making

Intercollegiate Workshop on Eco-friendly Ganpati making was conducted for the students of Matoshri Vimlabai Deshmukh Mahavidyalay on 29-08-19. Head of Dept. Dr. S. P. Ingole gave guest lecture and guided students on Eco-friendly Ganpati making. P.G. students of the department participated in the workshop.

Intercollegiate Workshop on Eco-friendly Ganpati making

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

One day workshop on," Breast Cancer Awareness Campaign & Open Discussion"

Environmental science Students participated in the one day work shop conducted by Cancer foundation, Amravati on 29 Oct. 2017 at Matoshri Vimlabai Deshmukh Hall. The Topic of one day workshop is – "Breast Cancer awareness campaign and Open Discussion". In this workshop a scientific guidance is provided to student by team of doctors. An issue of women health and lifestyle was discuses in workshop. To create an awareness photography exhibition was also organized by the students.

Breast Cancer awareness campaign and Open Discussion

Participation in Cycle rally in collaboration with Mission Olympics

Students and staff from the department of Environmental Science participated in the cycle rally organized by Shri Shivaji Sci. College, and Mission Olympics, Amravati, on 15th August 2018.

Cycle rally

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Ozone Day Celebration: 16 Sept 2016

Ozone Day was celebrated on 16 Sept. 2016, at Shri. Shivaji Sci. College, Amravati. Theme was to create Awareness about the ozone layer its importance and threats. All staff members and students of college participated in the event. Bicycle rally was organised in collaboration with environmental Cell and green berets on 16ht September 2016.

Ozone day Celebration

Breast Cancer Awareness Week

Breast Cancer awareness week was organized from 1st Oct. 2016 - 7th Oct. 2016 at PDMC, Amravati in collaboration with Cancer foundation Amravati. Students actively participated in the activity and worked as volunteer in the Free Check Up Camp, at PDMC, Amravati.

Breast Cancer Awareness Week

One day work shop - Breast Cancer awareness campaign and Open Discussion

Noise pollution monitoring

Noise Pollution Monitoring is regular activity conducted by daily monitoring for noise during peak hours, at different squares in Amravati. The activity is conducted for creating awareness regarding the noise pollution abatement and increase public participation for tackling noise pollution.

The activity was conducted for creating awareness regarding the noise and air pollution, its abatement and public participation for tackling noise pollution. The readings are also provided to AMC, Amravati for preparing their 'Yearly Report'.

Noise Pollution Monitoring

Noise Pollution Monitoring

Noise Pollution Monitoring

Dr. H. S. LUNGE
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Public awareness by use of mud idols for Ganesh Chaturthi

Public awareness by use of mud idols for Ganesh Chaturthi

Department of Environmental Science in collaboration with Mungsaji Mauli Sansthan, Amravati conducting the awareness campaign for guiding and aware the people about the use of Ganesh idols prepared from mud and clay since last five year. Students from the UG and PG Environmental Science actively participated in the awareness campaign and aware people about the environmental impact of synthetic color and plaster of paris.

Public awareness by use of mud idols for Ganesh Chaturthi

Public awareness by use of mud idols for Ganesh Chaturthi

Eco-friendly Raksha Bandhan

2019-2020

Eco-friendly Raksh-Bandhan

All the U.G. & P. G. students actively involved in the process of Rakhi making from waste material. All the prepared Rakhi were tied by the staff to the plants in college campus on 15th August 2019.

Eco-friendly Raksh-Bandhan

Dr. H. S. LUNGE
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Shri Shivaji Science College
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NAAC ACCREDITED WITH "A" GRADE

Principal
Shri Shivaji Science College
AMRAVATI.

World Lion Day 10 Aug, 2016

World Lion Day

Inauguration of Environmental science Society:- (10th Aug. 2016)

On 10th Aug. 2016 dept. has organised programme of Inauguration of Environmental Science Society in New auditorium of the college. On this occasion Principal of the college, V.G. Thakare was present as the president of programme. Dr. A.B. Bhosale & Mr. Yogesh Lolge, SRTM University, Nanded were present as the chief guests of the programme.

Environmental Science society was inaugurated by hands of Dr. A.B. Bhosale. The guest lecture of Mr. Y.S. Lolge on the topic "Scope of Environmental Science"

Inauguration of Environmental science Society

Guest Lecture

Ozone Day Celebration

"Ozone Day Celebration" (16th 2016 Sept.)

On 16th 2016 Sept. department celebrated ozone day at college level by organising cycle rally in collaboration with N.S.S., N.C.C., Environmental Cell and Green Berets to encourage students to use bicycle to lower air pollution due to fossil fuel.

Cycle Rally

Dr. H. S. LUNGE
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Shri Shivaji Science College
Amravati.

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Shri Shivaji Science College
AMRAVATI.

National Science Day Celebration 27-28 Feb, 2017

National Science Day- NSD 2017 Scientific Rangoli competition (27th& 28th Feb. 2017.)

On the eve of National Science Day- NSD 2017 Scientific Rangoli competition was organized by dept. of Environmental Science on 27th& 28th Feb. 2017. The theme was Science & Technology through Rangoli 23 student participated.

All the heads of different department & Prof. V.G. Bhamburkar, Secretary of the shri Shivaji education society visited for this occasion. The invited judges were Mrs. Manisha C. Mohokar & Dr. J. D. Dhote. . On 28th Feb. 2017 it was inaugurated by Principal Dr. V. G. Thakare, Secretary Shri Shivaji Education Society Prof. V.G. Bhamburkar & all the Heads of departments also visited the completion venue. Then it was open for all the students. Prizes were distributed in the valedictory function.

Inaugural - National Science Day

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Tree Plantation Programme 1 July, 2017

2017-2018

Greening Maharashtra Drive by Govt. of Maharashtra

Tree Plantation Programme (1 st July 2017)

On the occasion of tree plantation programme of Maharashtra Govt. schedules on 1 st July 2017 dept. of Environmental science and Envi. Cell decided to organized tree plantation programme at Shivwadi, Shri Shivaji Science College, Amravati. Inaugural of this Function was Dr. V.G. Thakare. He innovated the students with different concept related environmental pollution how they affect the human life. Near about 25 plants such as Gulmohar, Wad, Kamalkas, Khaya were planted at college Premises. The motive was to create social awareness about the importance of tree plantation. All depts. & the faculties participated in the plantation programme.

Tree Plantation Programme

Amazon Rainforest Day5 Sept, 2017

Behalf of Amazon Rainforest Day 5 September

Inauguration of Environmental science Society:- (6th Sept. 2017)

Environmental Science Society was Inaugurated by Chief Guest Mr. Prashant Sawai Director, MTDC, Amravati and Guest of Honour Mr. Yadav Tarte Patil 6th Sept. 2017 in the old Auditorium, Shri Shivaji Sci. College, Amravati.

On this eve Guest lecture was delivered by Mr. Prashant Sawai on Topic "Eco and Agro tourism" and "Role of Youth in Wildlife and Environmental Conservation". Mr. Prashant Sawai guided the students regarding the current status of tourism industry and the management issues. He also provided information on the various issues related to the youth participation and careers and future avenues in this area. Second Guest lecture was delivered by Mr. Yadav Tarte Patil on "Wild life and Biodiversity Conservation".

Inauguration of Environmental science Society

Tree Plantation Programme 31 July, 2018

2018-2019

Greening Maharashtra Drive by Govt. of Maharashtra

Tree Plantation Programme (31-7-2018)

On the occasion of tree plantation programme of Maharashtra Govt. to achieve 13 Crore Tree plantation target, dept. of Environmental science and Environmental Cell decided to organized tree plantation programme on both sides of road at the entry gate of Shri Shivaji Science College, Amravati. Inaugural of this Function was Dr. V.G. Thakare. He innovated the students with different concept related environmental pollution how they affect the human life. Near about 25 plants such as Gulmohar, Kamalkas, Khaya were planted.. The motive was to create social awareness about the importance of tree plantation. All depts. & the faculties participated in the plantation programme.

Tree Plantation Programme

Tiger Day Celebration 30 July, 2018

Tiger Day Celebration (Date : 30- 7-2018)

On 30/7/2018 department of Environmental science celebrated Tiger Day by showing students documentaries on the Tiger. The programme was arranged in U.G. lab of the department. All the students of the department i.e. UG & PG are called upon to see documentaries on the tiger. The documentaries aware students about the importance of tiger in the jungle; its role in the forest ecosystem; how forests having tiger are conserved; food chain in forest ecosystem etc.

P.G. I year students also presented their presentation on "Need of Tiger protection".

Tiger Day Celebration

National Honey Bee Day21 August, 2018

National Honey Bee Day 22 Aug

Environmental Science Society Inauguration – 2018 (Date: 21 – 8-2018)

Inauguration of Environmental Science Society was organized on 21 st August 2018. Hon. Dr. V.G. Thakare, president of this inaugural program & the chief guest of the function was the Executive Director of rattan India Power Ltd. Mr. Himanshu Mathur. Other guest present was Mr. Hemant Nimkar, Senior Manger (Environment). Mr. Abhijit Sarvaiyawhi is working as Dy. Manager in Rattan India power ltd. Nandgaonpeth, Amt.; he is alumni of our dept. On the occasion of Inauguration, Ms. Manisha Jane was felicited for the award of Ph.D. Ms. Sujata Pachghare was felicitated with memento for being topped in S.G.B.A.U., Amt. in the subject of Environmental Science in 2017-18.

On the occasion, Mr. Mathur earged students to adopt Environment friendly lifestyle including clean and pollution free college campus, use of ecofriendly products in daily routine for sustainable environment. President of the function, Principal of the college, Dr. V.G. Thakare also earged students to aware and advocate family and society to adopt ecofriendly lifestyle.

Guest Lecture on Water Harvesting and Conservation

Guest Lecture On:-" Water Harvesting and Conservation"

On 4th Sept. 2018, a guest lecture was organized jointly with the Dept. of Geology. Mr. Mawle, Asso. Prof., Dept. of Geology, S.G.B.A.U., Amt. was the Chief Guest of the Function. He delivered guest lecture on "Water Harvesting and Conservation". He informed students about various techniques of water conservation. He also conveyed the need of rainwater harvesting for resolving the future water scarcity problem and water availability.

On this occasion, Ms. Nilima Ingle, water quality expert, Z.P., Amt., Guest of honor of the function, informed about the various schemes of Z. P. including ' MagelTyalaShet Tale' etc. She also informed about the employment opportunities in the subject of Environmental Science.

Guest Lecture On:-" Water Harvesting and Conservation"

Eco-friendly Rakshabandhan

2019-2020

Eco-friendly Raksh-Bandhan

All the U.G. & P. G. students actively involved in the process of Rakhi making from waste material. All the prepared Rakhi were tied by the staff to the plants in college campus on 15th August 2019.

Eco-friendly Raksh-Bandhan

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
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AMRAVATI.

Ozone Day Celebration 16 September 2019

Ozone Day Celebration

"International Day for the Preservation of the Ozone Layer", was celebrated on**16 Sept. 2019.** On this occasion walkathon was organized in collaboration with NSS, NCC and sports Dept.

Inauguration of Environmental Science Society 3rd October 2019

World Farm Animals Day 2 October

Inauguration of Environmental Science Society

The Environmental Science Society was inaugurated on **3rd Oct. 2019**. The society was inaugurated by Mr. DilipGode, Executive Director, Vidarbh Nature Conservation Society, Nagpur.

Dr. V. R. Ghurde, Ex. Principal of college was present as a guest of honour. He has honoured with "Life Time Achievement Award" which was sponsored during Vasundhara Film Festival, 2018.

Inauguration of Environmental Science Society

भारतीय सौर २३ आश्विन १९४१ ८

श्री शिवाजी विज्ञान महाविद्यालयात पर्यावरणशास्त्र सोसायटीचे उद्घाटन

स्थांना भेटी

Visit to Jaldut Exhibition Van

Visit to 'Jaldut Photo Exhibition Van'

P. G. Students of dept. visited the Jaldut Photo Exhibition Van on 22nd Oct.2019. The aim of visit is to give message to the students about water conservation processes & its importance.

Visit to 'Jaldut Photo Exhibition Van'

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

National Science Day Celebration

National Science day Celebration

On **28 Feb 2020** a guest lecture was organised on the eve of national Science day on the topic **"Women in Science".** Alumni of the Dept. **Ms. Sujata Pachghare** who is working as a city coordinator in Morshi in SwacchaSarvekshan Abhiyan, Govt. of Maharashtra delivered a lecture. P. G. students and B.Sc. IInd Yr. students were attended the guest lecture.

National Science day Celebration

Dr. S.P. Ingole
Head
Dept. Of Environmental Science
Shri Shivaji Science College,
Amravati.

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

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Shri Shivaji Science College
AMRAVATI.

Science awareness programme

- Science awareness programme was arranged on Wednesday 12th August,2015at Kasturba Kanya Shala, Amravati .The various activites carried out were-

1)Green Chemistry approch-Micro scale Technique Kit.

2)Acquaintancewith apparatus used and Demonstration on basic Chemistry Experiments.

3)Eradication of Superstition.

4) Power Point Presentation on Prithvi beti ka Suraj Papa Ko Patra.

5) Short Kit on tiger Conservation by BSc III PCM Students Nisha Bhubhure, Anjali Gawai.

6) Tree donation and plantation.

7) Slide show on Tiger Conservation.

8) Poster display on preservation of culture and tradition.

9)Conservation of Flora and Fauna.

About fifty students from BSc. II MBB, MBZ and CEB demonstrated nearly 20 different experiment to the 400 students Vth to standard Xth..

Our student enthusiastically explained experiments like Tree shifting model, Tricky water, Density concept, Magic ballon, Introduction to apparatus, colour symphony, Micro scale technique kit, fruit battery power, fire extinguisher, relation between mass and volume, harmful effects of alcohol from cold drinks, Catch the gas, magic Mystery, Capillary action of water, Food Adulteration, blowing a ballon, Identification of acids and bases, etc. Student enjoyed watching the posters displayed on conservation of Flora and fauna, preservation of India tradition, monuments, culture.

- **Science Awareness Program arranged at**

Department of chemistry , Shri Shivaji Science College , Amravati had arranged science awareness program for the school children of Shri Shivaji Multi High School, Amravati on Tuesday, 9th Aug 2016 . It was a two-fold activity by the B.Sc. I and III year students for the school children.The theme of the exhibition was to demonstrate syllabus oriented, conceptual basic science experiments .

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

SHRI SHIVAJI SCIENCE COLLEGE NAAC ACCREDITED WITH "A" GRADE AMRAVATI

Principal
Shri Shivaji Science College
AMRAVATI.

Activities organised by Eco friend club

Shri Shivaji Science College, Amravati

"ECOFRIENDS"

Department of Botany

Extension Activity

REPORT

(2006-2018)

"ECOFRIENDS"
(Extension Activity of Department of Botany)

Aim

Environmental imbalance is destroying humanity regardless of race, religion or sex, ideology or belief. Industrialization, modernization and urbanization have begun to exhibit serious tendencies of failure, just when the lofty dream of bringing health and abundance to the people of world seems within reach. Statistics are difficult to evaluate in terms of what might happen to the quality of environment unless some careful planning and careful execution of projects is carried. "ECOFRIENDS" is an association which will intertwine three pillars of our developing nation i.e. Student, Teacher and Parent to construct public awareness of the dangers to health and life inherent in continuation of the present scenario that degrade out our environment. "ECOFRIENDS" will implement three-concept strategy i.e. Planning – Placement – Prevention to preserve environmental quality.

Objectives

- To inculcate acquaintance and interest about Nature and Environment.
- To develop scientific attitude.
- To integrate students with the society and environment.
- To convey laboratory wisdom to society.
- To execute "Plantation programme" with the support of the students, parents and teachers.
- To make environment hygienic by implementing various health related programmes.
- To introduce medicinal plants, their properties and exploit them into routine life.
- Collection, conservation and propagation of medicinal plants to drive them in society.
- To endeavour ways and means to keep environmental balance.
- To exploit wealth of nature in disciplined and economic manner.
- To suggest approved modes of classification, disposal and recycling of waste material.
- To celebrate days related to environment e.g. Environment Day, Pollution Free Day, etc.
- To establish contacts with various organizations working for betterment of the nature.
- To organize nature visit, workshop, gathering, exhibitions, and road shows under the guidance of experts of the respective fields.

Keeping all the above-mentioned objectives in mind, department of Botany commenced the various activities by registering the students as a member of this association. Following demonstrations about several social problems were successfully handled by the department some of the most significant activities are as follows –

1. Snakes: Fears, Facts and Fiction

To create awareness about the snakes and remove fears from the student's mind and inculcate snake conservation a demonstrations were organized. Different snake friends were invited to deliver lectures and Mr. Ujjawal Thorat, President, Wild Life Protection Association, Amravati exhibited several varieties of snakes and acquainted students about the fear factors related to snakes. In this way "ECOFRIENDS" used to celebrate Wild Life Protection week.

2. Vegetarianism Campaign

On the day after "POLA" a festival of Maharashtra, most of the people used to consume non-vegetarian food. On this day thousands of animals killed for eating purpose. Unknowingly, some of the threatened animal species may have been cruelly killed and attempted to eliminate from the nature. Therefore, to advocate the "Vegetarianism" Ecofriends demonstrated against the consumption of animal meat in the very silent way. Rare animals viz. Bater, Titar, Ghorpad, Rabbits, etc were rescued from the poachers. Such demonstrations were appreciated by almost all the local media persons the concept was perpetuated.

3. Water pollution during Ganapati Festival:

As known to all of us, the system or the ritual of the immersion of the idols with great pomp and show at the end of the ten days festival from Ganesh Chaturthi to Anant Chaturdashi has come down the history right from the time of Lokmanya Tilak. But the fate of the aquatic lives after all these idols will go down the waters! Worrisome speculations have already started jerking the minds of peoples. An urgent attention of the government also is drawn by the ecologists and environmental scientists towards the possible hazards inflicted by the Plaster Of Paris of the immersed idols. The "ECOFRIENDS" has realized the problem of pollution being created by immersion of thousands of Ganesh idols. All the members have openly appealed to the public to go back to the traditional clay idols instead of Plaster of Paris idols and to reduce the size of the idols. The "ECOFRIENDS" also issued an appeal through a request to the idol makers not to use toxic chemical paints. This drive has been carried out at the doorstep of the Ganesh Idol Market on the day before Ganesh Chaturthi and created awareness among the public.

Agitation against POP Idols of Lord Ganesha (9th Sept.2008)

4. Tree Plantation:

On the auspicious or special days like Independence Day, Bhausaheb Anniversary, etc. "ECOFRIENDS" planted various trees to instill the conservation strategies amongst the students. "ECOFRIENDS" have organized Plant Donation Programme and arranged a "Vriksh Dindi". Through this, about 70 – 80 plants have been planted in various institutes of Shri Shivaji Education Society. This programme was successfully conducted with the help of plants provided by "Pedmissile Foundation" and Social Forestry, Amravati.

Tree Donation to Shivaji Multipurpose School, Amravati (18th Jan 2008)

Tree donation and Plantation in other Educational Institutes of Shri Shivaji Education Society

5. Demonstration against "Environmental Pollution" on Earth Day:

To create awareness and bring the divesting situation of nature Ecofriend activists demonstrated Symbolic death of Mother Earth. This has aired very important message to common citizen of Amravati. It was organized at the centre place of the city and attracted attention of common man. Electronic and Print media broadly published activity in respective ways.

Suicide of Nature: The most praised demonstration was "Suicide of Nature". This was an attempt to symbolize that Nature is committing suicide due to number of human disturbances

for the nature. One suicide note was displayed beside the coffin in which Symbolic Nature was placed in the form of Ecofriend Activist.

Mother Earth Suicide – Demonstration on World Environment Day (5th June 200

6. World Environment Day:

Ecofriend activists proposed through demonstration that Nature is not honoured by human beings. It was demonstrated in the following ways:

Crucifixion of Nature: Activist was crucified like Jesus Christ symbolizing the cruel crucifixion of Nature by performing inhuman activities threatening our environment.

पर्यावरण की रक्षा का 'यीशू' ने दिया संदेश

Crucifixion of Nature –

Demonstration on World Environment Day (5th June 2009)

"Ecofriends" planned to handle increasing solid waste generated during the festivals like Ganesh Puja, Amba Utsav, Mahalaxmi, etc. The **Nirmalya Kalash** will be founded in the Botany department for the college students. They will bring and collect all the Pooja material in the kalash and later on all the collected materials will turn to vermicompost by using unit available with Botany Department.

8. Nature Walk

Department has organized Nature walk for citizens and school students of Amravati city. During walk various plants were shown and their scientific information and economic importance was illustrated to all.

Nature Walk in the area around Chhatri lake Amravati Under Vasundhara International Film Festival

9. *Parthenium* eradication

Parthenium hysterophorus, also known as Star weed, Carrot weed, White cap and White top etc. has become one of the most dreaded weeds across the globe. As the seeds are very light and easily carried by wind, water or through human activities, it spreads so easily and grows abundantly everywhere as the weed virtually inundates the cultivated and barren lands. A single plant is capable of producing thousands of seeds which will multiply in no time. It does not allow other plants nearby to survive. The weed is considered as one of the greatest sources of dermatitis, asthma, nasal-dermal and nasal-bronchial types of diseases. A poisonous chemical called lactone is also present in *parthenium* grass which can affect the production of crops by 40%. Thus the weed is a threat to human being, live stock and agriculture. So, the right time to remove the weed is before spreading the seeds.

As the growth of *'Parthenium'* a dreaded weed is at alarming proportion in the Shivwadi of college campus. The students of Ecofriends of Botany department has participated in the activity on 13th September 2013 to weed out '*parthenium*'. This activity has spread awareness about harmful *parthenium* grass. Almost 45 students participated in the drive to eradicate

10. Raising saplings of Medicinal and Economically Important Plants

"You are breathing because there is a tree around you"

For providing beautiful, aesthetic and tranquilizing environment along with conservation of medicinal and economically important plants the Ecofriend unit has the responsibility of raising saplings of different plant species. A sapling is a young tree that is beginning to grow. In most cases, the best stage at which to plant a tree is when it is a sapling , because trees that are larger than saplings are difficult to move due to their size and extensive root system. An advantage of

tree saplings is their flexibility, which typically permits them to be trained into different forms and shapes.

To spread awareness of conservation of medicinal and economically important plants the activity to raise saplings was organized on 23rd September 2013 by the Ecofriends. Different saplings of plants like *Aloe vera, Asparagus racemosus, Catharanthus roseus, Pongamia pinnata, Azadirachta indica,Spathophyllum sp.Ocimum sanctum* were raised during this programme. Student activists enthusiastically participated and all the saplings were kept in the poly house of the college garden. These saplings were distributed to different students and needy

Students raising sapling of medicinal plants

11. Landscape and Garden Planning

Landscape planning is an activity concerned with reconciling competing land uses while protecting natural processes and significant cultural and natural resources. Landscaping is both science and art, and requires good observation and design skills. It is an independent profession. It bridges between landscape architecture and garden planning. A good landscaper understands the elements of nature, construction and blends them accordingly. These designers tend to work for clients who wish to commission construction work. Landscape planners can look beyond the 'closely drawn technical limits' and 'narrowly drawn territorial boundaries' which constrain design projects.

Now a days there is a great demand for landscape planning. Hence to impart knowledge and improve the skills of students a workshop on "Landscape and Garden Planning" was jointly organized by Ecofriends, Department of Botany, Shri Shivaji Science College Amravati and Garden Club Amravati on 28th September 2013. Prof. C.M. Deshmukh, President of Amravati Garden Club inaugurated the workshop and delivered a talk about how and where the garden should be created, format of the garden and its maintenance. More than 100 students has participated and highly benefited by this workshop.

1) **"Environment Awareness Campaign"** from 5th June to 5th July 2014 organized in collaborations with Amravati Garden Club, Amravati. Sponsored by Maharashtra Pollution Control Board.

a) 5th June Inauguration of the campaign
b) 28th June plastic bag eradication
c) 5th July concluding programme

Month-long environment campaign from today

■ **Amravati Bureau**
AMRAVATI, June 4

AMRAVATI Garden Club, Amravati and Eco Friends and Shri Shivaji Science College, Amravati have jointly organised 'Paryavaran Janjagruti Abhiyaan' (Environment Awareness Campaign) from June 5 to July 5.

