Syllabus for

Bachelor of Science in Environmental Science (Honours)

Under Choice based Credit System

SEM IV and SEM V

Academic Session

w.e.f. 2020-2023

For

All Constituent/Affiliated Colleges under

BINOD BIHARI MAHTO KOYALANCHAL UNIVERSITY,

DHANBAD

ENV-H-C-408-T	Conservation of biodiversity & wild Life Management	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group A will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rest eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- The question no. 9 will be of short notes type each carrying six marks (6x2=12) in which only two should be answered out of four options.
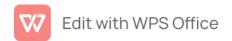
ENV-H-C-408-T : Conservation od Biodiversity & Wildlife Management

Unit I: Conservation of Biodiversity

1.1 Levels of Biodiversity, types and distribution of biodiversity,

1.2. Cause of biodiversity destruction,

1.3. Steps in the management & conservation: in-situ conservation, ex-situ conservation, inter-situ conservation,

1.4. Biodiversity Hot spots: concepts, distribution and importance.

1.5 Use of biodiversity: Source of food, medicine, raw material, aesthetic and cultural.

1.6 Role of IT in conservation of floras &faunas

Unit II: Wild life Management

2.1. Wildlife management, national parks, biosphere reserves, sanctuaries .

2.2. Concept of various conservation project implemented in India:

     2.2.1 Project Tiger,

     2.2.2 Project Rhino

     2.2.3 Project Crocodile,

     2.2.4. Project Elephant;

2.3. IUCN Categories of threatened species, Red Data Book

Suggested Readings:

- Begon, M., Townsend, C. R., and Harper, J. L..*Ecology from Individuals to Ecosystems.* Wiley-Blackwell, USA. 2005.
- Botkin, Daniel B. and Keller, Edward A. *Environmental Science: Earth as a Living Planet.* 6th ed. John Wiley & Sons, USA, 2007.
- Chapman, J. L. and Reiss, M. J. *Ecology: Principles and Applications.* Cambridge University Press, UK., 1998.
- Cunningham, W. P. and Cunningham, M. A. Principles of Environment Science. Enquiry and Applications. 2nd ed. Tata McGraw Hill, New Delhi, India, 2004.

SEMESTER IV

ENV-H-C-409-T	Freshwater, Marine & Soil Habitat	(04 CREDITS, 60 hr. Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group A will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying

12 marks.

- The question no. 9 will be of short notes type each carrying six marks (6x2=12) in which only two should be answered out of four options.

ENV-H-C-409-T :Freshwater, Marine & Soil Habitat

Unit I: Freshwater and Marine Habitat

1.1.   Fresh habitat: lotics and lentic habitats,

1.2.   Physical, chemical, and biological characteristics of freshwater and marine habitats.

Unit II: Estuaries & Soil Habitat

2.1 Estuaries: Characteristics, adaptation on organisms living in estruries, important estuaries in India.

2.2 Soil: formation, profile, zonation, classification and types of soil soils found in India;

2.3. C/N Ratio, Soil Indicators, Factors effecting Soil Quality – Harvesting, Fertilizers

Suggested Readings Books:

1. Anne E. Magurran. 2003. Ecological diversity and its measurements. Blackwell Publications.
2. J.S.Singh, S.P. Singh and S.R. Gupta. 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).
3. V.H. Heywood and Watson R.T. (Ed). 1995. Global Biodiversity Assessment: UNEP.

SEMESTER IV

ENV-H-C-410-T	Distribution of Rocks, Remote Sensing & GIS	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be

answered of   which question no. 1 will be compulsory

- Questions will be grouped into two - Group A and Group B.
- Group A will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- The question no. 9 will be of short notes type each carrying six marks (6x2=12) in which only two should be answered out of four options.

ENV-H-C-410-T :Distribution of Rocks, Remote Sensing & GIS

Unit I: Rocks

1.1 Structure of earth, Composition of Earth.
1.2. Rocks: Definition, Formation, Types of rocks,

Unit II: GIS & Remote Sensing

2.1.   Remote Sensing – Optical and Microwave , Physical Basis for remote sensing, Remote sensing process, Satellites, Semsors and ground station, system for data collection, passive system & Active system,
2.2. Applications of remote sensing.
2.3 Geographic Information System: basic concepts,
2.4 Integration of related system in GIS, Application of GIS.

Suggested Readings Books:

1. Anne E. Magurran. 2003. Ecological diversity and its measurements. Blackwell Publications.
2. J.S.Singh, S.P. Singh and S.R. Gupta. 2008. Ecology, Environment and Resource

Conservation. Anamaya Publications (New Delhi).

3. V.H. Heywood and Watson R.T. (Ed). 1995. Global Biodiversity Assessment: UNEP. Cambridge University Press Threats to biodiversity: Natural and anthropogenic, species extinctions, IUCN threat

categories, Red data book, Invasions: causes and impact.

Biodiversity conservation, principles and strategies; *in-situ* and *ex-situ* conservation, Protected Area Network.

Biodiversity Hot spots: concepts, distribution and importance.

Use of biodiversity: Source of food, medicine, raw material, aesthetic and cultural.

Biodiversity prospecting.

SEMESTER IV

ENV-H-C-408,409 & 410-P	Practical based on 408-P,409-P & 410-P	(06 credits, 60 hr,Teaching)

Sl no	Practical	Marks Obtained
1	Water analysis	15
2	Soil forming rocks analysis	15
3	Microbiological analysis	10
3	Project of nearest habitat visited	10
4	Practical record	5
5	Viva voce	5
	Total	60

ENV-H-C-408-P, 409-P& 410-P - Practical based on 408-P,409-P& 410-P

1. Measurement of chloride in water sample.

2. Measurement of phosphate in a water sample.

3. To Analysis the physiological characters of soil forming rocks.

4. Microbiological analysis- Inoculation of bacteria from soil and water, growth of bacteria, Identification of bacteria by gram staining.

5. Preparation of project on a habitat visited.

6. Viva- voice and Practical Record.

SEMESTER V

ENV-H-C-511-T	Environmental Pollution	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- The question no. 9 will be of short notes type each carrying six marks (6x2=12) in which only two should be answered out of four options.

ENV-H-C-511-T : Environmental Pollution

Unit I : Water Pollution &Air Pollution

1.1. Concept of pollution: types of pollutants. Source: Point and non- point source

1.2 Bioaccumulation, biomagnifications, stress and strain.

1.3 Water pollution: definition, Types and its characterstics standards of potable and drinking water, prevention and control, treatment, eutrophication.

1.4 Air pollution: definition, ambient standards , Control Measures , Acid rain, photochemical smog, Green houses effect, ozone depletion, automobile pollution,& its control measures,

Unit 2: Soil, Sound & Radiation pollution:

2.1. Soil pollution: definition, sources, types, effects and control.

2.2. Sound pollution- Basic concepts. Noise –Sources, effect & Control measures,

2.3. Radiation pollution – Basic Concepts. Types of Radioactive pollutants, Hazards & Its control Measures, Case study of Nagasaki & Hiroshima

2.4. Standards of Air, Water, Soil & Noise Quality

Suggested Readings:

- 1. A. K. De. (3rd Ed). 2008 Environmental Chemistry. New Age Publications India Ltd.
- 2. I. C. Shaw and J. Chadwick. 1997. Principles of Environmental Toxicology. Taylor&
- Francis Ltd.
- 3. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
- 4. Ira. S. Richards. 2008. Principles and Practices of Toxicology in Public Health. Jones

- and Barlett Publications

ENV-H-C-512-T	Waste & its Management	(04 CREDITS, 60 hr. Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.