Changes in the environment are taking place all over. Things like global warming and many others are occurring. With a purpose to curb ill-effects of environmental change, Amravati Garden Club, in collaboration with Eco Friends and Shri Shivaji Science College, will execute Environment Awareness Campaign from June 5 to July 5. It is in close relevance to World Environment Day sponsored by Maharashtra Pollution Control Board, Amravati Division, Amravati.

Inauguration of this campaign will take place at the hands of Jitendra Sangewar, Divisional Officer, Maharashtra Pollution Control Board, and under the chairmanship of Prof Chandrashekhar Deshmukh, President of Amravati Garden Club, Amravati on June 5 at 11 am at Shri Shivaji Science College. Dr Vijay Thakare, Principal, Shri Shivaji Science College, Amravati will be the chief guest.

Various projects like 'Vrukshdindi', environment related debate competition, nature painting competition, slogal competition, polythene bag eradication, and 'Vrukshamelawa' are going to be conducted in this campaign. Concluding programme of this campaign and prize distribution of various competitions held during the campaign will be held on July 5.

National Service Scheme unit of Shri Shivaji Horticulture College, Amravati, Botany Department of Government Vidarbha Institute of Science and Humanities, Amravati, Horticulture Department of Shri Shivaji Agriculture College, Shri Vinayak Vidya Mandir, Shri Shivaji Science College, Amravati and Social Forestry Department, Amravati are taking efforts for making the campaign successful.

Dr.Jitendra Sangewar, Regional Officer MPCB on Inaugural Session

Vrukshadindi

Street play by Ecofriends for plastic bag eradication

Dr.Dinesh Tyagi CCF,MTR Amravati addressing gathering in concluding porgramme

12. 1st August 2014 to 7th August 2014 : Poem writing/Nature Drawing/Short writing – competition on the topic "Nature is our true friend" on the occasion of Friendship Day

On the occasion of Friendship day the "Ecofriends" has organized various competitions on the topic "**Nature is our true friend**". All the ecofriends enthusiastically participated in these competitions. Poem, Nature Drawing and Short writing were judged by the expert faculty members and prizes were given to the winners in Inaugural Programme. Principal has addressed the students about environmental awareness and encouraged them to participate in such events. He has also appreciated the winners of the events.

13 Raksha Bandhan celebration on 12th August 2014 by tieing Rakhi to the trees in the campus

Ecofriends have celebrated the **"Raksha Bandhan"** in a special way by tieing Rakhi to the trees in the college campus. As trees are beneficial to mankind in all aspects, the main aim behind this event was to spread awareness regarding conservation of trees.

15 Inaugural Function and **guest lecture** by Dr. Nishikant Kale on the topic "Amazing world of plants" on 14th August 2014

16 "Nirmalya Kalash" 8th September 2014

"Ecofriends" planned to handle increasing solid waste generated during the festivals like Ganesh Puja, Amba Utsav, Mahalaxmi, etc. The **Nirmalya Kalash** will be founded in the Botany department for the college students. They will bring and collect all the Pooja material in the kalash and later on all the collected materials will turn to vermicompost by using unit available with Botany Department.

17 "Cleanliness and **Tree Plantation Programme"** 2nd October 2014

As our Prime Minister has launched the "The Swachh Bharat Mission" a campaign to clean India and to pay tribute to Mahatma Gandhi on 2nd October. We can't let our college campus remain unclean so **Ecofrends** enthusiastically participated in the Cleanliness drive and Tree Plantation Programme in the campus.

18 "Swachh Bharat Abhiyaan"Cleanliness drive in the campus was organized on 14th
nuary 2015 in collaboration with NCC cadets on Army Day

19 Slogan competition during shivotsav- prize distribution 30th Jan 2015

During Shivotsav the Slogan Competition was organized by Ecofreinds on Environmental Issues. The Slogans were judged by the expert faculty and prizes were given to the first three winners.

20 Nature camp at Green circle 21st and 22nd Feb 2015

The two days residential "Nature Camp" was organized under Ecofriends an extension activity of Botany department at "Green Circle" Mardi road, Amravati on 21st and 22nd February 2015. **Inaugural Function** - was organized at central dome

"Nature walk for Bird Watching", executed by Dr. Jayant Wadatkar.

Dr. Anand Ghaisas,Senior Sceintist of Homi Bhabha Research Institute delivered a lecture on astrobiology

Shivaji College holds Nature Camp 'Ecofriends'

■ Amravati Bureau
AMRAVATI, Mar 8

DEPARTMENT of Botany from Shri Shivaji Science College, Amravati runs by Shri Shivaji Education Society recently organised 2 days Nature Camp 'Ecofriends' at Green Circle, Amravati.

Prof Mutarza Ali, former Head of Computer Science Department from Shivaji Science College, Amravati inaugurated the camp while Prof L N Gawande, Former Vice-Principal of the college presided over the programme. Lectures on various topics were organised on the occasion.

Prof L N Gawande and Prof Murtuza Ali delivered lecture on Astrology and gave detailed information regarding it.

On the second day of the camp Prof Vishwas Jadhav gave detailed information about meditation and took students for nature trip for bird watching.

Dr Jayant Wadatkar gave information about bird watching and also provided information about various birds.

Vishwajeet Patil gave information about farm lakes, solar panel, wast water and treatment plot.

Prof Arvind Kadbe delivered lecture on 'Save Nature'.

The students presented cultural programme on the occasion. Total 100 students of the college attended the camp.

Dr V G Thakre, Principal of Shivaji Science College, Amravati and Dr Prakash Devtare, Head of Botany Department guided for the organisation of the camp.

Prof Bhupendra Dongarkar, Dr Ganesh Hedaoo, Dr Tushar Wankhade, Dr Dilip Hande, Dr Dinesh Khedkar, Dr Rekha Maggirwar, Anand Oke, Shirin Mohammad, Vaishali Deshmukh, Ravi Kale, Gajanan Parvatkar, Sarju Ingle, Amol Partoti and Nilesh Kasdekar took efforts to make the programme successful.

One of the dignitaries addressing the programme.

20) **Friendship day celebration in unique way:**

As students are always very enthusiastic to celebrate friendship day every year on 1st Sunday of August. This year Ecofriends has focused on spreading message on "Environment conservation". The special friendship bands with messages on Environment conservation were prepared by members of Ecofriends. These special friendship bands were tied to the office staff and departmental faculty members.

21) **"Matiche Ganpati Abhiyaan"**

Ganesh festival is one of the major festivals celebrated in our region. Every year Ganesh idols prepared with plaster of paris and chemical colours are polluting our environment hence to reduce impact of plaster of paris and save our water resources from harmful material, Ecofriends has organized "Matiche Ganpati Abhiyaan"on 16th &17th 2015. Mr.Madhukar Gharad, President Wanrai, Hon'ble H.B.Thakare, Treasurer, Shri Shivaji Education Society,Amravati. Adv.M.K.Nana Deshmukh, Executive Member, Shri Shivaji Education Society,Amravati, Principal V.G.Bhamburkar,Secretary, Shri Shivaji Education Society,Amravati along with Dr.V.G.Thakare,Principal,Shri Shivaji Science College,Amravati have inaugurated the campaign. Overwhelming response was given by the public of Amravati. In all 350 people were benefited by this campaign and purchased clay Ganesh Idols from the stall at college campus.

शिवाजी महाविद्यालयाचे विद्यार्थी पुरवणार शाडूच्या गणेशमूर्ती

प्रतिनिधी, अमरावती

येथील श्री शिवाजी विज्ञान महाविद्यालयाच्या वनस्पतीशास्त्र विभागाअंतर्गत पर्यावरण संवर्धनाचे कार्य करणाऱ्या 'इकोफ्रेंड्स' या विद्यार्थी संघटनेच्या पुढाकाराने यंदाच्या गणेशोत्सवातही गणेशभक्तांना शाडूच्या मातीच्या गणेशमूर्ती पुरवण्याचा उपक्रम राबवला जाणार आहे.

इकोफ्रेंड्स ही संघटना आपल्या वैविध्यपूर्ण आयोजनांच्या माध्यमातून पर्यावरण संरक्षणाचे कार्य करीत आहे. गेल्या वर्षी या संघटनेने गणेशोत्सवादरम्यान जलाशयांचे प्रदूषण वाढवणाऱ्या निर्माल्याच्या व्यवस्थापनाचे कार्य हाती घेतले होते. गणेश विसर्जनाच्या दिवशी गणेशभक्तांकडून विहिरी, तलाव किंवा टाक्यांमध्ये विसर्जित केल्या जाणाऱ्या निर्माल्याला गोळा करून त्यापासून शाडूळ खतनिर्मिती केली होती. २००७ पासून कार्यरत असलेल्या या संघटनेने पर्यावरणविषयक जनजागृती, प्लास्टिक कचरा निर्मूलन, वृक्षदान, वृक्षारोपण, वृक्षदिंडी असे विविध कार्यक्रम राबवले आहेत.

गणेशभक्तांनी प्लास्टर ऑफ पॅरिसच्या गणेशमूर्तींचा वापर न करता मातीच्या मूर्तींचा पुरस्कार करावा, यासाठी विद्यार्थ्यांनी आता मोहीम हाती घेतली आहे. संघटनेने अमरावतीच्या नामवंत मूर्तिकारांकडून शाडूच्या मूर्ती बनवून घेतल्या आहेत. त्या श्री शिवाजी विज्ञान महाविद्यालयाच्या वनस्पतीशास्त्र विभागात उपलब्ध करून देण्यात आल्या आहेत.

या मूर्ती आठ इंच आणि बारा इंच, या दोन आकारांमध्ये अनुक्रमे १२५ आणि २५० रुपये या किमतीला नाममात्र नफा ना तोटा तत्त्वावर विक्रीसाठी ठेवण्यात आल्या आहेत. ज्या नागरिकांना मूर्ती हवी असेल, त्यांनी महाविद्यालयात आधी नोंदणी करावी व १६ किंवा १७ सप्टेंबरला महाविद्यालयातील स्टॉलवरून प्राप्त कराव्या. अधिक माहितीसाठी ९४२३६२२२८५, ९४२३६२२२८७ किंवा ९८२२५७६०६६ या क्रमांकावर संपर्क साधावा, असे आवाहन, श्री शिवाजी विज्ञान महाविद्यालयाचे वनस्पतीशास्त्र विभागप्रमुख डॉ. प्रकाश देवतारे यांनी केले आहे. प्लास्टर ऑफ पॅरिसच्या मूर्तीचे विघटन होत नाही. नैसर्गिक जलस्त्रोतांमध्ये त्या अडथळा बनत असून झरे बंद होत आहेत. मूर्तीसाठी वापरला जाणारा रासायनिक रंग नदी, तलावांमध्ये मिसळून जलप्रदूषण वाढवत आहे. या सर्व बाबी पर्यावरणासाठी घातक असल्याने सहजरीत्या विरघळणाऱ्या मातीच्या गणेशमूर्ती वापरणे आवश्यक असल्याचे डॉ. प्रकाश देवतारे यांनी सांगितले. गेल्या वर्षी छत्रीतलावाशेजारी गणेशमूर्तींचे विसर्जन करण्यात आले होते, पण नंतर काही महिन्यातच या मूर्ती भग्नावस्थेत पडलेल्या दिसल्या. काही दिवसांपूर्वी या तलावाची साफसफाई करण्यात आली.

Dignitaries inaugurating **"Matiche Ganpati Abhiyaan"** on 16th September 2015

"**Matiche Ganpati**" in the stall at college campus

Matiche Ganpati Abhiyan 2018

Matiche Ganpati Abhiyan 2018

22) **Guest lecture of Dr. Kishore Rithe** (Founder, Satpuda Foundation, Amravati)

23) **Street play in the school premises:** To generate awareness amongst school children regarding the hazardous effects of POP and other unhealthy practices during Ganesh festival- on 1st September 2016

24) **Appeal from Ecofriends:** To keep classroom neat and clean the special dustbins prepared from waste boxes by members of Ecofriends were kept in all the classrooms on 17th October 2016

25) **Visit to Wadali Bamboo Garden** :- The department of Botany has arranged the visit of the students to Wadali garden specially to study the species of Bamboos. Now a days there is increasing demand for timber and the depletion of natural forest have encouraged the utilization of many less popular species. Bamboos have for a very long time been used as timber. Bamboos are some of the fastest-growing plants in the world and also renewable natural resource known to us. It is a small wonder and are used extensively throughout the world as an inexpensive, plentiful and sustainable material in a variety construction projects.

Being the student of Botany, they must know about these plants and it is also included in their syllabus underutilization of plants. We are fortunate to have the diversified collection of Bamboo plants from different parts of the country at Wadali Forest Garden. It is the second largest bamboo nursery of Maharastra exists in Amravati. Spread over 40 hectares, it has got 110 species of bamboo, some locally grown and some imported from countries like China, Malaysia, South America and South Africa. Mr. Salim the caretaker of this garden has given information about these Bamboo species during this visit.

Hon'ble Hemant Kumar Meena, Divisional Forest Officer, Melghat Tiger Reserve, Amravati. Guided the students and asked to register for Green Army.

26. **Paper bag making workshop:-** *Ecofriends* and Indian Women Scientist's Association Amravati Branch organized workshop on "Paper bag making" On 4th August 2018. Dr. Deeplaxmi Kulkarni, Head Department of Zoology, Bhartiya Mahavidyalay, Amravati and her students had given training of paper bag making to in all 56 students of Shri Shivaji Science College and Brijlal Biyani College. The *Ecofriends* had celebrated this year's friendship day with environment conserving message and gifting these paper bags to the faculty members of the college. The IWSA members Dr. Rina Lahriya, Dr. Kumud Chaudhari were present for this workshop.

Days Celebration by Zoology Department

Report

Sr.No.	Days celebration	Date	
1	World Tiger Day	29 July	
2	Wildlife Week (6 Oct)	1 st week of October	
3	Bird Week	1 st week of November	
4	World AIDs day	1 December	
5	World Wetland Day	2 February	
6	Great Back yard Bird Count	14 Feb	
7	Woman's Day	8 March	
8	World Sparrow Day	20 March	
9	Sparrow Day	22 May	
10	World Environment Day	5 June	

1. International Tiger Day:

Department of Zoology celebrates International Tiger day on 29 July every year.

2. **Wildlife Week celebration:**

Department of Zoology celebrates 'Wildlife Week on 1 to 7 October' every year.

3. Bird Week:

Department of Zoology celebrates 'Bird Week ' in first week of November (1 to 7 November' every year.

4. World AIDs day:

Department of Zoology celebrates 'AIDS Day' on 1 st Dec. every year.

5. World Wetland Day:

Department of Zoology celebrates 'World Wetland day' on 2 nd February every year.

6. Great Back yard Bird Count:

Department of Zoology celebrates 'Great Backyard Bird Count(GBBC)' onward 14 th February every year.

9. World Biodiversity Day:

Department of Zoology celebrates 'World Biodiversity Day' on 22 May every year.

10.World environment Day.

Department of Zoology celebrates 'World Environment Day' on 5 June every year.


Dr.Salim Ali
Wildlife and Environment Conservation Society, Amravati
Shri Shivaji Science College, Amravati
Birth Anniversary of
Dr. Salim Ali

USE of Bicycle

Awareness for minimize the Air pollution

Organized Cycle Rally:

- Department of Zoology had organized **Cycle rally as a part of Wild Week celebration** on date **02 Oct 2015 in collaboration with Melghat Tiger Reserve Office and Wildlife and Environment Conservation Society, Amravati.** In all 30 students were participated from department in Cycle rally.

- Department of Zoology had organized **Cycle rally and Plastic removal drive at Chatri lake as a part of Wild Week celebration** on date **02 Oct 2016 in collaboration with Melghat Tiger Reserve Office and Wildlife and Environment Conservation Society, Amravati.** Teachers and students were participated from the department in Cycle rally.

Bicycle Rally as a part of Wild Week celebration


SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S
SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI.
वन्यजीव सप्ताह
भव्य सायकल रॅली
CYCLE RALLY

Beat the Plastic Pollution

- Department of Zoology had organized **Cycle rally and Plastic removal drive at Chatri lake as a part of Wild Week celebration** on date **02 Oct 2016 in collaboration with Melghat Tiger Reserve Office and Wildlife and Environment Conservation Society, Amravati.** Teachers and students were participated from the department in Cycle rally.

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Dept. of Environmental Science

Activities Report:2020-21

1. **Title of the activity : Essay/ Article / Blogging Competition on the theme "Solution to Carbon Emission"**

Objective: The objective of the activity was to celebrate **National Science Day-2021** and aware students about **carbon footprints** which is a measure of the impact your activities have on the amount of carbon dioxide (CO2) produced through the burning of fossil fuels and is expressed as a weight of CO2 emissions produced in tonnes.etc.

Activity conducted: The activity was conducted on the eve of **National Science Day -2021**which was about to be celebrated in the college **on 28th Feb.2021**. The NSD committee provided lists of activities among which dept. has to choose one activity, which can be done in online mode. Brochure of the activity was sent on students what's app group and asked to write their views on the theme of the activity i.e. "Solution to Carbon Emission" in the form of Essay/Article or Blog in 200 to 500 words and send it to the e-mail given in the brochure.18 students participated in the activity. Most of the students sent the essay on the theme of the competition. All the write-ups were scrutinized by the experts and 1st, 2nd and 3rd winners weredeclared. The e-certificates were provided to all the participant students. It was decided by the NSD Committee that winner students will be provided hard copy of the certificatewhen college will reopen after lockdown.

Outcome: The activity made students to think on the theme deeply and innovatively so that they could put forth solutions of the problem. The activity made the students to read on the topic, thus improved their knowledge and also helped to aware them about the burning topic of carbon emission.

Brochure of the activity

Shri Shivaji Science College, Amravati
Department of Environmental Science
NATIONAL SCIENCE DAY 2021
ESSAY/ARTICLE/BLOG COMPETITION
(THEME- Solution to Carbon Emission)
Result

Ist winner	Ms. Kalyani Satish Thakare (M.Sc. Ist.Year)
IInd winner	Mr. Yash Vidyadhar Dalvi (B.Sc. Ist.Year)
Consolation prize	Ms. Aishwarya D. Tayade (B.Sc. III rd Year)

Winners of the activity

2. **Title of the activity:"Photo/ Selfie with Plant"**

Objective: Celebration of **Earth Day-2021** by encouraging students for plantation at home or in their vicinity to get the benefits and services from plants such as increase of oxygen level in the atmosphere in covid pandemic period etc.

Activity conducted: The activity was conducted **on 22nd April 2021** on the eve of **Earth Day-2021.** Earth Day is symbolic of all that we are aiming to do to make this world a better place for future generations. Brochurewith instructions of the activity was sent to students &faculty staff. They are instructed to plant a sapling or plant a tree with their own name or in the name their loved ones and asked them to send a selfie or photowith planted sapling or plant through provided registration link. Each participant was honored with 'Green Beret' and awarded with e-certificate having a space for his / her selfie/photograph. Near about 50 students participated in the activity.

Outcome: Students actively participated in the activity and planted about 50 plants in the yards & in the vicinity of their house and sent selfie with plant. The activity will surely inculcate among students the habit of planting and taking care of plants. Thus it will surelyhelp to sprout affection towards our mother earth & inspires to act towards the protection of the environment and focus on the need for conservation.

Brochure of ' Photo/Selfie with Plant' activity

Respected Sir / Madam🙏□

it's our intense 🌳🌳🌳 eco pleasure to announce that on the occasion of **Earth Day** 🌎 **22April** Department of **Environmental Science** is taking the cognigence of current pandemic situation and significance of oxygen is being □□🌴🌴 highlighted by organising tree 🌲🌲🌲 plantation i.e.for student activity by staying at home and🙏□🙏□🙏□ being safe . Plz convey to your students to participate in the activity.

Link for sending Photo : https://docs.google.com/forms/d/1UkrMfbZN-lH8-ucSQ0ks1UoQ01nkf7K_vOloegOpvKY/edit?usp=sharingThanks.🌴🌴🌴

Message to faculty members with link for registration & sending photo for the activity

Students participated in ‘ Photo/ Selfie with Plant’ activity

3. Title of the activity :Webinar on - Environmental Research and Urban Mobility in Amravati.

Objective: To inform & motivate students & the society about the need to increase the number of buses in the city to reduce airpollution and problems related to it.

Activity conducted: Parisar society of Pune in collaboration with Department of Environmental Science, Shri. Shivaji Science College organized webinar**on dated 19th May2021** on the topic- "Environmental Research and Urban Mobility in Amravati" to reach the voice of urge to encourage students, society and Govt. authorities improve the public transport system by increasing the number of busesas per standard ratio. For this panel discussion was organized in Dr. Sangita Ingole, Head, Dept. of Environmental Science was participated as a panelist along with Dr. NishikantKale,Prof.RamMeghe College of Engg. and management, Badnera; Yadav Tarter Patil, Writer & Environmentalist; Praful Sawarkar, Environmentalist and Yashraj Ingole, Research Scholar,,Prof.Ram Meghe College of Engg. and management, Badnera.

Panelists expressed their views. Dr. S.P. Ingole focused on the pollution caused due to automobiles. Dr. Nishikant Kale I nformed about the carbon footprints in detail.YadavTarte patil expressed the need to save biodiversity from air pollution and Praful Sawarkar guided about the various diseases. Parisar officials informed that there is need of 50 buses per one lakh population.

Outcome: The webinar arouse awareness in the students and the society thatthere is need of 50 buses per one lakh population as per standards and every has to raise a voice for it to safeguard the air & health of people from pollution by rising number of personal vehicles

Parisar and ShriShivaji Science College, Amravati presents

Engage for Environment Webinar Series

* 1- Environmental Research and Urban Mobility in Amravati*

Date - 19-5-21 , 4 PM

Respected Panelist of this Webinar

Dr. S. P. Ingole
HoD, Environmental Science Department, Shri Shivaji Science College of Amravati

Dr. Nishikant Kale
Prof Ram Meghe College of Engineering and Management, Badnera– Amravati

Yadav Tarte Patil
Writer, Environmentalist

Yashraj Ingole
Research Scholar, Department of Civil Engineering, Prof Ram Meghe College of Engineering and Management, Badnera-Amravati.

PrafullSavarakar
Environmentalist

To Join our webinar-
Click on this link to join us tomorrow -
https://t.co/RoxG1DpWBP

For more info
Prashant - 8208382708

Joining Link and webinar Information provided to students

Brochure of the Webinar

अमरावतीच्या उज्ज्वल भविष्यासाठी सिटी बसेसची संख्या वाढवाव्यात

अमरावतीतील पर्यावरण तज्ज्ञ : विद्यार्थी व शैक्षणिक संस्थांनी शहराच्या पर्यावरणाची जबाबदारी घ्यावी

News about Webinar publishedin Newspaper

4. Title of the activity:Online Webinar for UG, PG & Research students on 5th June2021 on the eve of "World Environment Day - 2021"

Objective:"To arouse awareness in the society through students to conserve & protect our Environment.

Activity conducted: On the Eve of **"World Environment Day 2021"**Dept. of Environmental Science, Shri. Shivaji Science College, Amravati in collaboration with Dept. of Geography, Shri.Shivaji Arts & Commerce College Amravati, organized Online Webinar for UG, PG & Research students **on 5th June 2021** " Students were informed & brochure of the programme was sent on what's app groups. Zoom links for registration, for joining the webinar and YouTube live link were also shared with students.Prof. Pravin Khandve, Head, Dept. of Civil Engg., Prof. Ram MegheCollege of Engg. and management,Badnera and Mr. AdwaitKeole, Environmentalist & Alumni of our Department were present as speakers of the webinar. Dr. Vandana Deshmukh, Head, Dept. of Geography, gave the introductory speech of the programme. Dr. SangitaIngole, Head, Dept. of Environmental Science introduced the guest.

Prof. Khandve guided students on the topic " Green Building : A new concept" He told that by using the windows, ventilation, rainwater harvesting, reuse of water, use of solar powered equipment, conversion of household waste into bio compost, we can convert our home into a sustainable green building. He also urged the audience to use manufactured sand instead of natural sand while constructing house.

Mr. AdwaitKeolespoke on the topic "Hidden world of Caves". He said that there is need of research in the field of caves. He explained the topic in detail and throws a light on the new concepts like cavers, stalactite, and stalagmite in a simple language. He shared some thrilling photographs related to caves with students. Near about 150 students attended the webinar.Programme anchoring and vote of thanks was given by Dr. Kirtidhvaj Gawai. Prof. Khandve managed the work of admin for the programme. Faculty member Mr. Vikrant Bute work hard for the successful conduction of the programme.

Outcome: Students learnt about the concept of green buildings, how to make our home into a green building, about manufactured sand. Students also learnt about caves such as time period it required, how they form, new concepts related to caves etc.