ENV-H-C-512-T : Waste & Its Management

Unit I: Waste Concepts

1.1. Basic Concepts of waste- types, and sources; solid waste, liquid waste, Hazardous waste,

1.2. Characterization of municipal solid waste, Biomedical waste, effect of Solid waste on environment, human health, aquatic bodies, Mines wastes.

Unit II: Waste Management

2.1. Different techniques on collection, storage, transportation, and disposal of solid waste;

2.3. Wastewater treatment: Industrial effluents, Municipal effluents and mines effluents

2.4. Concept of 3R's- Recycle, Reuse, Reduce

2.5. Biological Processing- Composting, Aerobic & Anaerobic Digestion.

Suggested Reading

- Acharya, D.B. and Singh, M. *Hospital Waste Management*. Minerva Press, Delhi. 2003.

Alleman, J. E. and Karanagh, J. T. *Industrial Waste*. Ann Arbor Science.1982.

- Bhatia, S.C. *Solid and Hazardous Waste Management*. Atlantic Publishers.2007.

- Blackman, W.C. *Basic Hazardous Waste Management*. CRC Press, USA. 2001.

- Evans, G. *Biowaste and Biological Waste Treatment.* James and James (Science

Publishers) Ltd, U.K. 2005*.*

- Hasan Syed E. Geology and Hazardous Waste Managemet, Prentice Hall, USA, 1996.

- Kreith, F. *Handbook of Solid Waste Management*. McGraw Hill Publishers, USA. 22,1999

- LaGrega M.D., Buckingham, P.L. and Evans J.C., Hazardous Waste Management, McGraw Hill International Publications, Singapore, 1994 – Revised Edition Available – ISBN 0-07-113454-9.

- Moore, J. W. *The changing Environment*. Springer-Verlag. 1986.

SEMESTER V

ENV-H-C-511 &	Practical based on 511-P & 512-P	(04 credits, 60 hr.

	512-P		Teaching)

Sl no	Practical	Marks Distribution
1	Capillary rise experiment	10
2	Ion exchange analysis	10
3	Soil Temperature analysis	10
4	Practical Record	5
5	Viva Voce	5
	Total	40

ENV-H-C-511-P& 512-P

1. Determination of capillary rise phenomenon of water in soil column.

2. Determination of soil temperature by using soil thermometer

3. Determination of anion exchange capacity of soil.

4. Determination of cation exchange capacity of soil

5. Project .Report

6. Practical record.

7. Viva- voice.

ENV-H-DSE-501A-T	ECOLOGY Vs ECONOMY	(04 CREDITS, 60hr. Teaching)

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- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.

ENV-H-DSE-501A-T: ECOLOGY Vs ECONOMY

Unit I: Environmental Economics

1.1 Concepts of environmental economics, Characteristics of environmental goods, environmental economics Vs Traditional economics,

1.2. Cost Benefit Analysis,

1.3 Morals & Ethics of Environmental Protection,

1.4 Natural Resources Economics- Economics of Non-renewable & renewable Resources, economics of fuels & Minerals, Taxation, economics of Water Use

Unit II: Sustainable Development

2.1 Concepts of Sustainable development- Resource management, water Use strategies, Land use planning, Forest Management, Energy consumption from non renewable resources, Alternate option of Energy & Challenges.

2.2. Carrying Capacity - Definition & Scope of Development Planning, integrated

resources management strategies.

2.3 Environmental Education,- Needs and different approaches In India,

2.4 Institutes & Research Centres in INDIA.

Suggested Readings:

1) Edgar G. et al, 2008, Environmental education, Sense Publishers
2) J.M. Haris,2017, Environmental & natural Resource Economics: A Contemporary approach, 4th Edition, Routledge Publishers.

SEMESTER V

ENV-H-DSE-501B -T	ENVIRONMENTAL IMPACT ASSESSMENT	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.

ENV-H-DSE-501B -T: ENVIRONMENTAL IMPACT ASSESSMENT

Unit I: Environmental Impact Assessment

1.1. EIA- definitions, and Concepts,

1.2. Scope and methodologies of EIA.

1.3. Role of Projects Proponents, developers & Consultants.

1.4. Terms of Reference, Impact Identification and Prediction, EIS and EMP.

Unit II: EIA Regulations

2.1. EIA Regulations, Social Impacts,

2.2. Life cycle Assessment.

2.3. Environmental Planning & Environmental Audit.

2.4. ISO Guidelines.

.

Suggested Readings:

1) Edgar G. et al, 2008, Environmental education, Sense Publishers
2) J.M. Haris,2017, Environmental & natural Resource Economics: A Contemporary approach, 4th Edition, Routledge Publisher.

SEMESTER V

ENV-H-DSE-501C -T	Atmosphere & Atmospheric stability	(04 CREDITS, 60 hr, Teaching)

ENV-H-DSE-501C-T: Atmosphere & Atmospheric Stability

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.
-

Unit I: The Atmosphere

1.1. Structure of atmosphere& Composition

1.2 Energy Balance & energy transfers

1.3 Green house effect

Unit II: Atmospheric Stability

2.1. Atmospheric Lapse Rate, ALR, DLAR.

2.2. Inversions,Mixing Heights,Plume Behaviour.

2.3. Gaussian Plume Behaviour,

Suggested Readings:

* 1. A. K. De. (3rd Ed). 2008 Environmental Chemistry. New Age Publications India Ltd.
* 2. I. C. Shaw and J. Chadwick. 1997. Principles of Environmental Toxicology. Taylor&
* Francis Ltd.
* 3. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
* 4. Ira. S. Richards. 2008. Principles and Practices of Toxicology in Public Health. Jones

andBarlett Publication

SEMESTER V

ENV-H-DSE-502A -T	Environmental Biotechnology & Eco -restoration	(04 CREDITS, 60hr. Teaching)

* In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
* Questions will be grouped into two - Group A and Group B.

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- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.

ENV-H-DSE-502A-T	Environmental Biotechnology &Eco- restoration	(04 CREDITS, 60hr. Teaching)

ENV-H-DSE-502A-T: Environmental Biotechnology &Eco-restoration

Unit I: Bioremediation

1.1. Bioremediation- Concepts, Need & Scope, Concepts of Bioreactors,

1.2. Environmental Application of Bioremediation, Case Study in Mines and oil spills areas

Unit II: Cleaning Up of Environments by using plants

2.1. Phytoremediation – Basic Concepts and different examples

2.2. Medicinal Plants - their role. Project medicinal Plants.

2.3. Afforestation, forestry & their types- commercial forestry, production forestry, social forestry, Agro forestry.

Suggested Readings

- Evano, G.H. and Furlong, J.C. *Environmental Biotechnology – Theory and Application.* John Wiley and Sons, USA. 2004.
- Jjemba, P.K. *Environmental Microbiology – Theory and Application.* Science

Pub.

Inc., USA. 2004.

- Olguin, C. J., Sanchez, G., Hernandez. E. *Environmental Biotechnology and Cleaner*

Bioprocesses. Taylor & Francis.2000.

- Pepper, I.L. and Gerba, C.P. *Environmental Microbiology - Laboratory Manaul.* Elsevier, USA. 2005.

- Ratledge, C. and Kristiansen, B. *Basic Biotechnology.* 2nd ed. Cambridge University

Press, Cambridge, UK. 2002.

Rittman, B. and McCarty, P. L. *Environmental Biotechnology: Principles and Applications.* 2nd edition. Tata McGraw-Hill, USA. 2000.

Rittmann, B.E. and McCarty, P.L. *Environmental Biotechnology – Theory and Application.* McGraw Hill, USA. 2001.

Silver C. S. and DeFries, R. S. *One Earth one Future: - Our Changing Global Environment.* East-West Press Edition, 1991.

Singh, J.S., Singh, S.P. and Gupta, S.R. *Ecology, Environment and Resource Conservation.* Anamaya Publishers, New Delhi, India. 2006.