Screen shot of webinar online platform showing the speakers and faculty members of both departments Celebrating World Environment Day 2020-21

Brochure of the Webinar for the celebration of World environment Day 2021 withactive zoom link for registration and YouTube live link

Link for Joining the Webinar :
https://us02web.zoom.us/j/82739719593?pwd=SzNNMzlJMVhGV21TVWpmbitLSysyZz09

'जागतिक पर्यावरण' दिनानिमित्य वेबिनारचे आयोजन

अमरावती (प्रतिनिधी) जागतिक पर्यावरण दिन -२०२१ चे औचित्य साधून पर्यावरणशास्त्र विभाग. श्री शिवाजी विज्ञान महाविद्यालय व भूगोल विभाग श्री शिवाजी कला व वाणिज्य महाविद्यालय अमरावती यांच्या संयुक्त विद्यमाने वेबिनारचे आयोजन करून जागतिक पर्यावरण दिवस साजरा करण्यात आला. वेबिनारचे प्रास्ताविक भूगोल विभागप्रमुख डॉ . वंदना देशमुख यांनी केले. वक्त्यांचा परिचय पर्यावरणशास्त्र विभाग प्रमुख डॉ . संगीता पी इंगोले यांनी करून दिला. वेबिनारसाठी प्रो. राम मेघे इंजि. व मॅनेजमेन्ट कॉलेज, बडनेरा येथील सिव्हिल इंजि. विभाग प्रमुख प्रा. प्रवीण खांडवे व पर्यावरण तज्ञ श्री . अद्वैत केवले हे वक्ते म्हणून उपस्थित होते.

प्रा. प्रवीण खांडवे यांनी 'ग्रीन बिल्डिंग अ न्यू कन्सेप्ट' या विषयावर मार्गदर्शन केले. व्याख्यानामध्ये त्यांनी खिडक्या, व्हेंटिलेशिन, रेनवॉटर हार्वेस्टिंग , पाण्याचा पुनर्वापर, सोलर पॉवर इक्विपमेन्ट , घरच्या कचऱ्याचे बायोकम्पोस्ट मध्ये रूपांतर इत्यादींचा वापर करून पर्यावरणपूरक अश्या सस्टेनेबल ग्रीन बिल्डिंग मध्ये कसे रूपांतर करता येईल याबाबत तपशीलवार माहिती विशद केली. घर बांधकाम करतेवेळी नद्यांमधील रेती न वापरता मॅन्यु फॅक्चरड रेतीचा वापर करावा असे सांगितले . वेबिनारचे दुसरे वक्ते पर्यावरणशास्त्र विभागाचे माजी विद्यार्थी श्री. अद्वैत केवले यांनी 'हिडन वर्ल्ड ऑफ केव्हज्' या विषयावर व्याख्यान दिले. यामध्ये तपशीलवार व रोमांचकारी अशी माहिती विद्यार्थ्यांसमोर विशद केली. गुहांवर भारतामध्ये संशोधन होण्याची गरज आहे असे मत व्यक्त केले. नैसर्गिक गुहांच्या निर्मितीसाठी हजारो वर्षांचा कालावधी, केवर , स्टॉलाक्टाईट , स्टॉलाग्माईट अश्या नवीनतम संकल्पना तपशीलवार सादर केल्या . कार्यक्रमाच्या यशस्वितेकरीता श्री शिवाजी विज्ञान महाविद्यालयाचे प्राचार्य डॉ . वि. गो. ठाकरे व श्री शिवाजी कला व वाणिज्य महाविद्यालयाच्या प्राचार्या डॉ . स्मिता देशमुख यांचे मोलाचे मार्गदर्शन लाभले.वेबिनारमध्ये जवळपास १५० विद्यार्थी ऑनलाइन पद्धतीने उपस्थित होते. कार्यक्रमाचे संचालन व आभार प्रदर्शन डॉ . कीर्तीध्वज गवई यांनी केले. कार्यक्रमाचे ऍडमिन म्हणून प्रा. प्रवीण खांडवे यांनी मोलाची भूमिका बजावली. कार्यक्रमाच्या यशस्वितेकरीता प्रा. श्री विक्रांत बुटे यांचे सहकार्य लाभले.

News of the Webinar Published in "Dainik Hindusthan" on 15/06/2021

Ozone Day Celebration: 16th Sept. 2021

Title of the activity : Intercollegiate Poster Competition on the eve of World Ozone Day.

Objective: The main objective of the competition was to aware and sensitize students about importance of ozone, ozone depleting substances (ODS), it's contribution in Global warming, effect of ozone depletion, and to encourage them to work unitedly for better tomorrow.

Activity Conducted: On the eve of world ozone day , Dept. of Environmental Science In collaboration with Amravati Municipal Corporation, Amravati under "Mazi Vasundhara" organized intercollegiate poster competition in online mode. 2 subjects were given to students 1. Sources of ozone depletion and 2. Solution to the Global Warming. The students were provided with Google form link and wereasked to register and send the photo of their poster through it.

On 16th Sept., World Ozone Day 2021, color prints of the photos of the poster was taken and exhibition of the posters was arranged in the dept. of Environmental Science. The posters were judged by Dr. G. A. Wagh of Dept. of Zoology for the first, second and consolation prize in each of the 2 topics. The formal inauguration of the poster competition was done by the hands of the respected principal of the college Dr. G. N. Chaudhari in the presence of Head, Dept. of Environmnetal Science Dr. S. P. Ignoreand other faculty members of the Dept. Dr. K. J. Gawai and Mr. V. D. Bute

Outcome : To make the poster for the Ozone Day, students read about the ozone depletion in detail, searched for the different posters they can use to prepare their own poster. Thus by this activity, students were awaredabout the effects of the ozone, ozone depleting substances (ODS), correlation of ozone depletion and global warming, their role in preventing the phenomenon.

Message Sent on Student's what'sapp Group

Greetings of the Day□ Dear Students,
On the eve of "World Ozone Day,16th Sept. 2021", Dept.of Environmental Science, Shri. Shivaji Science College, Amravati & Amravati Municipal Corporation, Amravati jointly organizing "Intercollegiate Poster Competition" on the topics
1. Sources of Ozone Depletion & 2. Solutions to Global Warming
Grace the event with your participation & Submit the photo of your poster on any one of the above topics with the help of below link
Date & Time : Up to 12.00 p.m. on or before 16th Sept. 2021.
Link for Submission
:https://docs.google.com/forms/d/e/1FAIpQLSc7ulrXKjMjNEWGXEvNDUrQ8gcHG7FYtx0pzA-2pH0ZFp6K4Q/viewform?usp=pp_url

Note : All the participants will get e- certificate.
□"Let's Work Unitedly for Better Tomorrow"□

Thanks.
Dept. of Environmental Science.

Brochure of Ozone Day

Shri Shivaji Education Society Amravati's

Shri Shivaji Science College, Amravati

NAAC accredited by "A Grade" CGPA 3.13 (3rd Cycle), UGC Awarded "College with Potential for Excellence" (2nd Phase) Identified by DST, Govt. of India under FIST and Sant Gadge Baba Amravati University as "Lead College".

On the eve of World Ozone Day

Department of Environmental Science &

Amravati Municipal Corporation, Amravati

Jointly Organizing

Intercollegiate Poster Competition

Under 'Mazi Vasundhara'

- Topic -

1. Sources of Ozone Depletion & 2. Solutions to Global Warming

Dt. 16 September, 2021

CERTIFICATE

This is to Certify, that

Ku. Kalyani P. Chaware, Shri. Shivaji Science College,Amravati

has participated in "Intercollegiate Poster Competition"
on "Sources of Ozone Depletion & Solutions to Global Warming"
organized by Department of Environmental Science and
Amravati Municipal Corporation, Amravati
and secured Consolation Prize.

Dr. G. N. Chaudhari, Principal, Shri Shivaji Science College, Amravati

Dr. S. P. Ingole, Head, Dept. of Environment Science

Dr. K. J. Gawai, Program Coordinator, Shri Shivaji Science College, Amravati

Shri Shivaji Education Society Amravati's

Shri Shivaji Science College, Amravati

NAAC accredited by "A Grade" CGPA 3.13 (3rd Cycle), UGC Awarded "College with Potential for Excellence" (2nd Phase) Identified by DST, Govt. of India under FIST and Sant Gadge Baba Amravati University as "Lead College".

On the eve of World Ozone Day

Department of Environmental Science &

Amravati Municipal Corporation, Amravati

Jointly Organizing

Intercollegiate Poster Competition

Under 'Mazi Vasundhara'

- Topic -

1. Sources of Ozone Depletion & 2. Solutions to Global Warming

Dt. 16 September, 2021

CERTIFICATE

This is to Certify, that

Dr. K. J. Gawai, Shri Shivaji Science College, Amravati

has participated in "Intercollegiate Poster Competition"
on "Sources of Ozone Depletion & Solutions to Global Warming"
organized by Department of Environmental Science and
Amravati Municipal Corporation, Amravati.

Dr. G. N. Chaudhari, Principal, Shri Shivaji Science College, Amravati

Dr. S. P. Ingole, Head, Dept. of Environment Science

Dr. K. J. Gawai, Program Coordinator, Shri Shivaji Science College, Amravati

Sample Certificate of Ozone Day issued to students

गुरुवार, दि. २३ सप्टेंबर २०२१ www.dainikhindusthan.com

जागतिक ओझोन दिनानिमित्त आंतरमहाविद्यालयीन पोस्टर स्पर्धेचे आयोजन

अमरावती दि. २२ : जागतिक ओझोन दिनानिमित्त श्री.शिवाजी विज्ञान महाविदयालय, अमरावती व अमरावती महानगरपालिका ,अमरावती माझी वसुंधरा अंतर्गत संयुक्त विद्यमाने 'आंतरमहाविद्यालयीन पोस्टर स्पर्धेचे' आभासी पद्धतीने आयोजन करण्यात आले. विद्यार्थ्यांमध्ये , ओझोनचे महत्व, ओझोन थरातील घट होण्यास कारणीभूत असलेले पदार्थ , जागतिक तापमानवाढीत त्याचे योगदान,ओझोन अवक्षयाचे परिणाम इत्यादींबद्दल जनजागृती करणे, उज्वल भविष्यासाठी एकत्रित काम करण्यासाठी त्यांना प्रवृत्त करणे हा या स्पर्धेमागील उद्देश होता. स्पर्धेसाठी दोन विषय

देण्यात आले १) ओझोन अवक्षयाचे स्रोत व २) जागतिक तापमान वाढीवरील उपाय. या आभासी स्पर्धेसाठी ४० विद्यार्थ्यांनी आपला सहभाग नोंदविला. स्पर्धेसाठी विद्यार्थ्यांना गुगल फॉर्मची लिंक देण्यात आली व त्यावर रेजिस्ट्रेशन करून पोस्टरचे फोटो पाठविण्यास सांगण्यात आले.

जागतिक ओझोन दिन १६सप्टेंबर ला त्या फोटोच्या कलर प्रिंट काढून त्या पर्यावरण शास्त्र विभागात प्रदर्शित करण्यात आल्या. महाविद्यालयातील प्राणिशास्त्र विभागातील डॉ. गजानन वाघ यांचेकडून त्यां पोस्टरमधून प्रत्येक विषयांमधून प्रत्येकी उत्कृष्ट दोन पोस्टर व एक -एक प्रोत्साहनपर विजेते काढण्यात आले. त्यानंतर स्पर्धेचे औपचारिक उदघाटन महाविद्यालयाचे प्राचार्य आदरणीय डॉ. जी. एन. चौधरी यांचे हस्ते करण्यात आले. याप्रसंगी पर्यावरणशास्त्र विभागप्रमुख डॉ. संगीता इंगोले, डॉ. कीर्तिध्वज गवई, श्री. विक्रांत बुटे व डॉ. गजानन वाघ उपस्थित होते. या स्पर्धेच्या यशस्वीतेकरिता विभागातील शिक्षकेतर कर्मचाऱ्यांचे मोलाचे सहकार्य लाभले.

चांदूरबाजार तालुक्यात ४४,५१६.३० हेक्टरवर खरीपाची पेरणी

मागिल वर्षी पेक्षा,७८७ हेक्टरने पेरा घटला

यंदाच्या खरीपात तूरीचा पेरा वाढला, सोयाबीन, कापूस पेऱ्यात घट

-Ozone Day News published in Hindustan Daily News Paper-

"Wildlife Week :2021"

Title of the activities: **Activity 1 :-"Slogan Competition" on the topics i. Protection of livelihood in forest ii. Sustaining people and planet.&**

Activity 2 :-Webinar on the Topic "Forest & wildlife conservation through community participation."

Objective: The main objective of the competition was to aware students about importance of protection & conservation of wildlife to maintain the balance of environment in nature.

Activity Conducted: On the eve of wildlife week : 2021, Dept. of Environmental Science in collaboration with Amravati Municipal Corporation, Amravati under "Mazi Vasundhara" organized 2 activities viz. 1. **"Slogan Competition"** on the topics i. Protection of livelihood in forest ii. Sustaining people and planet.& 2.**Webinar** on the Topic **"Forest & wildlife conservation through community participation."**

For slogan competition, Google form link was sent to all Dept. student's what's app group and were asked to register and send the slogan through it. Zoom link provided by the college was sent to all Dept. student's what's app group to attend the Webinar.

On 7th Oct. 2021 webinar was conducted from12.30 to 2.00 P.M. on Zoom app .The results of the slogan competition was also declared after the webinar by Mr. Dhananjay Sayre, speaker of the webinar, alumina of Dept, CEO- NISARGA Agro Forestry Tech Net Melghat & Resource Person- Center For Environment education.- Pune.

Introductory speech of the program was given by Dr. S. P. Ingole. Head, Dept. of Environmental Science. Anchoring of the program & vote of thanks was given by Dr. K. J. Gawai. Faculty of Dept., Mr. V. D. Bute and non teaching members of the Dept. worked hard for the successful organization of the program.

Outcome : To prepare the slogan for wildlife week, students read about the wildlife , searched for the different slogans, searched the different words related to wildlife and their meaning which they can use to prepare their own slogan. Thus by this activity, students were awared about the different aspects related to wildlife viz. their decreasing numbers, need of conservation, protection, habitat loss etc.

Brochure of Wildlife Week : 2021

Greetings of the Day
Dear Students,
On the eve of "Wildlife Week 2021", Dept.of Environmental Science, Shri. Shivaji Science College, Amravati & Amravati Municipal Corporation, Amravati, under "Mazi Vasundhara" jointly organizing
Activity 1 :- "Slogan Competition" on the topics
1. Protection of livelihood in forest 2. Sustaining people and planet. &
Activity 2 :- Webinar on the Topic "Forest & wildlife conservation through community participation." on 7th Oct. 2021 at 12.30 p.m. by Mr. Dhanajay Sayre, CEO- NISARGA Agro Forestry Tech Net Melghat , Resource Person- Center For Environment education.- Pune.
Submit your "Slogan" on any one of the above topics with the help of below link
Upto 6 october 2021.
Link for Submission of Slogan : https://docs.google.com/forms/d/e/1FAIpQLSerUBHFQ4nqSTR-S4SRFQWxN38te9nyjPE5eCh8yJTCQ-fBuA/viewform?usp=pp_url
Note : All the participants will get e- certificate.
Thanks.
Dept. of Environmental Science.

Slogan Competition Message sent on Students What's App Group

Shri. Shivaji Science College, Amravati is inviting you to a scheduled Zoom meeting of Department of Environmental Science. " Wildlife Week -2021"
Webinar on

Topic: "Forest & Wildlife Conservation through Community Participation"
Speaker - Mr. Dhananjay Sayare
- CEO, NISARGA Agro forestry Tech Net Melghat.
- Resource Person, Center For Environment Education, Pune.

&

Declaration of "Slogan Competition" Result .

Time: Oct 7, 2021 12:30 India

Join Zoom Meeting

https://us02web.zoom.us/j/81681125617?pwd=bVhVdnlLRmVpaGJUNnozSllRTTYydz09

Meeting ID: 816 8112 5617

Passcode: 210632

-Zoom Meeting Link For Webinar sent on students whats app Group-

प्रथम-

कृतिका जगदीश मोहोड, MSc 2nd इयर

श्री शिवाजी सायन्स कॉलेज

द्वितीय

योगेश्वरी साहेबराव सुर्वे, BSc 1st year

श्री शिवाजी सायन्स कॉलेज

तृतीय

अश्विनी दिनेश तांबडे, MSc 2nd year

श्री शिबाजी सायन्स कॉलेज

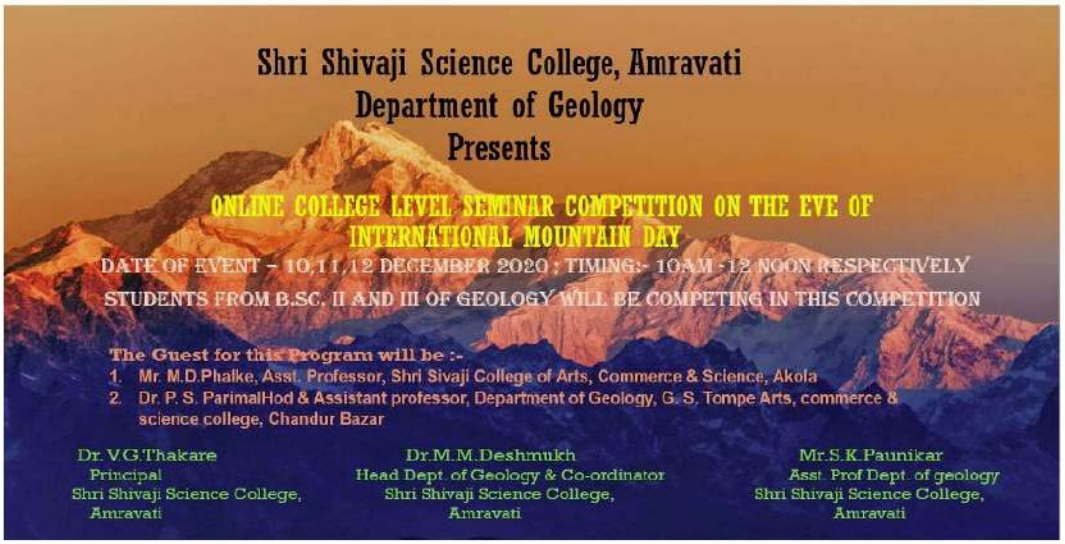
-Winners of Slogan Competition-

-Screenshots of Webinar-

Activities organized related with environment issue

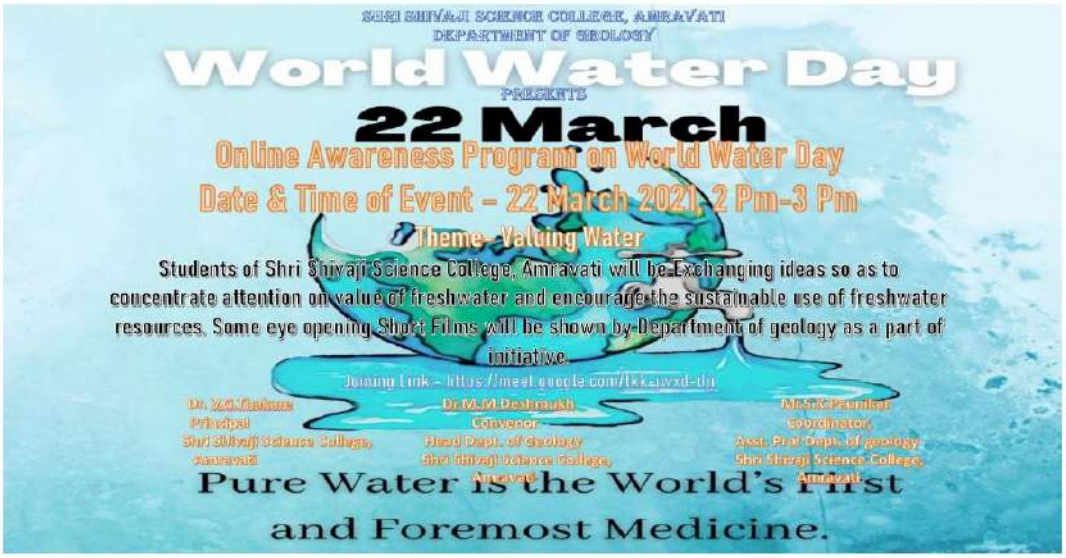
International Mountain Day

- On the eve of International Mountain Day Department of Geology organized three days online seminar competition dated 10, 11, 12 December 2020 for B.Sc. II & III Geology students of our college. International Mountain Day celebrate to create awareness about the importance of mountains to life, to highlight the opportunities and constraints in mountain development, and to build alliances that will bring positive change to mountain peoples and environments around the world. On the eve of this Department of Geology organized three days online seminar competition dated 10, 11, 12 December 2020 for B.Sc. II & III Geology students of our college. The guest for this program was Dr.P. S. Parimal, Head & Assistant professor, Dept. of Geology, G.S. Tompe College, Chandur Bazar and Mr. M. D. Falke, Assistant Professor, Dept. of Geology, Shri SHIVAJI Arts, Commerce & Science College, Amravati.
- Three Day Seminar Competition was organized for B.Sc. II & III Geology students. 47 Students from B.Sc. II & III Geology (PHG+CAP) participated in the Seminar Competition where Ku. Dipti Sudhir Wankhade won 1st place and Ku. Sayali Dinesh Hore won 2nd place, Ku. Vaishnavi Gajanan Wayakar and Mr. Om Shinde won 3rd place.



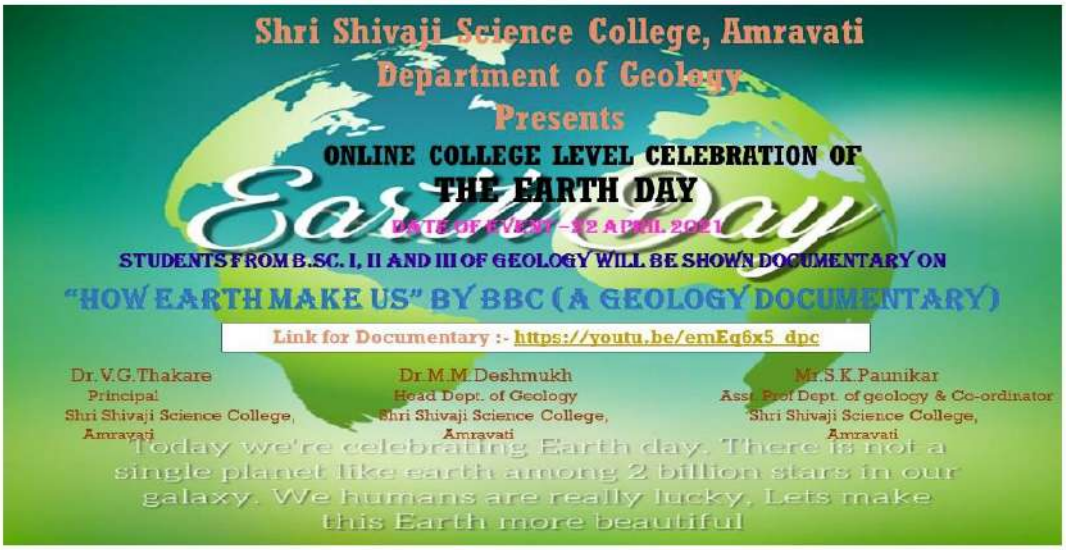
World Water Day:

On the eve of World water Day Department of Geology organized online Awareness Program on the theme valuing water dated 22 March 2021 for B.Sc. students of our college. Dr. Mayura Deshmukh Head & Assistant Professor, Department of Geology, and. Mr. Saurbh Paunikar, Assistant Professor, Department of Geology and Students of Shri Shivaji Science College, Amravati was Exchanging ideas so as to concentrate attention on value of freshwater and encourage the sustainable use of freshwater resources. Some eye-opening Short Films was shown by Department of geology as a part of initiative.



Earth Day:

On the eve of Earth Day Department of Geology organized online a Geology Documentary on "How Earth Make Us" Program shown on the theme valuing earth dated 22 April 2021 for B.Sc. Geology students of our college. Earth Day celebrate to create awareness about the people to encourage environmental protections and encourage people to recycle.