Speth, J. C. *Global Environmental Challenges – Transitions to a Sustainable World.* Orient Longman Pvt. Ltd., New Delhi. 2004.

UNEP. *Global Environmental Outlook 3: Past, Present and Future.* Earthscan Publications. 2002

SEMESTER V

ENV-H-DSE-502B-T	Environmental Statistics	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
- Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
- two should be answered out of four options.

ENV-H-DSE-502B-T: Environmental Statistics

Unit I: Data Sampling & Structure

1.1 Data types and sampling and characterization

1.2. Central tendencies- Mean, Median and Mode.

1.3 Measures of Dispersion – standard Deviation, Standard Error, Variance, Correlation & Regression.

Unit II: Test of Significance

2.1. Test of significance (T- Test).

2.2. Chi Square test

2.3. ANNOVA,

Suggested Readings:

- Biostatistics by S. Chand

- Biostatistics by Tata Mcgrawhill Publication.

SEMESTER V

ENV-H-DSE-502C-T	Environmental Pollution & Human Health	(04 CREDITS, 60 hr, Teaching)

- In all nine questions are to be set of equal values and five questions are to be answered of   which question no. 1 will be compulsory
- Questions will be grouped into two - Group A and Group B.
- Group a will comprise question no. 1, which will consist of two parts A & B. Part A will be MCQ type, covering entire syllabus and carry one mark each(1x6=6) and part B will comprise short answer, three mark each(3x2=6). There will be no option in the Q. No. 1.
Rests eight questions will be of long type set from the whole syllabus in Group B. Examinees are required to answer any four from this group, each carrying 12 marks.
two should be answered out of four options.

ENV-H-DSE-502C-T: Environmental Pollution & Human Health

Unit I: Air and Soil Pollution on Human Health

1.1. Ambient Air Quality Monitoring & Standards (National Ambient Air Quality Standards of India). Air quality index

1.2. Indoor air pollutants & their effects on human health and control measures

1.3. Effect of Soil Pollution on human health

1.4. Effect of Radioactive Pollutants on human health

Unit II: Water & Noise Pollution on Human Health

2.1. Standards of IS: BIS on drinking water quality, Industrial quality, and Municipal waste water.

2.2. Eutrophication and Effect of heavy metals on human health.

2.3. NAAQs standards of Noise Pollution and effects on human health

 2.**4** Effect of Biomedical pollutants (Carcinogenic) - somatic & Genetic effects, Control Measures.

Suggested Readings:

- 1. A. K. De. (3rd Ed). 2008 Environmental Chemistry. New Age Publications India Ltd.
- 2. I. C. Shaw and J. Chadwick. 1997. Principles of Environmental Toxicology. Taylor&
- Francis Ltd.
- 3. S.C. Santra. 2011. Environmental Science. New Central Book Agency.
- 4. Ira. S. Richards. 2008. Principles and Practices of Toxicology in Public Health. Jones

andBarlett Publication

SEMESTER V

ENV-H-DSE-501A/B/C & 502A/B/C-P	Practical based on DSE 501-P&502-P	(04 credits, 60hr. Teaching) F.M: 50(40 EXT. +10 INT.)

ENV-H-DSE-501A/B/C & 502A/B/C-P - Practical based on DSE 501A/B/C & DSE502A/B/C

1. ENV-H_DSE501A-P- Practical based on ENV-H-DSE-501A (Ecology Vs Economy and Sustainable Development)

Sl no	Practical	Marks Distribution
1	Report presentation	5
2	Power point presentation+ Report	10

	presentation , Mathematical Analysis	
3	Practical Record ,Viva voce	5
	Total	20

1. Prepare a report on estimation of minerals from various sources.

2. Prepare a power point presentation / Report on visit to forest ecosystem using curated database.

3. Prepare a report on estimation of Non Renewable fuels and renewable fuels used in India by Various sources

4. Estimation of plant population by T-test and Z-test method.

5. Prepare a report on case studies of interlinking of Rivers & its applications.

6. Practical Record.

7..Viva Voice.