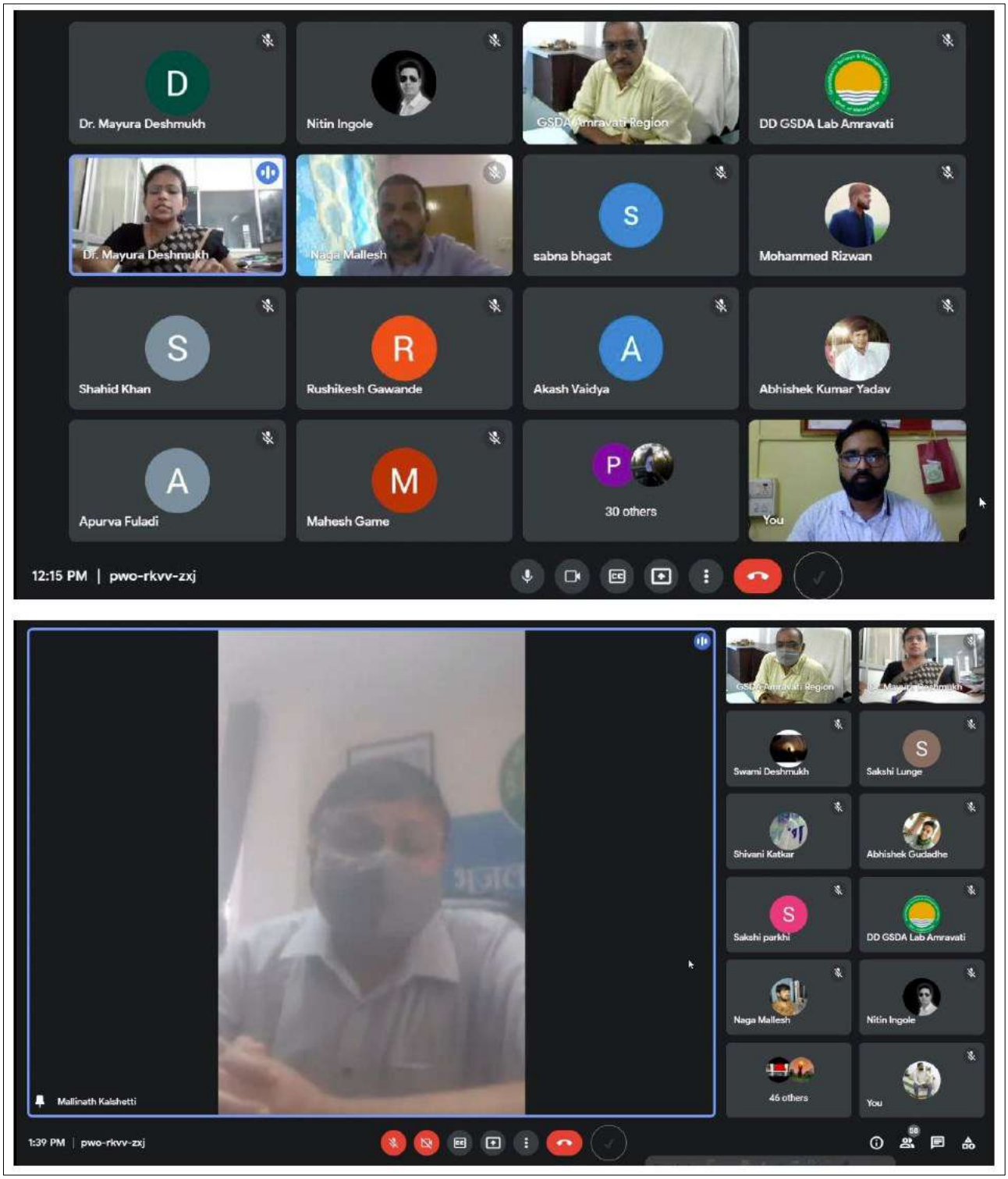
World Environment Day:

Department of geology and B.Sc. Geology students were celebrated "World Environment Day" with by taking a pledge to protect and grow the plant and also to promise to save environment dated 5 June 2021.

World Water Week:

The week from 23rd August to 26th August is celebrated all over the country as World Water Week. On this occasion, on 24th August 2021, at A one day online work shop was Dept. of Geology organized collaboration with Groundwater Survey and Development Institute Amravati (GSDA), Government of Maharashtra between 12 to 3 p.m. This medium has been used to spread more information and communication about groundwater management and geology among the people. Special guidance has also been received to create awareness about job and business opportunities in groundwater management and geology. In the online work school, Mr. Sanjay Karad, Deputy Director, Groundwater Survey and Development Institute, Amravati Pradesh, Amravati, Government of Maharashtra.

Students received valuable guidance on how groundwater management and geology students can demonstrate through field work and make local people aware of various techniques of groundwater conservation. Dr. Mallinath Kalashetti, (IAS) Director, Groundwater Survey and Development Institute, Government of Maharashtra, was the chief guest and the students received valuable guidance on their groundwater management. Mrs. Prarthana Divare, Assistant Chemist, NABL Accredited, Regional Water Testing Laboratory, Groundwater Survey and Development Institute, Amravati, Government of Maharashtra demonstrated the analysis of water quality and received valuable guidance from the students. Shri Nagmallesh Gampala, Geophysicist, Institute of Groundwater Survey and Development, Amravati received valuable guidance on Geophysical Survey Methods. 100 students were present in this program and also assistant professors were present and everyone showed good response.


Dr. Mayura Deshmukh
Nitin Ingole
GSDA Amravati Region
DD GSDA Lab Amravati
Dr. Mayura Deshmukh
Naga Mallesh
sabna bhagat
Mohammed Rizwan
Shahid Khan
Rushikesh Gawande
Akash Vaidya
Abhishek Kumar Yadav
Apurva Fuladi
Mahesh Game
30 others
You
12:15 PM | pwo-rkvv-zxj
Mallinath Kalshetti
Swami Deshmukh
Sakshi Lunge
Shivani Katkar
Abhishek Gudadhe
Sakshi parkhi
DD GSDA Lab Amravati
Naga Mallesh
Nitin Ingole
46 others
You
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Department of Zoology

Activities conducted by Zoology Department regarding Environment & Sustainability

1) Clay Ganesh Idol Awareness Program
2) WildLife Week celebration
3) World Wetland Day Program
4) **World Biodiversity day Program**
5) World Environment day
6) Guest lectures on Green Education

1) Clay Ganesh Idol Awareness Program:

Environment Awareness program ie., Clay Ganesh Idol Program entitled **"Matiche Ganapati Basawa Nisargashi Bandhilki Dakhawa"** was organized by Wildlife and Environment Conservation Society (WECS), Amravati in Collaboration of Department of Zoology, Shri Shivaji Science College, Amravati on 8,9 & 10 September 2021. In all 06 students & 04 teachers of the department were participated in this environment awareness Program. More than 600 people from the Amravati region benefited from this environment protection activity.

List of students participated in Clay Ganesh Idol Awareness Program :

Sr.No.	Name of the students
1	Mr.Sashank Nagrale
2	Mr.Mohit Gawande
3	Mr.Jagdeo Iwane
4	Ku.Onam Tiirmare
5	Mr.Anand Mohod
6	Mr.Abhishekh Dhikar

Department of Zoology staff & students participated in Environment Protection campaign

2) Wild Life Week program:

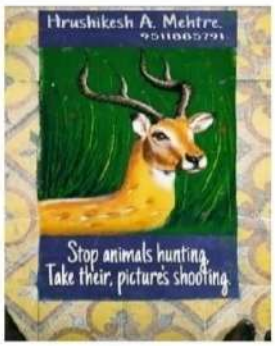
To mark **the wildlife week 2020** celebration on 4-5 October 2020 Department of Zoology was organised the **online power Point presentation Competition & Rangoli Competition** in collaboration with Wildlife and Environment Conservation Society (WECS), Amravati. Theme for the Rangoli competition was **'Face of Wildlife'** and for Power point presentation, **"Save Wildlife"**. In all 30 students were participated in Rangoli Competition & 11 students were participated in PPT creation & presentation Competition. Dr.G.A.Wagh was the coordinator of the Wildlife week Program.

List of students participated in wildlife week competition Program :

Sr.No.	Name of the students
1	Kalyani Santosh Kharat, Shri Vyankatesh College, Deulgaon Raja
2	Sakshi S. Tidke, Shri Vyankatesh College, Deulgaon Raja
3	Kajal Narayan Nikalje, Shri Vyankatesh College, Deulgaon Raja
4	Vaishnavi Vitthal Malode, Shri Vyankatesh College, Deulgaon Raja
5	Siddhi Suresh Bhorje, Shri Vyankatesh College, Deulgaon Raja
6	Maheshwari Mohan Punde, Shri Vyankatesh College, Deulgaon Raja
7	Varsha Vitthal Satbhai, Shri Vyankatesh College, Deulgaon Raja
8	Bhagyashri Anil Ghayal, Shri Vyankatesh College, Deulgaon Raja
9	Manisha Shivaji Shiralkar, Shri Vyankatesh College, Deulgaon Raja
10	Vaishnavi Gajanan Tidake, Shri Vyankatesh College, Deulgaon Raja
11	Komal Madhukar Girhe, Shri Vyankatesh College, Deulgaon Raja
12	Sakshi Kailas Wagh, Shri Vyankatesh College, Deulgaon Raja
13	Rutuja Ganesh Mhaske, Shri Vyankatesh College, Deulgaon Raja
14	Tejaswini Vishnu Zore, Shri Vyankatesh College, Deulgaon Raja
15	Sakshi Kailas Wagh, Shri Vyankatesh College, Deulgaon Raja
16	Prasanna Arun Sagane, Brijlal Biyani college,Amravati
17	Sakshi Tathod
18	Prerna Satish Wardhekar, Brijlal Biyani science college, Amravati
19	Sejal Sanjay Futane, Mahatma Fule mahavidyalaya Warud
21	Monali A. Vighe, Nanibhai College,B.Ed.,Amravati
21	Madhavi Wankhade
22	Shweta Chahakar
23	sanjana dhote, Rajarshee Shahu Science College Chandur Railway
24	Sunita Gajananrao Kale,Shri Shivaji science College Amravati
25	Salia Joshi, VMV,Amravati
26	Wrushikesh Mahatre, G.S.College,Khamgaon
27	Prachi Ahir, Shivaji college, Amravati
28	Namarata N.Nimbhorkar Shri,Shivaji Sci.College,Amravati
29	Vaishanavi Gulahane ,Bhartiya mahavidhyalaya,Amravati
30	Vrushali R.Ningote SGBUA,M.Sc.II Zoology

1 st prize in Rangoli

2 nd Prize Rangoli



3 rd Prize Rangoli

1 st Prize in PPT

Shri Shivaji Science College, Amravati

Department of Zoology

In association with Wildlife & environment Conservation Society, Amravati

Wildlife Week- 2020

PPT & Rangoli Competitions on Wildlife

Theme: **PPT-Save Wildlife**

Rangoli-Face of Wildlife

Results

Rangoli Competition Results:

1) Ku.Monali A.Vighe, Nanibai , B.Ed. College, Amravati

2) Ku. Sakshi Kailas Wagh, (B.Sc.III), Shri Vyankatesh Arts, Commerce and Science College, Deulgaon Raja, Dist-Buldana

3) Mr.Wrushikesh Mahatre, G.S.College, Khamgaon

Power Point Preparation Results:

1) Mr. Shashank Nagrale (B.Sc.II),Shri Shivaji Science ,College, Amravati

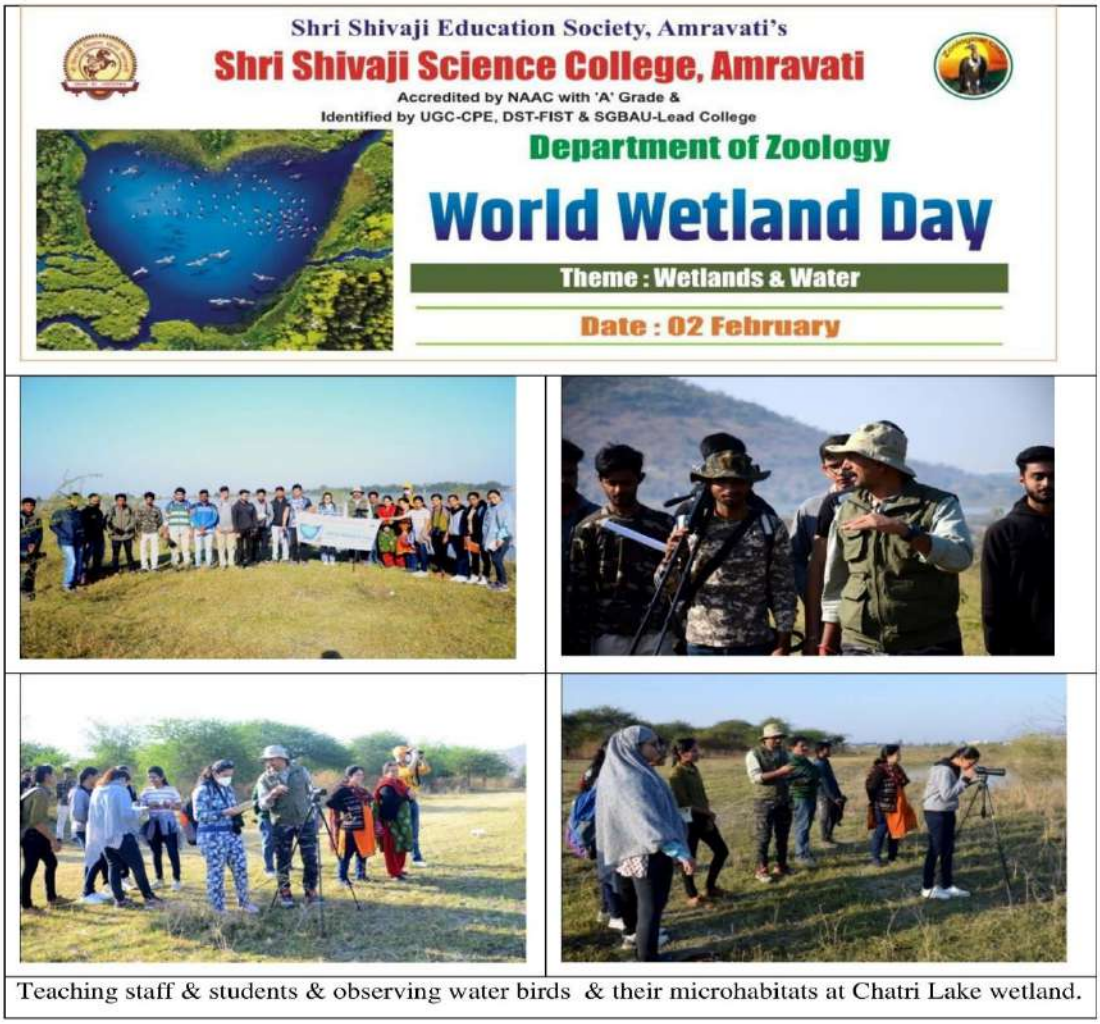
2) Ku. Maithali Delulkar(B.Sc.II), Shri Shivaji Science, College, Amravati

3) Not found suitable

Convener	Co-convener	Organizing secretary	Technical committee members
Dr.R.G.Jadhao	Dr.J.D.Dhote	Dr.G.A.Wagh	Dr.G.D.Hande Dr.R.A.Patil Bhagat Dr.S.J.Kawade

3) 'World Wetland Day- 2021'

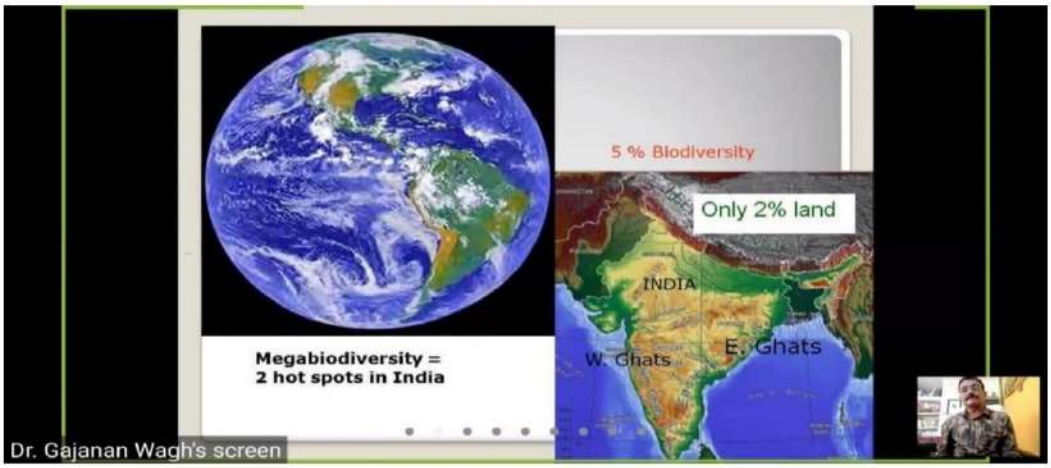
On the occasion **of 'World Wetland Day- 2021'**, Bird watching program is organized at Chatri Lake in collaboration with Wildlife & Environment Conservation Society (WECS) on 2 Feb 2021. UG, PG & COP students were participated & observed the Resident birds, Migratory birds & their micro habitats in fresh water wetland. Dr.G.A.Wagh, Dr.J.D.Dhote, Dr.Dilip Hande and Dr.Gayatri Hande were participated as the in charge teachers.



Teaching staff & students & observing water birds & their microhabitats at Chatri Lake wetland.

4) **World Biodiversity day Program**

On 22 May 2021 webinar was organized as a part of celebration of **"World Biodiversity day"**. On this occasion Dr.Jayant Wadadkar member of Maharashtra State Biodiversity Board & secretary, Wildlife & Environment Conservation Society, Amravati was delivered the lecture on **" Biodiversity, Wildlife & Forest Acts".** UG, PG & COC students were attended the Webinars. Dr.G.A.Wagh was the program coordinator.



Dr.G.A.Wagh ,MOU co-ordinator.

5. World Environment Day Program

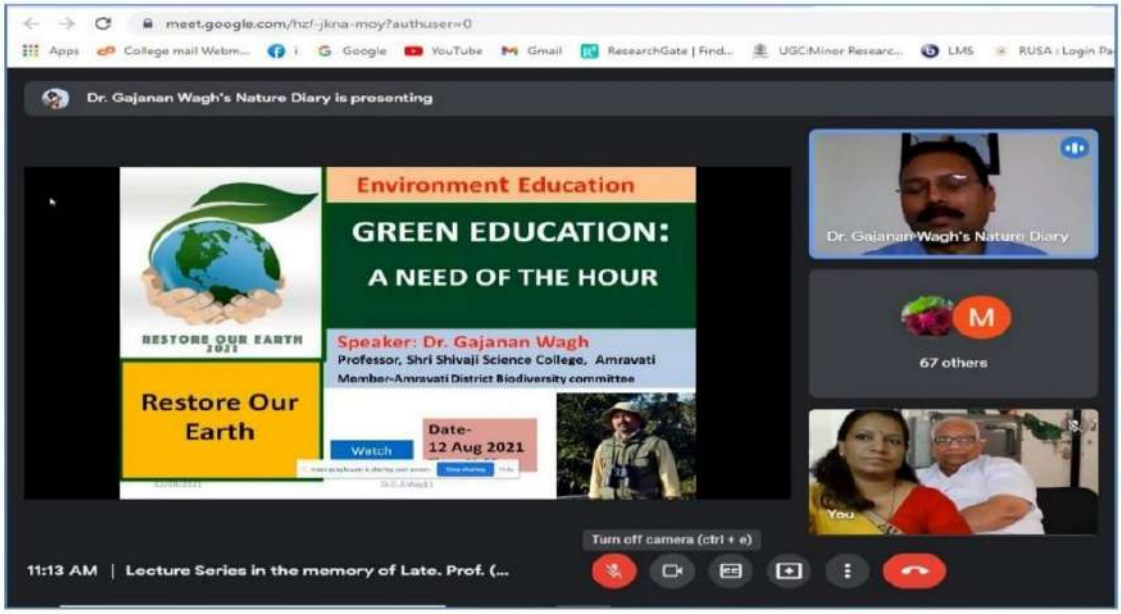
On the occasion of **World Environment Day 5 th June 2021** the Department of Zoology, Shri Shivaji Science College, Amravati was organized **intercollegiate online mobile Click Photography Competition.** Theme of World Environment Day 2021 was **"Ecosystem Restoration".** Dr.G.A.Wagh was the coordinator of the Environment Day program & Photography competition.

6. Guest Lectures:

1 .Dr.G.A. Wagh Delivered the guest lecture (Zoom Webinar) on **"Environment Education: Celebrate Eco-friendly Festivals"** This webinar was hosted by **Orchids International School Amravati** on **11 July 2021.**

Presentation delivered byDr.G.A.Wagh on Eco-friendly festival celebration

2. Dr.G.A. Wagh Delivered the guest lecture (Zoom Webinar) on **"Green Education: A need of Hour "** This webinar was hosted by **Department of Zoology, Shivaji Arts, Commerce and Science College, Chikhli** on **12 Aug 2021** to mark the **National Library Day.**



Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Shri Shivaji Science College, Amravati

Department of Botany

and

Shri Shivaji College of Agriculture Biotechnology, Amravati

Jointly Organizes

Online Poster competition

on

"Role of biotechnology for sustainable Agriculture"


Shri Shivaji Education Society Amravati's
Shri Shivaji Science College, Amravati
NAAC accredited by "A Grade" CGPA 3.13 (3rd Cycle), UGC Awarded "College with Potential for Excellence" (2nd Phase)
Identified by DST, Govt. of India under FIST and Sant Gadge Baba Amravati University as "Lead College".
Department of Botany
and
Shri Shivaji College of Agriculture Biotechnology, Amravati
Jointly Organizes
Poster Competition on
Role of Biotechnology for Sustainable Agriculture
Last date of submission 09/09/2021
Open for all UG/PG students.
Top three winners will be declared and the judges decision will be final.
Registration is compulsory for Poster Competition, No Registration Fee.
Registration Link: https://forms.gle/Yv1GeWvA7EMZ7zno7
WhatsApp Group link - https://chat.whatsapp.com/K06nzKZgN6rDmJrv2OfWbD
Telegram Link - https://t.me/joinchat/AB9ovhof8J1kNjM1
Joining of Telegram and WhatsApp group is compulsory for ease of Communication:
E- Certificate will be given to participant, only after submission of feedback.

Activities on Human values

Activities Conducted for Human Values

"Swachh Bharat Abhiyan" a week drive of cleanliness mission program under Government of India was celebrated was celebrated from 08th to 14th August, 2018, on this occasion the entire college campus was cleaned by the NSS volunteers and the oath of cleanliness was taken under the Swachh Bharat Swasth Bharat campaign.

On 3rd August 2019, For the sake of safety of the lives of college students under" Road Safety Week" road, road safety guidance message was given through demonstrations and training by the office of the commissioner of police, Amravati.

Mission on cleanliness "Swachh Bharat Abhiyan" was celebrated from 1st to 15th August, 2019, on this occasion the entire college campus was cleaned by the NSS volunteers and the oath of cleanliness was taken under the Swachh Bharat Swasth Bharat campaign.

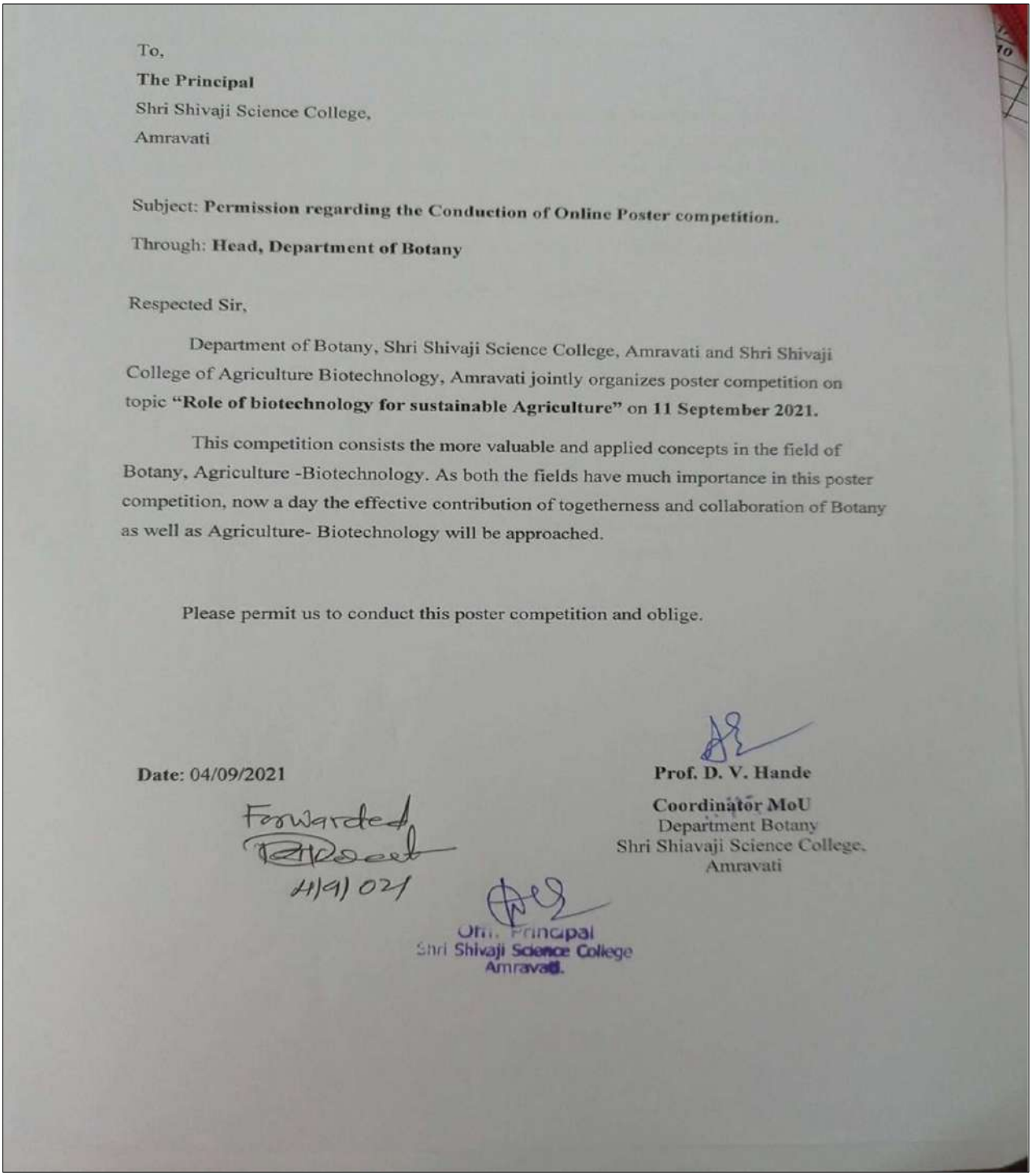
On the independence day of India, 15th August 2016, NSS students have offered the salute to the national flag of India. Under scheme of "One small buddle of scrap paper will nurture students career" NSS students collected scrap papers from college, staff members and from students homes and sell them in market and raised the money. Four meritorious and needy students were gifted with new bicycles with the hands of Principal Dr. V.G. Thakare from raised funds. This was one of the most innovative work done by NSS and college authorities.

On the occasion of Gandhi Jayanti and Lal Bahadur Shastri jayanti on 2nd October,2018, NSS swayamsevak carried out a cleanliness drive at Amravati Railway Station area and also conducted a street play at Rajkamal Chowk with the students and volunteers of NCC. **October 15**, 2018 the was celebrated as "Reading Inspiration Day" in the college on the occasion of Bharat Ratna Dr. A.P.J. Abdul Kalam's birthday. On this occasion Dr. Swapnil Arsad explained the importance of reading and all NSS volunteers recalled and saluted the memory of APJ.

NSS organised AIDS awareness rally with collaboration of Red Ribbon Club formed by District Aids Prevention and Control Unit, DAPCU, Amravati and NSS of the college on the occasion of "World AIDS Day" on 1st December, 2018.

Demonstration and training on **"Road Safety Week"** on 28th July 2017 by Amravati Commissioner of Police organised by "Succeed Safe" NGO from Mumbai for the safety of life of college students. Road safety guidance was given through demonstrations and training by Amravati and Succeed Safe in Mumbai. The program was inaugurated by Deputy Commissioner of Police Smt. Khedkar and under the guidance of Dr. Vijay Thakare. On this occasion, the students of junior and senior colleges staff took active part. Under the **initiative 'Swachh Bharat - Swastha Bharat',** the college was cleaned twice a month by NSS Volunteer.

On the occasion of "Gandhi Jayanti" on 2 October 2017 NSS volunteers clean the Amravati Railway Station and performed Street show with awareness programme. On 2nd October 2017, students participated in the AIDS Eradication Rally under DAPCU.



To,
The Principal
Shri Shivaji Science College,
Amravati

Subject: **Permission regarding the Conduction of Online Poster competition.**

Through: **Head, Department of Botany**

Respected Sir,

Department of Botany, Shri Shivaji Science College, Amravati and Shri Shivaji College of Agriculture Biotechnology, Amravati jointly organizes poster competition on topic **"Role of biotechnology for sustainable Agriculture"** on **11 September 2021.**

This competition consists the more valuable and applied concepts in the field of Botany, Agriculture -Biotechnology. As both the fields have much importance in this poster competition, now a day the effective contribution of togetherness and collaboration of Botany as well as Agriculture- Biotechnology will be approached.

Please permit us to conduct this poster competition and oblige.

Date: 04/09/2021

Prof. D. V. Hande
Coordinator MoU
Department Botany
Shri Shiavaji Science College,
Amravati

Forwarded
4/9/021

Off. Principal
Shri Shivaji Science College
Amravati.

Online Poster competition

on

"Role of biotechnology for sustainable Agriculture"

REPORT

Biotechnology has transformed both the agricultural production system and the agricultural research system, by creating a technical base that can be shared by the pharmaceutical, agricultural, chemical, and food processing industries. In the same way. biotechnology promises to change the employment base of the agricultural industries.Sustainable agriculture integrates three main goals are environmental health, economic profitability, and social equity

The Shri Shivaji Education Society is one of the prestigious educational cores in Maharashtra. It is established by Hon'ble Panjabrao Deshmukh in 1931 and today, its branches are widespread in entire Vidarbha fulfilling the dreams of the founder president for a better life of the Vidarbha peasantry. Likewise, from its inception, Shri Shivaji Science College, Amravati has played a pioneer role in academics, research and extension activities. It is actively involved in organizing conferences, workshops ,seminars competiton to enhance our education system and provide the opportunity to our students to explore by their own. Shri Shivaji Science College, Amravati Department of Botany and Shri Shivaji College of Agriculture Biotechnology, Amravati jointly Organizes Online Poster competition on **"Role of biotechnology for sustainable Agriculture"** on 11 September 2021.

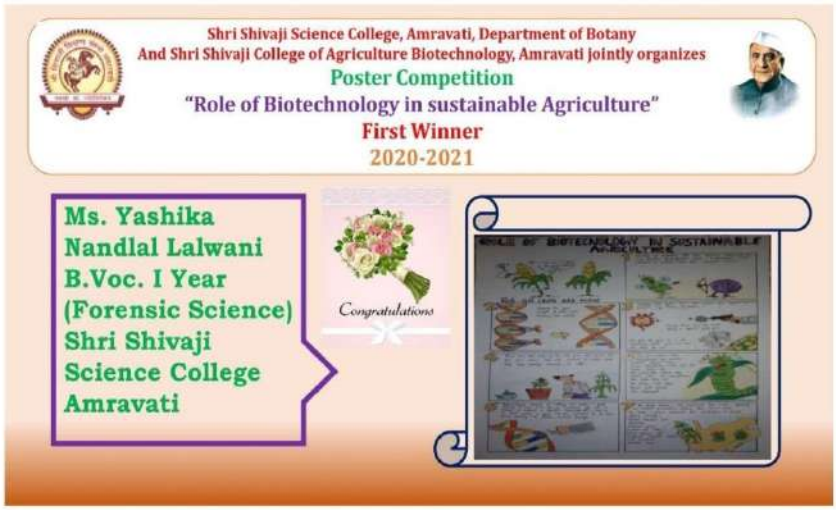
This Poster competition was open for all UG and PG students and we have received enormous response from all the corners of our nation for this competition and more than 200 participants have registered with very enthusiastically. It's really proud to mention that we could reach to Kalinga University, Raipur, Chattisgarh, Jalandhar, Latur Panjabrao Deshmukh Krishi vidyapith , Akola, Bori and Karanja for this competition This remarkable response for poster competition which has boosted our morals and encouraged us to organize similar events in future also.

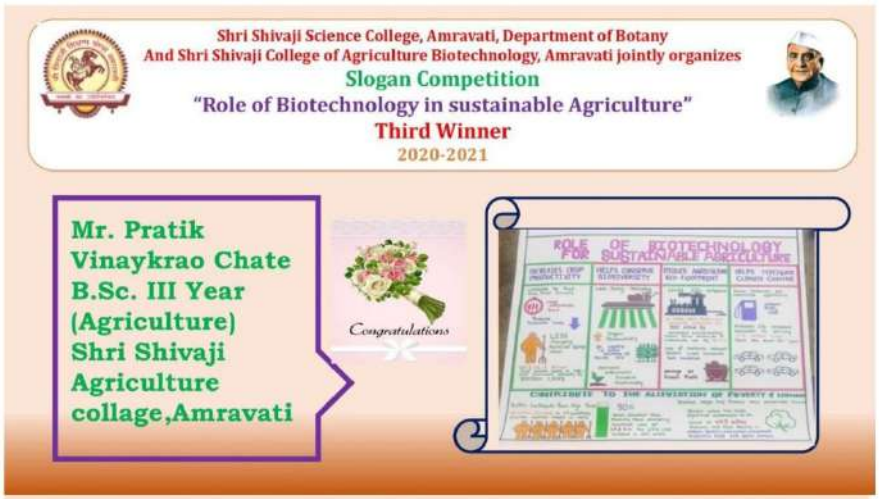
The main aim behind organizing this Poster competition was to involve and motivate students regarding Role of biotechnology, to provide combined efforts in protecting major domains of sustainable agriculture, It could not just be a practice, but rather combined strategic efforts in solving issues emerging from social demands, environmental disturbance and climatic changes.

The Jury for poster competition was Dr. Aniket Gade Associate Professor Department of Biotechnology, Sant Gadge baba Amravati University, Amravati. Our Collaborator Prof. Deepali Bharsakade, Director Shri Shivaji College of Agriculture biotechnology, Amravati for support and activity conducted jointly under memorandum of understanding.

Registration Link: https://forms.gle/PoRSBLCHsNBJhBKSA
Whatsapp Link: https://chat.whatsapp.com/K06nzKZgN6rDmJrv2OfWbD
Submission of Poster Link: https://forms.gle/JTzkp9zv1Xg5HjHn9
Telegram Link: https://t.me/joinchat/AB9ovhof8J1kNjM1
Feedback Link: https://forms.gle/fJk8QHkQjAhXtwgV6

The Winner for the Poster competition

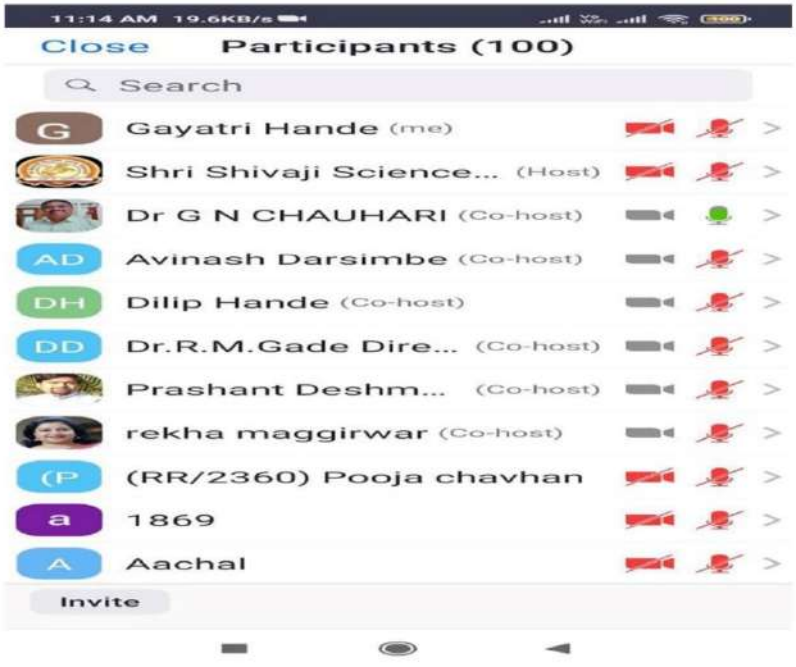



Shri Shivaji Science College, Amravati, Department of Botany
And Shri Shivaji College of Agriculture Biotechnology, Amravati jointly organizes
Slogan Competition
"Role of Biotechnology in sustainable Agriculture"
Third Winner
2020-2021
Mr. Pratik Vinaykrao Chate B.Sc. III Year (Agriculture) Shri Shivaji Agriculture collage,Amravati
Congratulations


Shri Shivaji Science College, Amravati, Department of Botany
And Shri Shivaji College of Agriculture Biotechnology, Amravati jointly organizes
Poster Competition
"Role of Biotechnology in sustainable Agriculture"
Second Winner
2020-2021
Ms. Priti Diliprao Tarpe B.Sc. II Year (CBZ Group) Brijlal Biyani science College Amravati
Congratulations


Shri Shivaji Science College, Amravati, Department of Botany
And Shri Shivaji College of Agriculture Biotechnology, Amravati jointly organizes
Slogan Competition
"Role of Biotechnology in sustainable Agriculture"
Third Winner
2020-2021
Mr. Puneet Somanagouda Bommangounder M.Sc. (Agriculture and Biotechnology) Vilasrao Deshmukh College of Agricultural Biotechnology, Latur
Congratulations

Certificate



Online Inauguration

Organizers

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

NSS volunteers cleaning village roads under Swachh Bharat Swasth Bharat Abhiyan

स्वस्थ भारत स्वच्छ भारत अभियानांतर्गत गावातील रस्ते सफाई करताना रासेयो स्वयंसेवक

शिबीर परिसर स्वच्छता व सफाई करताना रासेयो स्वयंसेवक

NSS volunteers cleaning Z.P. School and premises

जि. प. शाळेची व परिसराची सफाई करताना रासेयो स्वयंसेवक

नाल्या व भोवतालच्या साफसफाई करताना रासेयो स्वयंसेवक

NSS volunteers carrying out a cleanliness drive at Amravati Railway Station on the occasion of Gandhi Jayanti

गांधी जयंती निमित्य अमरावती रेल्वे स्टेशन येथे स्वच्छता अभियान राबवितांना

२ ऑक्टोबर २०१७ स्वच्छता अभियान कार्यक्रम अमरावती रेल्वे स्टेशन अमरावती

NSS volunteers helping with the Pulse Polio Campaign on Jan29, 2018

२९ जानेवारी २०१८ पल्स पोलिओ मोहिमेत मदत करणारे रासेयो स्वयंसेवक

ाथमिक आरोग्य केंद्रात पल्स पोलिओ डोस बालकांना देतांना रासेयो स्वयंसेविका

College students taking oath of cleanliness under Swachh Bharat Abhiyan

स्वच्छ भारत अभियान अंतर्गत महाविद्यालय परिसर झाडून स्वच्छ करण्यात आला

स्वच्छ भारत अभियान अंतर्गत स्वच्छतेची शपथ घेताना महाविद्यालयीन विद्यार्थी

Police Officer Mrs. Tidke guiding the students on Road Safety

रस्ते सुरक्षा विषयक विद्यार्थ्यांना मार्गदर्शन करिताना पोलीस अधिकारी श्रीमती तिडके

सुरक्षित रस्ते व वाहतूक नियम पालनाची शपथ घेताना महाविद्यालयीन विद्यार्थी

AIDS Awareness Rally, 01 December, 2017

१ डिसेंबर १७ जागतिक एड्स निर्मुलन दिवस बद्दल जनजागृती फेरी

जागतिक एड्स निर्मुलन दिवस निमित्य सायकल रेली मध्ये रासेयो स्वयंसेविका

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

NAAC ACCREDITED WITH 'A' GRADE

Principal
Shri Shivaji Science College
AMRAVATI.

Activities on Professional Ethics

Activities on Professional Ethics

Workshop on Effective enforcement of IPR: Patent and Copyright

Accredited by NAAC with "A" grade (very good) with a CGPA of 3.13
SHRI SHIVAJI EDUCATION SOCIETY AMRAVATI'S
SHRI SHIVAJI SCIENCE COLLEGE
College with Potential for Excellence.
Shivaji Nagar, Morshi Road, Amravati - 444 603, M.S.
Founder : Dr. Panjabrao Alias Bahusaheb Deshmukh
President : Shri. Harshavardhan Pratapsinh Deshmukh
Principal : Dr. V. G. Thakare
E-mail : shivajiscamt.office@gmail.com Website : www.shivajiscamt.org
Off. : (0721) 2660855; Res. (0721) 2551400, 2553130, Comp. Dept. : (0721) 2551366 Fax : (0721)2665485

Ref. No. SC/5357/2020 Date : 24/06/2020

To
Dr.Vijaya S. Sangawar,
Professor,
Department of Physics,
Govt. Vidarbha Institute of
Science and Humanities, Amravati

Respected Madam,

On behalf of organising committee of one day online workshop on **Effective enforcement of IPR: Patent and Copyright.** organized by Library and IQAC, Shri Shivaji Science College, Amravati on 17 June 2020 I acknowledge and appreciate your intellectual lecture on IPR. Your live lecture with evidences on the topic Patent: Know your Right will enrich the research community of our college.

Your guidance will inspire our research community

Thanking you,

Principal,
Shri Shivaji Science College,
Amravati.

Principal
Shri Shivaji Science College
Amravati.

Shri Shivaji Education Society Amravati's

Shri Shivaji Science College, Amravati
Re-Accreditted by NAAC A grade with CGPA of 3.13 College with Potential for Excellence

The present Pandemic COVID-19 situation have has caused immense information flowing through different channels. A massive webinars are organised by national and International academic as well as commercial organisation. The information which was login is now logout thus giving us an opportunity to learn and relearn. The present situation accelerated research opportunity and provided time to concentrate on research. If you are thinking of introducing something innovative in form of patent or writing book or publishing your research ensure that we do not infringe copyright . To know more about Intellectual property and your rights, the Library and IQAC is organizing online workshop on Effective Enforcement of IPR: Patent and Copyright on Wednesday 17 June 2020 at 2pm to 5pm.
Link of registration: https://forms.gle/GsaRw8xeMBTnqAa47

1st Session
2.30pm to 3.30pm

Resource Person
Dr.Vijaya S. Sangawar
Professor, Deptt. Of Physics
GVISH, Amravati
Topic:Patent: Know your Right
1.IPR
2. Patent its nature
3. Patent Drafting and processing
4. Patent Rights

2nd Session
3.45 to 4.45pm
Resource Person
Dr.Mangala A. Hirwade
Associate Professor,
Deptt. Of Library and Information Science
RTMNU, Nagpur
Topic:Copyright and Plagiarism issues in context to UGC
1.Copyright
2.UGC regulations
3.Plagiarism
4.How to avoid Plagiarism?

Shri Shivaji Education Society Amravati's
Shri Shivaji Science College,
Shivaji Nagar, Morshi Road, Amravati-444603
UGC Awarded College with Potential for Excellence
NAAC Reaccredited "A"grade (Very Good) with a CGPA of 3.13
Founder : Dr. Panjabrao Alias Bhausaheb Deshmukh
President : Shri Harshwardhan P. Deshmukh
Principal : Dr. V. G. Thakare
E-mail : shivajiscamt@gmail.com
Website : www.shivajiscamt.org
Fax : (0721) 2665485
Off : (0721) 2551400, 2553130

Ref: SC/5347/2020 Date: 11-06-20

To
Dr.Vijaya S. Sangawar,
Professor,
Department of Physics,
Govt. Vidarbha Institute of
Science and Humanities, Amravati

Subject: Invitation as Resource person for online workshop on Wednesday 17 June2020.

Respected Madam,

To enhance and explore rights regarding IPR, Library and IQAC committee, Shri Shivaji Science College, Amravati is organizing online workshop on **Effective enforcement of IPR: Patent and Copyright.** On behalf of Shri Shivaji Science College, Amravati, I invite you to deliver a lecture on the topic **"Patent: Know Your Rights".** Please accept our invitation and oblige.

Thanking you,

Principal,
Shri Shivaji Science College,
Amravati.

Shri Shivaji Science College
Amravati.

Shri Shivaji Education Society Amravati's
Shri Shivaji Science College,
Shivaji Nagar, Morshi Road, Amravati-444603
UGC Awarded College with Potential for Excellence
NAAC Reaccredited "A"grade (Very Good) with a CGPA of 3.13
Founder : Dr. Panjabrao Alias Bhausaheb Deshmukh
President : Shri Harshwardhan P. Deshmukh
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Ref: SC/5347/2020 Date 11.06.20

To
Dr Mangala A. Hirwade,
Associate Professor,
Deptt. of Library and Information Sci.
RTMNU, Nagpur.

Subject: Invitation as Resource person for online workshop on Wednesday 17 June 2020.

Respected Madam,

To enhance and explore rights regarding IPR, Library and IQAC committee, Shri Shivaji Science College, Amravati is organizing one day online workshop on **Effective enforcement of IPR: Patent and Copyright.** On behalf of Shri Shivaji Science College, Amravati, I invite you to deliver a lecture on the topic **"Copyright issues with reference to UGC" on 17 June 2020.** Please accept our invitation and oblige us.

Thanking you,

Principal
Shri Shivaji Science College,
Amravati.

Shri Shivaji Science College, Amravati

Effective enforcement Of IPR

Timestamp	1.Name:	2. Email:	3.Name of Department
6/14/2020 22:55:03	Dr. revati R khokale	ssclib1@gmail.com	Library
6/15/2020 19:37:40	Rekha C. Maggirwar	maggirwarrekha@gmail.com	Botany
6/15/2020 19:42:29	G. M. Dongare	infogmdongare@gmail.com	Chemistry
6/15/2020 19:43:34	Dr.SWAPNIL S ARSAD	swapnila470@gmail.com	Physics
6/15/2020 19:48:20	Dr DILIP VINAYAKRAO HANDE	dvhande@gmail.com	Botany
6/15/2020 19:52:24	Dr. Vaishali Vijayakumar Deshmukh	vaishalideshmukh27@gmail.com	Physics
6/15/2020 20:00:01	Dr.Jayashree Dipak Dhote	jayashree.dhote@rediffmail.com	Zoology
6/15/2020 20:11:31	Umesh Manikrao Patil	umeshmpatil1972@gmail.com	Mathematics
6/15/2020 20:38:36	Dr. Ms. A. D. Khambre	asmitakhambre@rediffmail.com	Chemistry
6/15/2020 20:39:08	Harshali Ganeshrao Wankhade	wankhadehg@gmail.com	Chemistry
6/15/2020 20:39:18	Prof. SANTOSH MAROTI ARADE	santosh.arade@gmail.com	Chemistry
6/15/2020 20:40:19	Dr.Rajesh P.Ganorkar	rajuganorkar100@gmail.com	Chemistry
6/15/2020 20:42:34	Dr Pramod R. Padole	pramodpadole@gmail.com	Chemistry
6/15/2020 20:42:48	Dr kavita R Tated	drkavitatated@gmail.com	History
6/15/2020 20:42:53	Dr. Rajesh R Wankhade	rajeshwankhade69@gmail.com	Chemistry
6/15/2020 20:43:38	Nilesh Bhatusing Jadhav	jadhavnilesh29@gmail.com	Chemistry
6/15/2020 20:45:41	Dr Pradip V Tekade	pradiptekade@gmail.com	Chemistry
6/15/2020 20:49:50	Abhijit Ingle	ingle.abhijitsingh@gmail.com	Department of chemistry
6/15/2020 20:50:07	Dr.Rajshri Vivek Dharmadhikari	rjdharma70@gmail. com	Library
6/15/2020 20:56:06	Dr.Savita Dinkar Thakare	smita.thakare0@gmail.com	English
6/15/2020 20:59:07	Pradnya Nalawade	14pradnya@gmail.com	Chemistry
6/15/2020 21:04:25	Dr Rajendra M Tated	rajendramtated@gmail.com	Commerce
6/15/2020 21:06:09	Dr Shailendra Deo	shailendradeo36@gmail.com	Mathematics

Shri Shivaji Science College, Amravati

Report 2020-2021

Workshopon IPR

Effective Enforcement of IPR: Patent and Copyright

The Library and IQAC organized online workshop on Effective Enforcement of IPR: Patent and Copyright on Wednesday 17 June 2020 at 11am to 3.30pm.The workshop was conducted online on Zoom app. The registration link was shared on emails and whatsApp groups with frequent alerts and 145 participants registered for the workshop. The workshop started with introduction by librarian. Hon' Principal Dr. V.G. Thakare, IQAC coordinator Dr.H.S. Lunge and all the head of departments and staff members participated online. The IQAC coordinator Dr. H. S. Lunge shared his view on topic and appreciated the speaker contribution in the field of IPR.The session started at 11.15am by the lecture of Dr.Vijaya S. Sangawar Professor, Deptt. Of PhysicsGVISH, Amravati, on Patent: Know your Right, she covered IPR, Patent its nature, Patent Drafting and processing and Patent Rights.