2. .ENV-H_DSE501B-P- Practical based on ENV-H-DSE-501B (Environmental Impact Assessment)

Sl no	Practical	Marks Distribution
1	Power point presentation ,Report presentation	10
2	Project work	5
3	Practical Record and Viva voce	5
4		
5		
	Total	20

1. Prepare a report on case studies on impact assessment : River valley

mining projects.

2. Prepare a power point presentation / Report on general principles of environmental audit.

3. Prepare a report on case studies on effective utilization of environmental laws in oil refineries, petro chemical Industries.

4. Draw digital mapping of green belt zones in India.

5. Prepare a report on various mega building projects and its impact assessment.

6. Practical Record.

7.Viva Voice

3. ENV-H_DSE501C-P- Practical based on ENV-H-DSE-501C (Atmosphere and Atmospheric Stability)

Sl no	Practical	Marks Distribution
1	Power point presentation +Report presentation	10
2	Mathematical Analysis /practical analysis	5
3	Practical Record, and Viva voce	5
4		
5		
Total	20	

1. Draw a wind rose diagram from given atmospheric circulation data.

2. Visit a nearby Industry and learn about various plumes behaviour at differ day times. Prepare a report on the different plume behaviour.

3 .Draw a temperature Inversion graph /diagram of your local area by using various sources/ given data.

4. Draw a meteorology graph/weather pattern of your area by using various sources.

5. Determine the AQI index of your nearby areas.

6. Practical Record.

7.Viva Voice.

4. **ENV-H_DSE502A-P- Practical based on ENV-H-DSE-502A (Environmental Biotechnology &Ecorestoration)**

Sl no	Practical	Marks Distribution
1	Growth pattern & Characteristics of microbes	10
2	Isolation of microbes /effect of antimicrobial chemicals, Graphical representation	5
3	Practical Record and Viva voce	5.
4		

5		
	Total	20

1. Isolation and enumeration of microbes from environmental samples.

2. Estimate or obtain the cultural Characteristics of isolated microbes.

3. Evaluation of antimicrobial chemical agents.

4. Study the graphical representation of effect of environmental parameters e.g temperature, pH, Salinity on microbes.

5. Determination of Bi-phasic growth curve.

6. Practical Record.

7. Viva Voice

5. **ENV-H_DSE502B-P- Practical based on ENV-H-DSE-502B (Environmental Statistics)**

Sl no	Practical	Marks Distribution
1	Calculation of Mean, Median, Mode	5
2	Standard Deviation ,Drawing of graphs from given data	10
3	Practical Record and Viva voce	5
4		
5		

	Total	20

1. Study of entry of data on Microsoft Excel Sheet.

2. Calculation of mean, median and mode from Microsoft Excel sheet.

3. Draw the different types of graphs, bar columns and pie charts by using given data in Microsoft Excel sheet.

4. Calculations of Standard Deviation by given data in Microsoft Excel Sheet.

5. Study and use of various computer applications/modes used in environmental practical.

6. Practical Record.

7. Viva Voice

6. **ENV-H_DSE502C-P-** Practical based on ENV-H-DSE-502C (Environmental Pollution &Human Health)

Sl no	Practical	Marks Distribution
1	Power point presentation +Report presentation	10
2	Drinking water Analysis	5
3	Practical Record and Viva voce	5

4		
5		
Total	20	

1. Prepare a report on Population modelling using Leslie's model.

2. Prepare a powerpoint presentation / Report on environmental issues & Human health

3. Prepare a report on awareness studies of different global pollutants- ozone depletion, corona Virus etc.

4. Prepare a power point presentation / report on basic hygiene and safety standards.

5. Drinking water/potable water Quality Assessments.

6. Practical Record.

7. .Viva Voice