The second session started at 12.30 after by Dr. Mangala A. Hirwade, Associate Professor, Deptt. Of Library and Information Science RTMNU, Nagpur on the topic Copyright and Plagiarism issues in context to UGC. In her lecture she covered Copyright, UGC regulations, Plagiarism, How to avoid Plagiarism? She explained thoroughly the issues of copyright giving examples of landmark cases in the past. The feedback link was shared after the workshop and feedback was received. The workshop concluded with vote of thanks by Librarian, Dr Revati R. Khokale.

VachanPrerna Din

The VachanPrerna Din 14October the birth anniversary of Late Dr A.P.J. Kalam was celebrated by organising guest lecture on the topic Patent An introduction, retrieval and Career opportunitiesby Mr VrushabhDahake, Librarian, BhartiyaMahavidyalaya, Amravati Mr Dahake explained how to write & read patent. He also explained different job opportunities in area of Patent. The lecture ended by vote of thanks.

Shri Shivaji Education Society, Amravati's

Shri Shivaji Science College, Amravati

Affiliated to Sant Gadge Baba Amravati University, Amravati

Re-Accreditted by NAAC "A" grade with CGPA of 3.13

College with Potential for Excellence

Certificate of Participation

This is to certify that **Dr. Ujwala S. Junghare** of **Shri Shivaji Science College** has participated in the online workshop on "Effective Enforcement of IPR : Patent and Copyright" on Wednesday, 17 June 2020.

Dr. R. R. Khokale	Dr. H. S. Lunge	Dr. V.G. Thakare
Librarian/ Convenour	IQAC Co-ordinator	Principal

Workshop on Research Methodology

Report of the 20th Annual Convention and Seminar on "Research Methodology in Current Context."

The 20th Annual Convention and Seminar on **""Research Methodology in Current Context."** have been organised by Department of Chemistry, Shri Shivaji Science College, Amravati on Sunday, December 02, 2018. The inaugural function was presided over by Hon'able Chair person **Shri Dilipbabu Ingole,** Treasurer, Shri Shivaji Education Society, Amravati. The function was inaugurated by Hon'ble **Prof. P.P. Mahulikar,** Pro-Vice Chancellor, KBC North Maharashtra University Jalgaon. **Dr. V. G. Thakare**, Principal, Shri Shivaji Science College, Amravati.& President AUCTA, Amravati, **Dr. G.N.Chaudhari, Professor & Head** Department of Chemistry, Shri Shivaji Science College, Amravati, **Dr.P.R.Mandlik,** Secretary, AUCTA, Amravati, **Dr. P.R.Padole**, Co-ordinator of the function were also present on the dais.

Hon'ble **Prof. P.P. Mahulikar,** Pro-Vice Chancellor, KBC North Maharashtra University Jalgaon had delivered a key-note address on the topic ""Research Methodology in Current Context.". More than 170 teachers of various colleges affiliated to Sant Gadge Baba Amravati University, Amravati and 40 students of UG & PG actively participated in this seminar.

On this occasion, teachers elected as senate member, member of academic council of SGBAU Amravati were felicitated for their achievements. Four retired teachers, namely, Dr. S. P. Deshmukh, Akola, Dr. B. N. Berad Nagpur, Dr.R. M. Kedar Amravati & Dr. S R. Dighade Badnera, who serve their entire life for nurturing and popularizing the subject Chemistry, AUCTA has felicitated such peoples for their work and contribution in chemistry.

Teachers who awarded Ph.D. degree in the subject of Chemistry from Sant Gadge Baba Amravati University, Amravati have also been honoured. Felicitation of the Merit Students (UG & PG) was done at the hands of dignitaries by awarding gold medals for their outstanding achievements in S. G. B. Amaravati University. Amravati, Summer-2017 examination in the subject Chemistry. Toppers of General Aptitude Test 2017-18 organised by AUCTA were also felicitated on this occasion.

Annual general body meeting was conducted in the second session of the program with very fruitful discussion and thereafter, election of office bearer. After the election programme, the newly elected members of managing committee were felicitated by the Dr. V. G. Thakare, President AUCTA. The newly elected President of AUCTA Dr. P. R. Rajput has delivered his views about the forthcoming line of action of the association. The program was concluded with the vote of thanks by Dr. P. R. Mandlik, Secretary of the association.

Workshop on Research Methodology

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Projects on Soil Quality Analysis

SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

Department of Chemistry

Soil Quality Analysis

Project Summary

Chemistry is basic branch of Science and covers Interdisciplinary study in all branches of Science including Soil Science, Oceans, Lands and Planets. In the present study, attempt has been made for applicability study in the field of Agriculture. Agricultural Chemistry is the study of Chemistry and Biochemistry in relation to Agricultural field.

In order to inculcate the social responsibility amongst the students, Department of Chemistry has incorporated the theme of Soil Analysis for research project.

Twenty four students of M.Sc.Chemistry Part II(SemIV) of 2019-20 batch performed their research project study on soil analysis. For which they selected the area in various talukas and villages from Amravati district.

Soil collection area was decided from geography, climate geography, type of soil, type of crop, fruits in the area. Soil sample was collected 3-4 ft below surface layer in the month of May when the farm has no crop as per the guidance of expert.

The collected soil sample was further processed in laboratory. The soil test analysis of Macronutrients, micronutrients, pH, conductivity measurement. The various parameters analysed were N, P, K, contents, S, Fe, Cu, Zn, Mn, B content, alkalinity, salinity, of soil.

For the analysis, instruments available in Department are PUSA-STFR meter, Conductometer, pHmeter,Kjeldal's flask, different instruments used for complexometric titration.

For the determination of these parameters different instrumental techniques from chemistry were applied such as Pusa STFRmetry, conductometry, pHmetry, complexometry, kjeldal's method.

The soil analysis also includes the atomic absorption analysis technique. For these students analysed the sample with the assistance from Department of Science and Agricultural Chemistry, Soil and Plant testing Lab Akola, Dr Panjabrao Deshmukh Krushi Vidyapeeth Akola.

Soil analysis serves as a valuable tool for farm to determine the inputs required for efficient and economic production. It helps as a farm management tool in selection of fertilizers, insecticides.

The study was incorporated in order to create awareness about environment to inculcate social responsibility amongst students.

The aim targeted through their research project study which developed their technical skill while handling different instrumentation and the guidance to society (farmers) where soil analysis was done will be helpful to farmers in soil management. The activity helps to build up emotional strength of farmers.

Shri Shivaji Science College Amravati.

PG Department of Chemistry

August 2019-2020

RESEARCH FIELDWORK REPORT

Research Topic : Soil Analysis by different Technique of Analytical Chemistryin daryapur region district Amravati.

Project Guide : **Dr. Archana S. Burghate**

Submitted by :Mr. Aditya KishorBramhankar

Purpose of Fieldwork report

1. Research project work for Msc II year.
2. To know the quality of soil in the selected region.

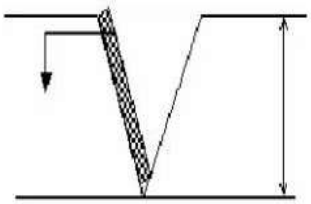
Place selected

The place was selected by the guide teacher and the place is Daryapur tehsil Amravati. This place is selected for the collection of soil sample from Daryapur Tehsil Amravati District Maharashtra. Total 5 no. Of farms are visited and collected soil sample from different areas of Daryapur Tehsil. The places from where soil sample collected includes such areas are as follows:Wadalgavan, Umari (mandir) and kokrda.

Methodology Implemented for Soil Sample Collection

Divide the field into different homogenous units based on the visual observation and farmer's experience. Remove the surface litter at the sampling spot. Drive the auger to a plough depth of 15 cm and draw the soil sample. Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray. If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container.

Soil Sample 001

1 inch / 2.5  cm 6 inches (15 cm)

Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels.Reduce the bulk to about half to one kilogram by quartering or compartmentalization.Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.Collect the sample in a clean cloth or polythene bag. Label the bag with information like name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler etc

Proof of Field Work

Date : 17/8/2020

Date-20/08/2020

SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

(Re-accredited by NAAC with Grade 'A')

P.G. DEPARTMENT OF CHEMISTRY

Academic Session – 2019-20

Field Report

Research topic:-

"Soil Quality Analysis in selected regions of Dhamangaon Rly.Tahasil (block) under Amravati district, Maharashtra"

Project guide:- Prof. Dr. Y.S. Thakare

Submitted by :- Mr. Aniruddha S. Hande

Purpose of field work:-

Soil is an important matter for cultivation of any type of crop. Soil supplies many necessary nutrients required for an healthy growth crop.

The yield is largly dependent on the soil in which the crop grows. So before cultivation it is very important to check the soil for its nutrients. By checking the soil you will know

whether the soil is having enough amount of nutrients or not.

If any nutrients is less or more than the required amount necessary measures can be taken. Soil

testing has became widely accepted in agribusiness both by farmers and industry.

Soil testing also allows to determine the micronutrients requirement of your crop. Soil testing provide a farm mangement tool with a potential benefit to the farmer of increasd yields.

Place Selected:-

Soil collected from "Dhamangaon Rly." taluka Dist. Amravati. Soil of Amravati district have been developed on the hilly and undulating topography. The soils, therefore, show a wide variation in their depth. soil collect from this area it is Deep soil, shallow soil and medium soil. deep soils are formed due to the accumulation and deposition of the soils from uplands.

Methodology implemented for sample collection:-

Soil Sampling objective Collect the soil sample during fallow pln the standing crop,

collect samples between rows.

1. Sampling at several locations in a zig-zag pattern ensures homogeneity.Fields, which are similar in appearance, production and past-management practices, can be grouped into a single sampling unit.
2. Collect separate samples from fields that differ in colour, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system etc. Avoid sampling in dead furrows, wet spots, areas near main bund, trees, manure heaps and irrigation channels.For shallow rooted crops, collect samples up to 15 cm depth. deep rooted crops, collect samples up to 30 cm depth. For tree crops, collect

profile samples.Always collect the soil sample in presence of the farm owner who knows the farm better.

3. Materials required:-Spade or auger (screw or tube or post hole type) Khurpi,Core sampler, Sampling bags Plastic tray or bucket.
4. Divide the field into different homogenous units based on the visual observation and farmer's experience.Remove the surface litter at the sampling spot.Drive the auger

to a plough depth of 15 cm and draw the soil sample.Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray. If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.

5. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container. Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels. Reduce the bulk to about half to one kilogram by quartering or compartmentalization.

6. Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.

7. Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.

8. Collect the sample in a clean cloth or polythene bag.

9. Label the bag with information like name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler etc.

10. If the samples are meant for the analysis of micronutrients at-most care is needed in handling the sample to avoid contamination of iron, zinc and copper. Brass sieves should be avoided and it is better to use stainless steel or polythene materials for collection, processing and storage of sample.

Proof of field work:-

Declaration Of Candidate:-

I the undersigned solemnly declare that the project report " **Soil Quality Analysis in selected areas of Dhamangaon Rly.Tahasil (block) under Amravati district, Maharashtra**" is based on my own work carried out during the course of our study under the supervision of **Prof.Dr. Y.S. Thakare mam**.

1. I assert the statements made and conclusions drawn are an outcome of my researchwork. I further certify that,
2. The work contained in the report is original and has been done by me under the general supervision of my supervisor
3. The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad. We have followed the guidelines provided by the university in writing the report.
4. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

ShriShivaji Science College Amravati

PG Department of Chemistry

August 2019-2020

RESEARCH FIELD WORK REPORT

Research topic:-

"Soil Quality Analysis in selected areas of Tivsa Tahasil (block) under Amravati district, Maharashtra"

Project Guide : Dr. N. A. Kalambe

Submitted by : Miss Bhagyashri Rajiv Mankar

Purpose of field work:-

Soil is an important matter for cultivation of any type of crop. Soil supplies many necessary nutrirnts required for an healthy growth crop.

The yield is largly dependent on the soil in which the crop grows. So before cultivation it is very important to check the soil for its nutrients. BY checking the soil you will know whether the soil is having enough amount of nutrients or not.

If any nutrients is less or more than the required amount necessary measures can be taken.

Soil testing has became widely accepted in agribusiness both by farmers and industry.

Soil testing also allows to determine the micronutrients requirement of your crop.

Soil testing provide a farm mangement tool with a potential benefit to the farmer of increasd yields.

Place Selected:-

Soil collected from **"Tivsa"**Talukka District Amravati.Soils of Amravati district have been developed on the hilly and undulating topography. The soils, therefore, show a wide variation in their depth. soil collect from this area it is Deep soil, shallow soil and medium soil.deep soils are formed due to the accumulation and deposition of the soils from uplands.

Methodology implemented for sample collection:-

1. Sampling at several locations in a *zigzag* pattern ensures homogeneity. Fields which are similar in appearance, production and past-management practices, can be grouped into a single sampling unit.
2. Collect separate samples from fields that differ in colour, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system *etc*.Avoid sampling in dead furrows, wet spots, areas near main bund, trees, manure heaps and irrigation channels.For shallow rooted crops, collect samples up to 15 cm depth. deep rooted crops, collect samples up to 30 cm depth. For tree crops, collect profile samples.Always collect the soil sample in presence of the farm owner who knows the farm better
3. Materials required:-Spade or auger (screw or tube or post hole type) Khurpi,Core sampler,Sampling bags Plastic tray or bucket
4. Divide the field into different homogenous units based on the visual observation and farmer's experience.Remove the surface litter at the sampling spot.Drive the auger to a plough depth of 15 cm and draw the soil sample.Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray.If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.
5. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container.Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels.Reduce the bulk to about half to one kilogram by quartering or compartmentalization.
6. Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.
7. Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.
8. Collect the sample in a clean cloth or polythene bag.
9. Label the bag with information like name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler *etc*.
10. If the samples are meant for the analysis of micronutrients at-most care is needed in handling the sample to avoid contamination of iron, zinc and copper. Brass sieves should be avoided and it is better to use stainless steel or polythene materials for collection, processing and storage of sample.

Proof of field work:-

Pictures of Various fields-

Declaration:- Hereby, I declare That the project report **"Soil Quality Analysis in selected areas of TivsaTahasil (block) under Amravati district, Maharashtra"** is based on my own work carried out during the course of our study under the supervision of prof. **Dr. N.A. KalambeMam.**

1. I assert the statements made and conclusions drawn are an outcome of my research work. I further certify that,
2. The work contained in the report is original and has been done by me under the general supervision of my supervisor
3. The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad. We have followed the guidelines provided by the university in writing the report.
4. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

Date- 18/8/20

Place- Amravati

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

(Re-accredited by NAAC with Grade 'A')

P.G. DEPARTMENT OF CHEMISTRY

Academic Session – 2019-20

RESEARCH FIELD WORK REPORT

Research Topic:- " SoilQualityAnalysisinselectedregionsofBhatkuli area underAmravatidistrict,Maharashtra"

Project Guide:- Dr. Pramod R. Padole sir

Submitted by:- Ms. Manisha S. Bhatkar

Purpose of field work:

Soil analysis is used to determine the level of nutrients found in a soil sample. As such, it can only be as accurate as the sample taken in a particular field. The results of a soil analysis provide the agricultural producer with an estimate of the amount of fertilizer nutrients needed to supplement those in the soil. Applying the appropriate type and amount of needed fertilizer will give the agricultural a more reasonable chance to obtain the desired crop yield.

Objectives of Soil Analysis

- To provide an index of nutrient availability or supply in a given soil. The soil extract is designed to evaluate a portion of the nutrients from the same "pool" used by the plant.
- To predict the probability of obtaining a profitable response to fertilizer application. Low analysis soils may not always respond to fertilizer applications due to other

limiting factors. However, the probability of a response is greater than on a high analysis soil.

- To provide a basis for fertilizer recommendations for a given crop.
- To evaluate the fertility status of the soil and plan a nutrient management program.

Place Selected :

Five different places of tq. Bhatkhuli dist. Amravati reigion Maharashtra

- Shailendra bhatkar wathodashukleshwartq. Bhatkhuli dist. Amravati Maharashtra
- Rajendra khandarebhalashitq. Bhatkhuli dist. Amravati Maharashtra
- Vyankatraofutane :mhaispurtq. Bhatkhuli dist. Amravati Maharashtra
- Yogesh thorat :Bhatkulitq. Bhatkhuli dist. Amravati Maharashtra
- Rahul prawatkar :Dhamoritq. Bhatkhuli dist. Amravati Maharashtra

SoilcollectfromthisareaitisDeepsoil,shallowsoilandmediumsoil.deepsoils areformedduetotheaccumulationanddepositionofthesoilsfromuplands.

Methodology Implantation for sample

Soil sampling is a essential; process in analysis. A correct method make you close to a correct result.

Materials are required :

- Sapade
- Khurpi
- Core sample
- Sampling bag
- Plastic bucket

Procedure of Sampling:

- Divide the field into different homogenous unit based on the visual observation
- Remove the suface litter at the sample spot.
- Drive the augar to plugh the depth of 30cm and draw the soil sample
- Collect the 15 sample from each sampling unit of different places
- Make sure to make a v shape curve in the sample before collecting
- Mix the sample thoroughly and remove the soil sample.
- Grind the soil perfectly.
- Sew it .
- Collect it into a zip lock plastic bag.
- Label the bag with information like name of farmer, location of the farm, survey number, previous crop grown, present crop, name of sampler and date of collection.

DeclarationofCandidate:-

Itheundersignedsolemnlydeclarethattheprojectreport"**SoilQualityAnalysisinBhatkuli area underAmravatidistrict,Maharashtra**"isbasedonmyownworkcarriedoutduringthecourseofourstudyunderthesupervisionof**Dr. P.R.Padole sir**

- Iassertthestatementsmadeandconclusionsdrawnareanoutcomeofmyresearchwork.Ifurthercertifythat,
- Theworkcontainedinthereportisoriginalandhasbeendonebymeunderthegeneralsupervisionofmysupervisor
- TheworkhasnotbeensubmittedtoanyotherInstitutionforanyotherdegree/diploma/certificateinthisuniversityoranyotherUniversityofIndiaorabroad.Wehavefollowedtheguidelinesprovidedbytheuniversityinwritingthereport.
- Wheneverwehaveusedmaterials(data,theoreticalanalysis,andtext)fromothersources,wehavegivenduecredittotheminthetextofthereportandgivingtheirdetailsinthereferences.

Shri Shivaji Science College Amravati

PG Department of Chemistry

August 2019-20

RESEARCH FIELD WORK REPORT

Research topic : Soil Analysis

Project Guide : **Dr. Prashant R. Mandlik**

Submitted by : Miss Krunal Raosaheb Chunade

Purpose Of Field Work :- Field work is the most important process during research work in case of soil analysis. During field work we have to chek different types of soil sample, for soil analysis. At that time we check different parameters of soil.Their are so many parameters for analysis of soil but we have to select some parameters for the research work of soil. Main purpose of field work is to determine the quantities and qualities of the nutrients in the soil for better crop production.To calculate the diferrent percentages of nutrients NPK in the soil and determine the soil PH level. Due to the field work we can check and measure macro (i.e. P, K, S) and micronutrients (Fe,Cu,Zn,B,Mn) present in that soil and on the basis of that we can identify how much amount of that micro and macro nutrients are required for the proper growth of crop. Then to identify the structure and texture of soil. Due to field work we can check the fertility of soil, where the soil is fertile or infertile. If the soil quality is low then we can improve its quality by using different types of organic fertilizers or by different agricultural techniques. Most important purpose of field work is, which type of plants and crops are grown in this area are studied by field work. on the basis of that we can conclude that this soil is important for that particular crops and plants.

Place selected:- while doing the research work in the field of soil analysis, selection of place for soil analysis is the most important and first or component of research work. During research work we can choose the different farms for the sampling of soil sample. This farms are about 2 to 5 km far from each other. Then we can select four corners and middle place of this farm And collect the soil.

Methodology implemented for soil sample collection :-

During the research work of soil analysis methodology of collection of soil sample is most important factor means which type of method is used for the collection of soil sample.their are five samples are to be collected from different farms. One sample should be collected from diferent places in one farm. For that four corners and one middle place should be selected.

Proper soil sample collection relies on three principles:-

1) **Organization**: Having orderly system for soil sample collection and handling simplifies sample collection and minimizes the chance of human errors such as mislabeling or misplacing soil samples.
2) **Consistency**: Collecting each sample in a uniform manner between years and within the course of a sampling event wil greatly improve the quality and reliability of our results. This means taking samples in the same manner for each sample.
3) **Simplicity**: Simple procedure will help ensure sample collection is consistent and easily organized.

Sample collection- Before collecting soil sample gather certain materials and tools.

A soil probe, A clean plastic bucket, A trowel, permanent markers, sample bags, clipboard and paper or field notebook.

Sampling tool should be :

Uncontaminated, uniform in cross section to the desired depth provide reproducible sampling units

Sampling tools are : Blades, tubes, auger.

Select sampling depth according to the purpose of sampling.with the help of auger remove the upper layer of soil .Then with help of blades scratch the sides of this deep place.and then collect the sample in plastic bags and labling the bags. same method is aaply for another sample collection.

Soil sample should be prepare before laboratory analysis:

Air drying:- Crush large soil clods to facilitate drying. Do not dry at high temperature. During air drying avoid contamination from (i.e.dust, gases, rain). Air drying usually one week.

Crushing:- Crush the sample in mortar and pestle.

Sieving:- Sieve the soil through a 2 mm sieve made of brass, stainless steel, or plastic.

Storage:- store in clean polythene bags or bottles and label the the containers.

Proof of Field Work :

ShriShivaji Science College Amravati

PG Department of Chemistry

August 2019-2020

RESEARCH FIELD WORK REPORT

Research topic :

"Sudy of soil fertility and correlation of soil properties of selected villages under Tiosa block in Amravati district".

Project Guide : Dr. S. P. Ingole

Submitted by : Miss KomalPrabhulalji Joshi

Purpose of field work:-

Soil is an important matter for cultivation of any type of crop. Soil supplies many necessary nutrirnts required for an healthy growth crop.

The yield is largly dependent on the soil in which the crop grows. So before cultivation it is very important to check the soil for its nutrients. By checking the soil you will know whether the soil is having enough amount of nutrients or not.

If any nutrients is less or more than the required amount necessary measures can be taken.

Soil testing has became widely accepted in agribusiness both by farmers and industry.

Soil testing also allows to determine the micronutrients requirement of your crop.

Soil testing provide a farm mangement tool with a potential benefit to the farmer of increasd yields.

Place Selected:-

Soil collected from **"Tiosa"**Tahsil District Amravati. Soils of Amravati district have been developed on the hilly and undulating topography. The soils, therefore, show a wide variation in their depth. soil collect from this area it is Deep soil, shallow soil and medium soil.deep soils are formed due to the accumulation and deposition of the soils from uplands.

Methodology implemented for sample collection:-

Soil Sampling objective Collect the soil sample during fallow pin the standing crop, collect samples between rows.

1. Sampling at several locations in a *zig-zag* pattern ensures homogeneity. Fields which are similar in appearance, production and past-management practices, can be grouped into a single sampling unit.
2. Collect separate samples from fields that differ in colour, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system *etc*.Avoid sampling in dead furrows, wet spots, areas near main bund, trees, manure heaps and irrigation channels.For shallow rooted crops, collect samples up to 15 cm depth. deep rooted crops, collect samples up to 30 cm depth. For tree crops, collect profile samples.Always collect the soil sample in presence of the farm owner who knows the farm better
3. Materials required:-Spade or auger (screw or tube or post hole type) Khurpi,Core sampler,Sampling bags Plastic tray or bucket
4. Divide the field into different homogenous units based on the visual observation and farmer's experience.Remove the surface litter at the sampling spot.Drive the auger to a plough depth of 15 cm and draw the soil sample.Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray.If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.
5. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container.Mix the samples thoroughly and remove foreign materials like

roots, stones, pebbles and gravels.Reduce the bulk to about half to one kilogram by quartering or compartmentalization.

6. Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.
7. Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.
8. Collect the sample in a clean cloth or polythene bag.
9. Label the bag with information like name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler *etc*.
10. If the samples are meant for the analysis of micronutrients at-most care is needed in handling the sample to avoid contamination of iron, zinc and copper. Brass sieves should be avoided and it is better to use stainless steel or polythene materials for collection, processing and storage of sample.

Proof of field work:-

Pictures of Various fields-

Declaration:-

Hereby, I declare That the project report **"Soil Quality Analysis in selected areas of TiosaTahsil (block) under Amravati district, Maharashtra"** is based on my own work carried out during the course of our study under the supervision of **Dr. S. P. Ingole.**

1. I assert the statements made and conclusions drawn are an outcome of my research work. I further certify that,
2. The work contained in the report is original and has been done by me under the general supervision of my supervisor
3. The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad. We have followed the guidelines provided by the university in writing the report.
4. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

(Re-accredited by NAAC with Grade 'A')

P.G. DEPARTMENT OF CHEMISTRY

Academic Session – 2019-20

Research Field Work Report

Research topic:-

"Soil Quality Analysis in selected regions of Dhamangaon Rly.Tahasil (block) under Amravati district, Maharashtra"

Project guide:- Dr. Vrushali R. Kinhikar

Submitted by :- Mr. Shashikant A. Patil

Purpose of field work:-

Soil is an important matter for cultivation of any type of crop. Soil supplies many necessary nutrients required for an healthy growth crop.

The yield is largly dependent on the soil in which the crop grows. So before cultivation it is very important to check the soil for its nutrients. By checking the soil you will know whether the soil is having enough amount of nutrients or not.

If any nutrients is less or more than the required amount necessary measures can be taken. Soil testing has became widely accepted in agribusiness both by farmers and industry.

Soil testing also allows to determine the micronutrients requirement of your crop. Soil testing

provide a farm mangement tool with a potential benefit to the farmer of increasd yields.

Place Selected:-

Soil collected from "Dhamangaon Rly." taluka Dist. Amravati. Soil of Amravati district have been developed on the hilly and undulating topography. The soils, therefore, show a wide variation in their depth. soil collect from this area it is Deep soil, shallow soil and medium soil. deep soils are formed due to the accumulation and deposition of the soils from uplands.

Methodology implemented for sample collection:-

Soil Sampling objective Collect the soil sample during fallow pIn the standing crop, collect samples between rows.

1. Sampling at several locations in a zig-zag pattern ensures homogeneity.Fields, which are similar in appearance, production and past-management practices, can be grouped into a single sampling unit.

2. Collect separate samples from fields that differ in colour, slope, drainage, past management practices like liming, gypsum application, fertilization, cropping system etc. Avoid sampling in dead furrows, wet spots, areas near main bund, trees, manure heaps and irrigation channels.For shallow rooted crops, collect samples up to 15 cm depth. deep rooted crops, collect samples up to 30 cm depth. For tree crops, collect profile samples.Always collect the soil sample in presence of the farm owner who knows the farm better.

3. Materials required:-Spade or auger (screw or tube or post hole type) Khurpi,Core sampler, Sampling bags Plastic tray or bucket.

4. Divide the field into different homogenous units based on the visual observation and farmer's experience.Remove the surface litter at the sampling spot.Drive the auger to a plough depth of 15 cm and draw the soil sample.Collect at least 10 to 15 samples from each sampling unit and place in a bucket or tray. If auger is not available, make a 'V' shaped cut to a depth of 15 cm in the sampling spot using spade.

5. Remove thick slices of soil from top to bottom of exposed face of the 'V' shaped cut and place in a clean container. Mix the samples thoroughly and remove foreign materials like roots, stones, pebbles and gravels. Reduce the bulk to about half to one kilogram by quartering or compartmentalization.

6. Quartering is done by dividing the thoroughly mixed sample into four equal parts. The two opposite quarters are discarded and the remaining two quarters are remixed and the process repeated until the desired sample size is obtained.

7. Compartmentalization is done by uniformly spreading the soil over a clean hard surface and dividing into smaller compartments by drawing lines along and across the length and breadth. From each compartment a pinch of soil is collected. This process is repeated till the desired quantity of sample is obtained.

8. Collect the sample in a clean cloth or polythene bag.

9. Label the bag with information like name of the farmer, location of the farm, survey number, previous crop grown, present crop, crop to be grown in the next season, date of collection, name of the sampler etc.

10. If the samples are meant for the analysis of micronutrients at-most care is needed in handling the sample to avoid contamination of iron, zinc and copper. Brass sieves should be avoided and it is better to use stainless steel or polythene materials for collection, processing and storage of sample.

Proof of field work:-

Pictures of Various fields-

Declaration of Candidate:-

I the undersigned solemnly declare that the project report " **Soil Quality Analysis in selected areas of Dhamangaon Rly.Tahasil (block) under Amravati district, Maharashtra**" is based on my own work carried out during the course of our study under the supervision of **Dr. Vrushali R. Kinhikar** .

1. I assert the statements made and conclusions drawn are an outcome of my researchwork. I further certify that,
2. The work contained in the report is original and has been done by me under the general supervision of my supervisor
3. The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad. We have followed the guidelines provided by the university in writing the report.
4. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

(Re-accredited by NAAC with Grade 'A')

P.G. DEPARTMENT OF CHEMISTRY

Academic Session – 2019-20

Research Field Work Report

Research topic:

"Soil Quality Analysis in selected regions of Achalpur Tahasil (block) under Amravati district, Maharashtra"

Project guide:- Dr . N. H. Bansod Sir

Submitted by :- Ms. Vaishnavi G. Rase

Purpose of field work:-

purpose of the fieldwork experience is to provide occupational therapy students with the opportunity to integrate academic knowledge with application skills at progressively higher levels of performance and responsibility.

Soil is essential for life on this planet. Without it, we could not grow the food we need to live. What's perhaps less well known is that soil has other important functions, too, such as filtering our water, storing it to help prevent flooding and droughts, and providing a habitat for a third of the world's biodiversity most of which we still know very little about.

Soils also have a large impact on climate change, as they can store large amounts of organic carbon and are the most important terrestrial sink for carbon dioxide. The way we use land has a clear influence on the way soil functions, and thus on all the benefits we gain from it.

Place Selected:-

Five different places of Achalpur region, Maharashtra

Gajananrao Rase : pathrot, Amravati, Maharashtra.

Arun watha : shindi, Amravati, Maharashtra.

Pramod Gilda : kasampur, Amravati, Maharashtra.

Chandrashekhar rase : Jatangpur, Amravati, Maharashtra.

Sanjan more. : Jawalapur, Amravati, Maharashtra.

Soil collect from this area is deep soil, shallow soil and medium soil. Deep soils are formed due to the accumulation and deposition of the soils from uplands.

Methodology implemented for sample collection:-

1. the purpose of any soil survey is to characterize the area as fairly as possible within the limitations of the number of samples that it is possible to take and analyze, the efficiency of the sampling plan adopted is a major concern.

2. Soil sampling procedure may be divided into two parts: first, the allocation of the samples over the region under survey, and second, the technique of sampling.

3. Sampling procedure with reference to technique depends upon the nature of the problem and its details are usually well understood. Regarding the disposition of replicate samples, there appears to be a lack of quantitative information.

4. In order to secure data to test the adequacy of various sampling plans, were studied using a sampling pattern that would bring out the relative agreement of duplicate samples separated by predetermined distances.

5. Using the glass electrode, pH determinations were made and the data subjected to statistical analysis in order to show the efficiency of various spacings for replicate samples when large areas are surveyed.

6. It was found that intervals as low as ten feet or one hundred feet, were too small to constitute an effective method for sampling these areas, and it was possible to calculate by the analysis of variance the efficiency of various ways of sampling.

7. The results show in each case that samples from widely separated points vary more than samples taken close together.

8. This was also observed to hold for the lower horizons where the variation was not as great and tended to reach a maximum, value characteristic of the soil type.

9. The sampling procedure is discussed with reference to its application in crop fertility studies, soil classification, and the investigation of possible damage to soils over large areas.

Proof of field work:-

Declaration of Candidate:-

I the undersigned solemnly declare that the project report " **Soil Quality Analysis in selected areas of Achalpur.Tahasil (block) under Amravati district, Maharashtra**" is based on my own work carried out during the course of our study under the supervision of **Dr. N. H. Bansod sir.**

I assert the statements made and conclusions drawn are an outcome of my researchwork. I further certify that,

The work contained in the report is original and has been done by me under the general supervision of my supervisor

The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad. We have followed the guidelines provided by the university in writing the report.

Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

ACTIVITY-1

Motivational Lecture by Francis Patel for the participants of National Level Video Elocution Competition.

Date-6th August 2020

Number of Beneficiaries -95

Objectives-

- Appreciation and motivation of the participants of video elocution competition.
- To engage students in developing various skills like reading, listening and speaking during the pandemic.
- Improve the value system .
- To provide a motivational force to keep hopes alive.
- To increase productivity.

On the 6th of August, 2020, the department of Chemistry organized a Motivational Lecture for the participants of National Level Video Elocution Competition organized by the college. It's a thing of great pride for the college that this Video Elocution Competition got registered in the prestigious **U.N.EnvironmentProgramme**-2020-21.

Mr. Francis Patel, a well-versed teacher and motivational trainer provided his expert guidance to the participants of this competition.He inspired the participants by telling some very inspiring stories in a playful way. He also guided the participants for their effective communication and presentation skills. This event helped inculcate reading, listening and speaking skills amongst the students. In all, 95 students and 20 teachers attended this programme. The students were highly benefitted by this event and could perform far more effectively in the competition.

Prof. Dr. Anjali Bodade worked as an In-Charge Professor for the event.

Outcome-

- **Motivation for** reading, listening and speaking skills.
- Acquaintance with inspiring stories in a playful way .

DEPARTMENT OF CHEMISTRY - ACTIVITY-1

Motivational Lecture by Francis Patel for the participants of National Level VideoElocution Competition on 6th August 2020(Activity Incharge-Dr Anjali Bodade)

PARTICIPANT NAME	SCHOOL	CITY
1. Vaidehi Mohod	Prabodhan Vidhyala	Daryapur
2. Tanvi Parvatkar	Kasturba Kanya Shala	Amravati
3. Krishna Thakare	Titians' Public School	Amravati
4. Shahu Dharpal	Tomoae School	Amravati
5. Ansh Vaidya	Titans' Public School	Badnera
6. Amit Kalaskar	Shri Shivaji Vidyalaya	Yavatmal
7. Rakhi Adwani	Titans' Public School	Amravati
8. Ruchika Hagwane	School of Scholars	Akola
9. Falguni Joshi	Titans' Public School	Amravati
10. Shreshtha Muttalwad	Maharashtra Public school	Aurangabad
11.Shreya Gokulkar	School Of Scholars	Amravati
12. Anshul Laddha	Vijaya School for Excellence	Amravati
13. Madhavi Banginwar	Mohanabai Girls School	Digras
14. Anushka Chaware	Vidya Mandir High School	Koradi, Nagpur
15.Yuga Jamodkar	Tomoae School	Amravati
16. Yash Chopde	Jawahar Navodaya Vidyalaya	Amravati
17.Dnyaneshwari Ambadkar	Vasantrao Naik High School	Jarud
18.Soham. Mohod	Tomoae School	Amravati
19. Shreya Athawale.	Ratnabai Rathi High School	Daryapur
20.Shravani Dhawane	Podar International School	Amravati

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

Activity-2(Session 20-21)

Webinar on the **TOPIC : TRENDS IN E- RESOURCES IN THE DIGITAL ERA ,ACADEMIC INTEGRITY AND RESEARCH** ETHICS for P.G. AND Research Students BY SPEAKER DR VAISHALI P GUDADHE.

Date -Saturday dated 30 January 2021

No of beneficiaries-100(Research and PG. Students)

Objectives-

- To promote research culture among faculty, research scholars and post graduate students.
- To initiate innovative ideas .
- To work collaborately and make team work as a part of research culture.

Our college strives for a culture of excellence in education that promotes research and fosters creative talents. Department of Chemistry always leads in arranging activities for the students.

Today as we are experiencing the churning of the education system to raise up the new Generation.(GenerationZ/Net Generation).Online Webinar On the **Topic Trends In E Resources In The Digital Era ,Academic Integrity And Research** Ethics is the outcome of the brain child of CHEMISTRY DEPARTMENT for shaping the new generation to walk the unexplored path. Our aim was to promote research culture among faculty, research scholars and post graduate students . The main objective of this webinar was to initiate students to express their innovative ideas .To work collaborately and make team work as a part of research culture.

The Webinar was graced by the linking of learning personalities , Principal, Dr V.G.Thakare as the chairman , Speaker, Dr Vaishali .P. Gudadhe Dean faculty of interdisciplinary studies ,Professor and Head of library and information science ,Director of Women Studies Centre, Sant Gadge Baba Amravati University ,Dr G.N.Chaudhari, Professor and Head of Chemistry Department, All the teaching staff, research scholars and the Post graduate students in majority.

Dr G.N.Chaudhari gave the introductory remark ,Hon'ble Dr V.G.Thakre, Chairman for this event highlighted his views on research. While the speaker, Dean Dr Vaishali .P. Gudadhe guided the students on The **Topic Trends In E Resources In The Digital Era ,Academic Integrity And Research** Ethics .Information on online free e-resources was given in detail. In the present era of information technology awareness about copyright, licensepolicy, alertness about plagarism, plagarism policy tools which is very essential.We received an overwhelming response for the webinar.

In all, the organizers tried their best to follow what Respected Dr APJ Kalam has said-"Every mind is creative. Every mind is inquisitive....." Prof. Dr. Anjali Bodade worked as an In-Charge Professor for the event conducted the event. while vote of thanks was expressed by Dr Shruti Ingole.

OUTCOME:

- To initiate in students the habit of thinking out of the box.
- to express their innovative ideas .
- to work collaborately and make team work as a part of culture. to take ownership of their learning .
- Embrace diversity and flexibility .And allow remote work.
- Acquired Information of online free e-resources

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

Activity-3(Session 20-21)

Online National Periodic Table Day Celebration

Webinar on History of Periodic Table

Number of Participants -02

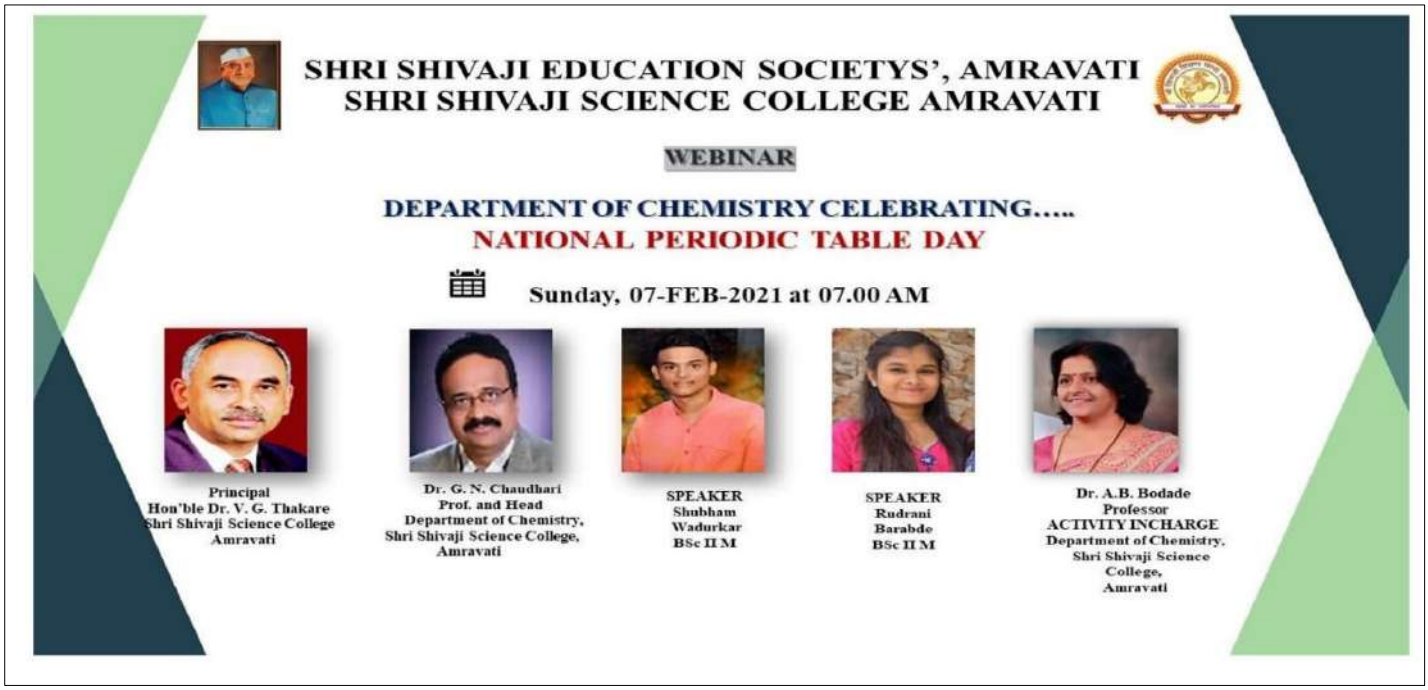
Beneficiaries-100 (students of 8^{th},9^{th},10^{th})

Objectives-

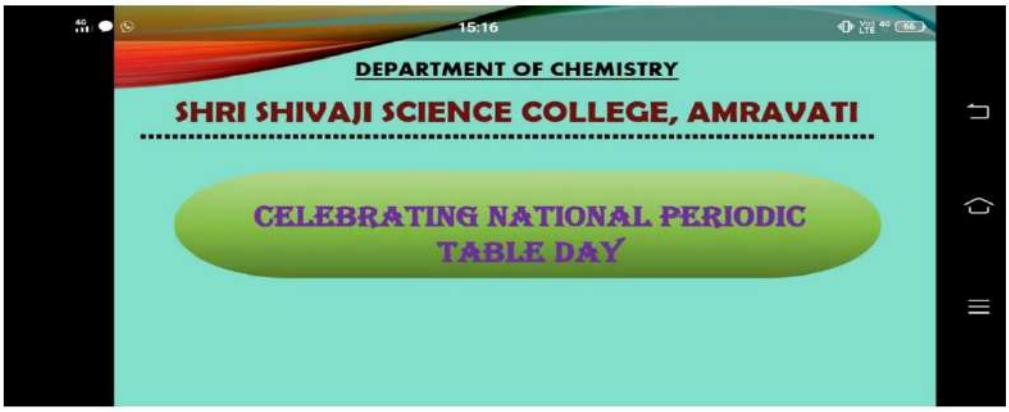
- **To honour the invention of periodic table and its scientific inventions.**
- **Initiate Online Scientific interaction of U.G.students with school students.**
- **To inculcate interest in chemistry subject.**

National Periodic Table Day was Celebrated by Department of Chemistry along with the School children of standard X from **Ratnabai Rathi Mahavidvalaya, Daryapur on Sunday ,7^{th} February 2021 at 7am** by arranging a webinar on History of Periodic Table. Introductory remark on fun in learning chemistry and periodic table was given by Dr A.B.Bodade. Our college students from B.Sc.II (PCM) – Ms. Rudrani Barabde and Mr Shubham Wadurkar explained the topic History of Periodic Table to the School children of Ratnabai Rathi Mahavidvalaya, Daryapur by power point presentation. Feedback was taken by asking questions Prof. Dr. Anjali Bodade worked as an In-Charge Professor.

- **Outcome –**
- Engaged the students in scientific activity during pandemic.
- U.G. students learnt soft skills through presentation.
- Revised the history of classification of periodic table.
- Learnt the tricks to remember modern periodic table.
- Cultivated students interest in periodic table and research outlook.
- Lead to a two fold activity,an activity by the U.G. students for the school Children.
- Healthy scientific interaction platform was provided.


SHRI SHIVAJI EDUCATION SOCIETYS', AMRAVATI
SHRI SHIVAJI SCIENCE COLLEGE AMRAVATI
WEBINAR
DEPARTMENT OF CHEMISTRY CELEBRATING.....
NATIONAL PERIODIC TABLE DAY
Sunday, 07-FEB-2021 at 07.00 AM
Principal
Hon'ble Dr. V. G. Thakare
Shri Shivaji Science College
Amravati
Dr. G. N. Chaudhari
Prof. and Head
Department of Chemistry,
Shri Shivaji Science College,
Amravati
SPEAKER
Shubham
Wadurkar
BSc II M
SPEAKER
Rudrani
Barabde
BSc II M
Dr. A.B. Bodade
Professor
ACTIVITY INCHARGE
Department of Chemistry,
Shri Shivaji Science
College,
Amravati


Aabha Chaudhari
SHRI SHIVAJI EDUCATION SOCIETYS', AMRAVATI
SHRI SHIVAJI SCIENCE COLLEGE AMRAVATI
WEBINAR
DEPARTMENT OF CHEMISTRY CELEBRATING.....
NATIONAL PERIODIC TABLE DAY
Sunday, 07-FEB-2021 at 07.00 AM



Science Awareness Program

Day/Date :- Monday 8th February 2021

Venue :- Kasturba Kanya Shala Amravati.

No. Of Beneficieries :- 70

TO promote the interest of the school students in science subject and to acquaint them with the knowledge of history periodic table ,Department of Chemistry arranged a two-fold activity an activity by P.G. students for the school children through **Science Awareness Program** at **Kasturba Kanya Shala Amravati on** Monday 8th February2021 .The program began with garlanding the portrait of Dr Bhausaheb Punjabrao Deshmukh the founder president of our society followed by **tree plantation** and inaugural function.Newly appointed headmistress Mrs Archana Lunge was felicitated by our staff Dr A.B.Bodade , Dr N.H.Bansod,Dr Shruti Ingole and Dr Archana Bodade. Activity incharge Dr Anjali Bodade informed about the event and the preventive measures during Covid -19 pandemic, while Dr N.H .Bansod gave a motivational talk. P.G.students Ms Rutuja Harne,Mr Niraj Diwedi, Mr Amol Rokade and Mr Chetan Soye taught the students basic Concepts in Chemistry and gave

Tricks to learn Periodic table by maintaining Social distancing in a batches of 35 students in two classrooms.At the end evaluation was done through questionnaire and appreciated by offering chocolates . Mr Niraj Diwedi who received a patent guided the students on out of the box research oriented thinking and the steps taken to patent his own ideas.

Prof. Dr. Anjali Bodade worked as an In-Charge Professor for the event.

DEPARTMENT OF CHEMISTRY - Activity 4(Session 20-21)

Science Awareness Program held on Monday 8th February 2021 at Kasturba Kanya Shala Amravati.

(In-Charge Professor -Prof. Dr. Anjali Bodade)

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

ACTIVITY -5 (Session20-21)

Celebration Of National Science Day By SHRI SHIVAJI SCIENCE COLLEGE, AMRAVATI

Science Day Celebration by Sharing Syllabus Oriented Video for Schools (std VII to X)prepared by BSc II PCM Students .

Followed by Quiz based on Videos for School Children And Issuing E-Certificate on Submission of Quiz.

Demonstrations Of Basic Scientific Concepts To The School Children

Science Day Celebration by Sharing Syllabus Oriented Video for Schools (std VII to X)prepared by BSc II PCM Students Followed by Quiz based on Videos for School Children And Issuing E-Certificate on Submission of Quiz .

Number of Participants-67 students (BSc II M+PHG)

Number of Beneficiaries-HIGH SCHOOL CHILDREN from 27 SCHOOLS (Standard VII to X)

VIDEO LINK: https://youtu.be/hyE1vU8wnP0

Quiz: based on videos https://docs.google.com/forms/d/e/1FAIpQLScp1AuBpx5RML3Wc9UX_hAjOXu9BI-L8_Gz0B49kihOvxLasg/viewform

OBJECTIVES :

- **To encourage and enable students to Develop inquiring minds and curiosity about science and the natural world.**
- **Acquire Knowledge, conceptual understanding and skills to solve problem.**
- **Communicate scientific ideas**
- To promote scientific temper in school children.
- To demonstrate experiments from syllabus.

- To Inculcate social responsibilities.
- To engage students in fruitful event.
- Communicate scientific ideas.
- Imbibe creative thinking.

DEPARTMENT OF CHEMISTRY CELEBRATED NATIONAL SCIENCE DAY from 3rd March to 10th March 2021 by sharing the syllabus oriented video on Demonstrations of Basic scientific concepts by the B. Sc. II year students for the School Children ,Under Science Awareness Programmed -2021. A Step Towards Socialising the U.G. students And Promoting Science among the school children. During the COVID PANDEMIC our efforts were to acquaint the school students with Demonstrations of Basic scientific concepts , experience the laboratory ambience and Communicate scientific ideas.

This is a TWOFOLD ACTIVITY – An activity by the B. Sc. II year students demonstrating basic concept in science through the video to the school children of Standard VII to X. Out of fourty videos received top thirteen were sorted out for the school children. Principal Dr. V.G. Thakare presided over the function as the Chairman,Prof and Head of the department of Chemistry Dr. G.N. Chaudhari as a Convener.The introductory remarks were given by Organizing Secretary Dr. Anjali.B. Bodade Based on demonstration the students are expected to solve the Quiz of 80 . On solving the quiz E-Certificate is issued .Shri Shivaji Education Society appeal the school teachers to circulate the Links of Video on Demonstrations of Basic scientific concepts and QUIZ to the students. Online Certificate will be issued on successful submission of the quiz.

Video Link- https://youtu.be/hyE1vU8wnP0

Quiz:https://docs.google.com/forms/d/e/1FAIpQLScp1AuBpx5RML3Wc9UX_hAjOXu9BI-L8_Gz0B49kihOvxLasg/viewform

The activity was carried out in two phases.

Phase- I Video was circulated through whatsapp to the students of BScII guiding them about the rules and the topics to be covered in five minutes span. Each topics was

Dr Anjali Bodade
Activity Incharge

Dr G.N.Chaudhari
Prof &HEAD

DEPARTMENT OF CHEMISTRY celebrated NATIONAL SCIENCE DAY from 3rd March to 14th March 2021 by sharing the syllabus oriented video on Demonstrations of Basic scientific concepts by the B. Sc. II year students for the School Children ,

A Step Towards Socialising the U.G. students And Promoting Science among the school children. During the COVID PANDEMIC our efforts were to acquaint the school students with Demonstrations of Basic scientific concepts , experience the laboratory ambience and Communicate scientific ideas.

Prof. Dr. Anjali Bodade worked as an In-Charge Professor for the event.

Letter from SOCIETY

explained in detail and text was provided. Students participated with enthusiasm and received good response .Out of forty videos received top eleven were sorted out for the school children.

Phase-II Top Eleven videos were circulated to the 300 schools of Shri Shivaji Education Society ,Amravati. Based on these demonstration a Quiz of 80 questions was framed for evaluation . Link to the Quiz was provided through the Principal of the schools. On solving the quiz E-Certificate was issued as a mark of evaluation of the knowledge acquired and Appreciation for participation. Topics covered:1)Study of Hydrocarbons by Mr. Abhishek shelke 2) Polar Satellite Launch Vehicle by Mr. Shubham Jadho 3)Periodic Trends by Ku. Misba Patel 4) Revolution of earth seasons by Ku. Vaishnavi Lonarkar 5) Newtons Law of Motion by Miss Rucha Dakhore 6) Scalar versus Vector Quantity by Mr. Anand Umale7)Stress Management by Miss Dipti Thakare 8)Bonding by Mr. Shitij Patkar Link for the Video9)Biotechnology by Arpit Kale10) Conical Pendulum and its Expression by Sanskruti Khandare 11)Eco-System By Miss Anagha Rathod 12) Solutions for Global Warning by Miss Pallavi Chandure 13)Photometry by Miss Rudrani Barabde. At the end, the school children should solve the QUIZ . The online Certificate were issued on successful submission of the quiz. Link for online Quiz was submitted.

OUTCOME-

- Demonstration and technical Skill.
- Awareness about social responsibility.
- During Covid Pandemic -19 the students experienced the ambience of Laboratory through demonstration.
- Students learnt to describe and discuss ways in which science is applied and used to solve local and global problems.
- Laid the foundation of basic concepts.
- Describe and evaluated the benefits and limitations of science and scientific applicationsas well as their effect on life and society.
- Learnt how science and technology are interdependent and assist each other in the development of knowledge and technological applications.
- Came to know how science and its applications interact with social,economic,political,environmental,cultural and ethical factors.

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

Activity Report- 6 (Session 20-21)

One day Workshop on Opportunity for Women Entrepreneur in the field of Beauty ,Cosmetic and Patenting .Dr Rahul Phate and Adv Ashutosh Swarankar.(7th March)
Shri Shivaji Science College

Department Of Chemistry

Womens Day Celebration

ONE DAY WORKSHOP ON OPPORTUNITY FOR WOMEN ENTERPRENEUR IN THE FIELD OF BEAUTY,COSMETIC AND PATENTING.

Date - Sunday 7 March 2021

OBJECTIVE-

- **TO** Promote female entrepreneurship.
- **To fetch self employment.**
- **Awareness about the rapidly advancing COSMETIC industry.**
- TO enable Progress in Technology.
- To Implement skill .
- To encourage research and Patenting in the new generation

One Day Workshop On **Opportunity For Women Entrepreneurs In The Field Of Beauty, Cosmetics And Patenting** was Organised on Sunday 7 March 2021 by Department of Chemistry, under the guidance of Course co-ordinator of Cosmetology Dr Anjali Bodade. The Workshop was graced by the linking of intellectual personalities , Principal, Dr V. G. Thakare as the chairman ,Speaker, Dr Rahul Phate, Dr G. N. Chaudhari Prof & Head of Department of Chemistry, Prof Dr Archana Burghate Senior Faculty Member, Teaching Fraternity, and students .

The objective behind arranging such an event was to Promote female entrepreneurship, Enable Progress in Technology ,to Implement skill and to encourage research and Patenting in the new generation , Rahul Phate Sir a result oriented Innovator ,a successful enterpreneur in the field of Cosmetic and a dedicated personality who has devoted his whole life to beautify the world guided the students on the various job openings in the field of cosmetics. Being a renowned Cosmetologist he gave very simple beauty tips to the students .He also gave offer for marketing his research products and franchise .Advocate Ashutosh Swarankar, Director BLI consultancy, pvt ltd, New Delhi focused on patenting and in details explained about type of work to be done for patenting rules and regulation for filing the patent through demonstration. He had given an open invitation to the students for guidance regarding patent filing as and when needed in future.Program was conducted by Dr Harshali Wankhade.

List of Students(Msc I & II AND COC 20-21).

Outcome-

- **Opportunity to Interact with a renowned cosmetologist.**
- **Aquired the knowledge of selection and application of cosmetic.**
- **Importance of Combing technique.**
- **Openings in cosmetic marketing.**
- **Product marketing tactics.**
- **Filing a patent.**
- **Motivated to file a patent.**
- **Guidance to select an appropriate research area for patenting.**

Dr. H. S. LUNGE
IQAC Coordinator
Shri Shivaji Science College
Amravati.

Principal
Shri Shivaji Science College
AMRAVATI.

Activities on Gender Sensitization

Awareness Program on Personal Grooming/Health /Self Defence

Seminar on Personal Grooming

To popularize career-oriented course in cosmetology amongst the newly admitted students for the session 2015-16 seminar on PG was arranged on 23 July 2015.

Students were guided on hygiene hair care and personal grooming by Beauty Therapist Dr. Usha S. Bhutad proprietor ''Innovation of Rahul Phate Unisex Tricology Clinic''. The B.Sc. I students were unformed about the harmful effects of soap and skin care, demonstrated on scientific coming techniques was given personal queries of the students were answered.

Activities Conducted for Gender Sensitization

Awareness Program on Health & Self-Defence|:

Awareness Program onHEALTH & SELF-DEFENCEwas arranged for the UG and PG students on 8th March 2016, on the eve of Women's day, by the Luminous Spark Guardian Teacher group in collaboration with Department of Chemistry & Women Cell Shri Shivaji Science College, Amravati.Theprogramme was inaugurated at the hands of chief guest Dr Pushpa JunghareSomvanshi M.D., Prof. & Head of Gyn. & Obs. Dept. PDMMC,Amt.in the gracious presence A.P.I.RitaUike The students were guided on Adolescence changes and had an healthy interaction with the students on gynec problems. While the A.P.I.RitaUike delivered a lecture on "**Prevention is Better ThanCure**and also taught self –.

II) Seminar by Rahul Phate on Health and Beauty Tips

One day seminar was organized by department of chemistry under skill development course in cosmetology on Wednesday, 19th September 2015. The students of UG, PG and research students along with college staff attended the seminar. Dr. Rahul Phate was the chief guest and Dr. V. G. Thakare, principal presided as a chairperson and Mrs. Usha Bhutad, Propriter of Yugandara Health Care, Amravati as a Guest of Honour for the inauguration ceremony.He focused on the topics-

1. Skin and hair care
2. Demonstration of scientific combing techniques.
3. Diet plan for the college students and also guided the students on eating habits.

SEMINAR ON HEALTH AND WELLNESS ON THE TOPIC –

MENSTRUAL HYGIENE

Need- poor menstrual hygiene caused by lack of education on the issue undermines the educational opportunities, health and overall social status of the girls. As a result, girls are kept from reaching their full potential.

VISION – To create a world in which every women and girl is empowered to manage her menstruation safely, hygienically, with confidence and without shame, where no woman or girl is limited by something as natural and normal as her period.

ACTIVITY- Education about menstruation changes everything. To highlight the importance of good menstrual hygiene management, Dr Anjali Bodade, Convener of WOMEN EMPOWERMENT CELL in Collaboration with Department of CHEMISTRY had arranged a Seminar on MENSTRUAL HYGIENE for the students of PAYOSHNI girls' hostel on Sunday 30 September 2018 in the hostel hall. Girls must freely discuss about their problems with their friends /care taker. Girls shoudn't feel ashamed about getting menses, it's a natural phenomenon. A team from Nagpur was called upon to introduce about their quality product FEEL NEW. Who guided the students and also distributed free samples? The activity took place in presence of nearly fifty girls and Varsha Deshmukh, Hostel Warden.

Seminar On Menstrual Hygiene At Payoshni Girls Hostel On Sunday 30 Sep 2018.

HANDS ON BODY SPA

Arranged By-Women Cell In Collaboration with Career Oriented Course In Cosmetology,Department of Chemistry.

Apart from the regular syllabus framed up by our university for the career oriented course in Cosmetology we keep the students updated with the latest arrival techniques in the beauty world Accordingly Women Cell in Collaboration with Career oriented course in Cosmetology,Department of Chemistry has arranged HANDS ON BODY SPA on sunday 23 September 2018 by demonstrating the various steps by the expertsMs Bhavana and Sneha accompained by Dr Yogita Kale from AROGYAM,Amravati.

Students were explained about the various steps involved in body spa and also given practise .They were also informed about the importance of music and the ambience of the room while the client is treated.The role of various creams,scrub and cleansing agent,different type of packs was also explained.At the end the results were quite clearly visible on the student model.Students were happy to learn whole body spa.

HANDS ON BODY SPA HELD ON 23 SEP 2018

SEMINAR ON AAHARATUN AROGYAKADYUN SUNDARTEKADE

To popularize career oriented course in cosmetology a seminar on AAHARATUN AROGYAKADYUN SUNDARTEKADE was arranged by Women Cell in collaboration with COC IN Cosmetology,Department of CHEMISTRY on Monday 24 september 2018 at 4pm in the college Auditorium.The seminar was chaired by Dr Neha Bhatkar,chief guest Dr Vaishali Gulhane,Ayurvedacharya,in the gracious presence of Dr Yogita Thakre, Women Cell Committee members Dr Sanjeevani Wagh, Dr Rekha Maggirwar and Convener Dr Anjali Bodade.The program was conducted by miss Pratiksha thakare

Dr Vaishali Gulhane guided the students about the co-relation between DIET, HEALTH AND BEAUTY .OF THE BODY SOUL AND MIND.by powerpoint presentation .The program began with meditation .Stress was laid on the Diet for the teens, Charming 40s and diet to be kept in the Canteen.A diet plan was proposed and consumption of soups,sprouts and uncooked food was given importance and suggested to consume very less quantity of chapatti.Simply by changing the diet one can not only cure disease but also achieve beauty.Students were also guided on polycystic ovaries, psoriasis and care to be taken by a diabetic.We had an open interaction with the students and the students asked their personal questions.Dr. Anjali Bodade informed the students about the Cosmetology Course

Presidential address was given by Dr. Neha Bhatkar and program ended with vote of thanks by miss gadekar and a song sung by miss sarode

Introductory Speech

Gender Equity (2017-18)

ACTIVITY 1

Workshop on Right decision on Right Time (infertility)

Balance for Better

Workshop on Right decision on Right Time (infertility) was arranged by Department of Chemistry on 8th march 2018 in the C.V.Raman Hall. Renowned gynaecologist of the city Dr.Pranjal sharma guided the student on important burning issue todays scenario infertility. Interactive session with the student was held and student curiosity was solved.

Diverting the attention of the students on the theme Dr Pranjal Sharma very well explained in a lucid way and focusing on the very important aspect of life that while in the career making days how important it is to take into account the fertility period together with nutrition and diet to lead a healthy and a happy life point. Man and women have equal status in society and progress of nation depends on well balanced growth of both men and women

NEWS FLASHED

One day Workshop on Right decision on Right Time (infertility)

श्री शिवाजी विज्ञान महाविद्यालयात महिलादिनी कार्यशाळा

■ डॉ.प्रांजल शर्मा यांचे मार्गदर्शन

सकाळ » TODAY

अमरावती सोमवार ११/३/१९

» अवतीभवती

अमरावती : महिलादिनी कार्यशाळेत मार्गदर्शन करताना डॉ. शर्मा

जागतिक महिलादिनी कार्यशाळा

अमरावती : स्थानिक शिवाजी विज्ञान महाविद्यालयात महिलादिनी योग्य वेळी योग्य विचार या महत्त्वाच्या विषयावर कार्यशाळा घेण्यात आली. शहरातील गायनॅकॉलॉजिस्ट डॉ. प्रांजल शर्मा यांनी या विषयावर विद्यार्थिनींना मार्गदर्शन केले. कार्यक्रमाच्या अध्यक्षस्थानी डॉ. संजीवनी वाघ होत्या. कार्यक्रमाचे आयोजन महिला सक्षमीकरण कक्षाच्या डॉ. अंजली बोदडे यांनी केले. यावेळी डॉ. शर्मा यांनी महिला आरोग्याच्या विविध विषयावर प्रकाश टाकला. प्रास्ताविक डॉ. संगीता इंगोले यांनी केले, तर आभार डॉ. रेखा मग्गीरवार यांनी मानले.

ACTIVITY 2

Programme under Gender equity

ACTIVITY-1

Skit on eradication of superstition ON 12TH AUG.2017

In indian scenario the society breeds distorted values of religion,class ,class distinction,sense of inferior and superior ,having boy as a successor of the family,To uproot these views especially in the new generation Ms. Sayli Atkare and her group from B.Sc II PCM presented a skit on eradication of superstition on 12th August 2017 .The activity was condusted under the guidance of Dr Anjali Bodade for the girl students of the school adopted by our college Kasturbakanya Kanya Shala ,Shyam Nagar,Amravati.

SKIT ON SUPERSTITION AT KASTURBA KANYA SHALA ON 12 AUG 2017

EMPOWERING GIRLS Department promotes gender equity by involvement of both boys and girls in various activities like science awareness, seminar coopetition, Day celebration etc. Which also makes the student aware of the importance of gender equity while working together?

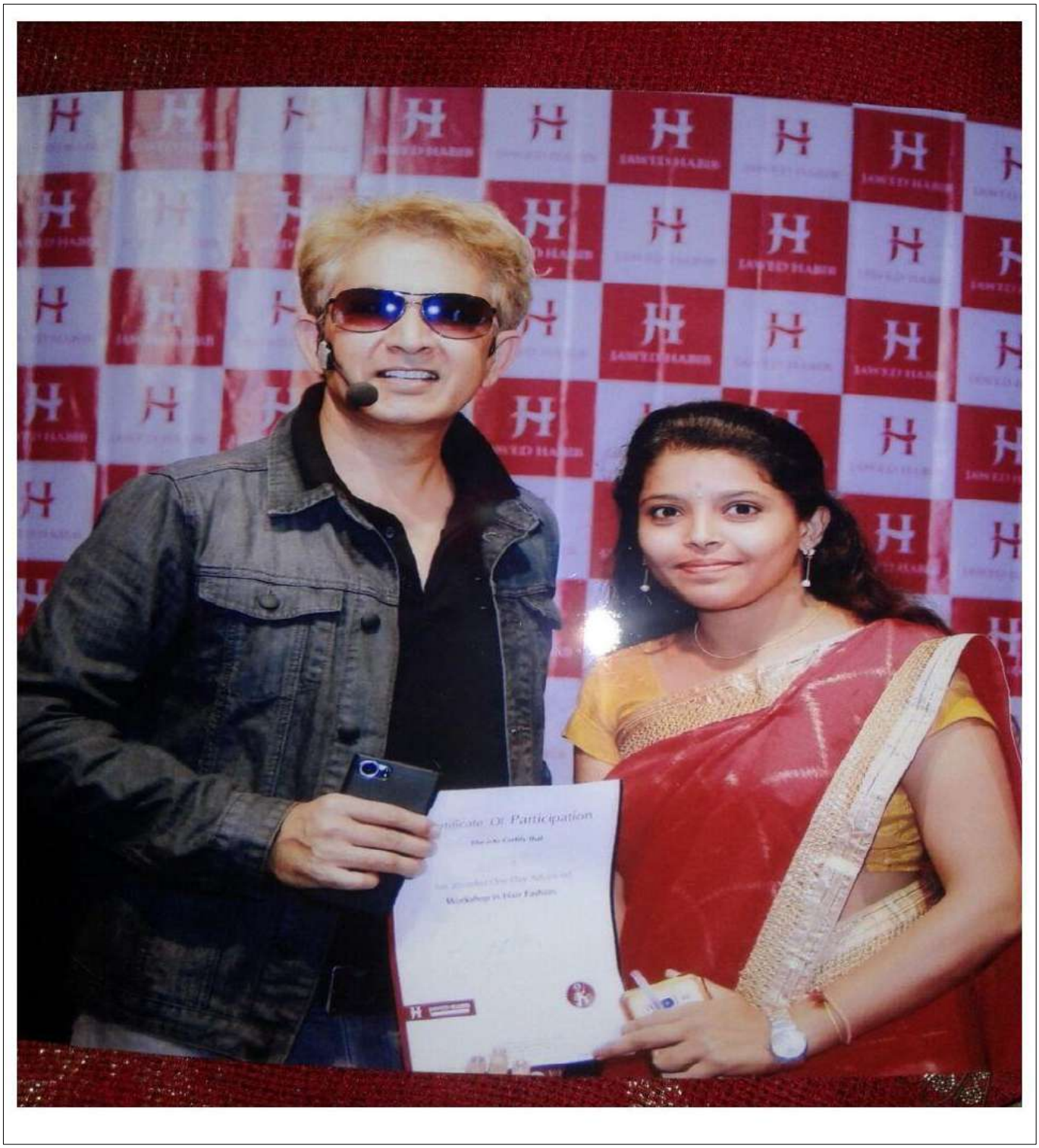
SELF RELIANCE THROUGH SKILLING

To support the efforts of the nation to empower women inorder to live with dignity.So that they can contribute as valued partners in sustainable development of the self ,families and the nation. Our Chemistry department contributes in skilling india by motivating students to attend seminars of skills.

Cosmetology students particupated in One Day Hair Fashion Seminar by famous hairstylist JAWED HABIB held on thrusday 3rd august 2017 at Sant Dnyaneshwar Sanskrutik Bhawan Amravati

In order to expertise our students of cosmetology in the science of hair,colouring, chemicals, innovative texturized cuts and creative colour The seminar was The participation certificate was received by the students at the hands of Jawed Habib . Students were guided with simple hair cutting and colouring eco-friendly techniques . Students were also boosted to choose their career as a beautician, and were made aware that this is one of the leading profession today

Hair Care Training by Javed Habib



ACTIVITY-4

Departmental Social Responsibility- DSR

Prior to teaching each faculty member is indebted towards the society .Departmental staff have contributed towards the society Dr. A.S. Burghate and Dr.S.K. Rithe gave financial assistance to the students by paying their COC fees.

"WORKING FOR THE CAUSE OF HUMANITY ,external student Ms Jyotsna Raut and a localite Ms Pratibha Patil were guided and effort were taken to get theMOU signed for theme so as to run government recognized course "Habib Hair Styling, "Indus Information Integrated Management Limited ,Corporate Office ,Kolkata for the unemployed youths of our locality to get skilledfully trained. Serving humanity is the essence of life,lets do our bit to make this world a happier place to live

Shri Shivaji Science College, Amravati

International Women's Day-2020

Report of Program Executed

Date: 09/03/2020

Respected sir/madam,

We are pleased to submit this report, **Poster presentation** and **Guest Lectures** were organized in our college on the occasion of "World Women's Day". The event was organized in conjunction with the **Women's Empowerment Committee** and Career Guidance Committee of our college.

Dr. Neha Bhatkar, Head of the Department, Zoology Department contributed chairperson of the programme. As well as being a prominent presence, **Dr. Neelima Ardak (Thakre)**, President, OBSTETRICIAN and GYNACOLOGISTS SOCIETY, Amravati and **Mrs. Pushpa Choudhary**, Director, Gayatri Nursery, Amravati were present on the dice.

Dr. Nilima Ardak (Thakre) gave a detailed guidance on the topic of "women's hygiene and nutrition care" through Power Point Presentation to all the attendees. In the present case, women have given many vivid examples of how much attention they have to this matter, in simple and straightforward terms, referring to the events experienced in their medical profession.

Mrs. Pushpa Choudhary directed that a woman living in a communal family be happy with her courage and how she can create a job ooportunity and lead a happy life. Realizing that women are not inferior in this age of competition, she described to all women that she should not flee new age because only she is a woman.

Dr. Mayura Deshmukh expressed vote of thanks. To carry out this program successfully, Dr. Revati Khokale, Dr. Rupali Bhagat Patil, Dr. Mayura Deshmukh, Dr. Harshali Wankhede taken the hard efforts.

Site of the event: C. V Raman Hall, Shri Shivaji Science College, Amravati
Time of the event: 3:00 pm to 4:00 pm

Street Play by NSS Students

Save Girl Child Campaign

Future destiny of India is being shaped in schools and colleges of India – Kothari Commission 1986

Save girl child street play and lecture series programs were arranged by NSS volunteers during celebration of National days and NSS camps to make awareness and value of a girl child. There is increasing female foeticide and girl's dropout rate in schools, colleges and universities in India. Unfortunately, the potential and creative abilities of women and girls are wasted. Due to old dated customs and traditions, they are used as tools to cook, wash and do domestic chores. It is very important to equalize women with men, girls with boys. They must be protected, provided basic rights like proper education, proper health care and proper attention. There must be gender equality in the society so that girls get chance to succeed and excel in life. Due to inequality and discrimination girls and women are leading a miserable life.

SHRI SHIVAJI SCIENCE COLLEGE,AMRAVATI

DEPARTMENT OF CHEMISTRY

Activity 8 (Session 20-21)

MENSTRUAL HYGIENE DAY

Date -21 May 2021

Beneficiaries – COC,U.G.,P.G.girl students.

Objective-

- **To promote menstrual hygiene.**
- **To promote awareness among freshers.**
- Awareness about different home -made and ready made sanitary products.
- Awareness about the myths about menstrual cycle.

Every year Career oriented course in cosmetology under the Department of Chemistry celebrates **Menstrual Hygiene Day** –a global event aimed at promoting the importance of safe menstrual hygiene management to create awareness amongst the freshers. The global theme for the Menstrual Hygiene Day 2021 was "**We need to step up action and investment in menstrual health and hygiene now!"**

Covid -19 pandemic has demonstrated that menstrual hygiene is a multifaceted challenge in India. Lack of access to period products was just at the tip of the iceberg when it came to the impact of the coronavirus crisis on period health ..Due to pandemic the past year has made it more difficult than ever to safely manage their periods. Sanitary pads were not included in the governments list of essential items ,a number of barriers to accessing sanitary products.Awareness about different home -made and ready made sanitary products available, maintainance of hygiene during periods and the myths about menstrual hygiene was created by circulating a ppt on **Menstrual Hygiene** to the students.

Outcome-

- Acceptance of menstrual cycle as a natural process.
- Ruling out the myths.
- Awareness about hygiene to be followed during periods.
- Awareness about home -made and ready made sanitary products.

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