Board of Studies (BOS)

Environmental Science

Savitribai Phule Pune University, Pune 411007

As per the guidelines mentioned in the university circular for Science faculty, reference number Ref / MIC / 27, dated 11th May 2021 and as per the discussions during BOS meeting on 17th may 2021, following is the list of F.Y., S.Y. and T.Y.B.Sc. and M. Sc. SEM I and SEM II of both semesters and annual pattern respectively.

F.Y.B.Sc., Semester 1, Practical Paper EVS – 113 based on EVS-111 & 112

Sr. No.	Title of Practical
1	Laboratory safety rules and introduction to laboratory equipment's
2	Collection and preservation of water and soil samples (Field Practical).
3	Determination of pH and Electrical Conductivity of Water and Soil samples
4	Determination of Alkalinity from water sample
5	Determination of Total Hardness (Ca & Mg) from water.
6	Determination of Chlorides from water.
7	Determination of TDS, TSS & TS from water
8	Determination of Organic Content from soil.
9	Identifying native plants for plantation with respect to Geography and Climate
10	Study of Plant Adaptations under various environmental conditions (Hydrophytes, Mesophytes, epiphytes, halophytes & xerophytes).
11	Study of Animal Adaptations under various ecological conditions

F.Y.B.Sc. Semester 2, Practical Paper EVS – 123 based on EVS-121 & 122

Sr. No.	Title of Practical
1	Measurement of Noise using Sound Level Meter (Field Practical).
2	Collection and characterization of planktons as bio-indicators from Eutrophic lake (Field Practical).
3	Identification of different Rock specimens from their physical properties.
4	Identification of different Mineral specimens from their physical properties
5	Determination of Turbidity in water by Secchi disc (Field practical).
6	Reading Topographic Maps and Symbols
7	Visit to garbage Disposal site
8	Study of soil properties – Temperature, texture and particle size
9	Study of various Soils found in India
10	Estimation of the Moisture Content & Water Holding Capacity of soil
11	Use of social media for e-networking and dissemination of ideas on environmental issues.

S.Y.B. Sc. Semester I, Practical Paper EVS - 233, Based on EVS -231 & EVS- 232.

Sr. No.	Title of Practical
1.	Study of grassland vegetation by List Count Quadrat Method to determine the Frequency, Density & Abundance.
2.	Determination of Frequency & Abundance of species across terrestrial – aquatic transitional zone, by Line Transect Method
3.	Determination of Density of species across terrestrial – aquatic transitional zone by Belt Transect Method
4.	Continuation of the use of Social Media for enetworking & dissemination of ideas on Environmental Issues Pertaining to the Course

5.	Determination of minimum area and number of quadrates for vegetation
6.	Determination of Shannon Diversity Index of a vegetation (Data sheet)
7.	Determination of Simpson Diversity Index of a vegetation (Data sheet)

S.Y.B.Sc. Semester II, Practical Paper EVS - 243, Based on EVS -241 & EVS- 242.

Sr. No.	**Title of Practical**
1.	Sampling of Air by High Volume Sampler
2.	Determination of Optimum Dose of Alum (Coagulant) required for water
3.	Determination of Turbidity of water. (Turbidimeter / Nephelometer)
4.	Determination of Residual Chlorine from treated water.
5.	Determination of Dissolved Oxygen in water by Winkler's method
6.	Study of Water Sampling and Preservation techniques
7.	Measurement of sounds by DB meter / SLM in silent, industrial, residential and commercial zones and Analysis
8.	Estimation of AGB, BGB and Carbon from sampling of trees
9.	Estimation of Productivity of Lake using DO method

T.Y.B.Sc., ENV -307-Practical Based on ENV-301 and 302 (Paper-VII, Semester-III and IV) Any 24 Practical

Sr. No.	Title of Practical
1	Study of flora of an urban terrestrial ecosystem (Field practical)
2	Study of fauna of an urban terrestrial ecosystem (Field practical)
3	Estimation of biomass from grassland by harvest method
4	Study of wetland ecosystem (Field practical)
5	Study of swamp (mangrove) ecosystem of Konkan coast (Visit)
6	To find out the diversity within an ecosystem using Shannon and Simpson's diversity indices
7	Studies on aquatic weeds, insects and birds
8	Studies on benthic fauna
9	To study the types of interactions: parasitism and mutualism with suitable examples from nearby ecosystem
10	To study the plants used in phytoremediation
11	Estimation of carrying capacity of soils from two different locations.
12	To study the effects of pollution on river ecosystem (Field practical)
13	Study of remote sensing techniques
14	Interpretation techniques for aerial photographs and satellite imageries
15	Vegetation mapping by using aerial photographs

T.Y.B.Sc., ENV – 308 Practical Based on ENV-303 and 304

Sr. No.	Title of Practical
1	Sampling of waste water from different polluted sites
2	Use of macrophytes as bio-indicators for water/soil pollution monitoring
3	Use of microorganisms as bio-indicators for water/soil pollution monitoring
4	Study of particulate matter in air
5	Analyzing the pH, temperature and EC of different waste waters
6	Determination of BOD in water sample
7	Testing the bacteriological quality of drinking water
8	Methods of disinfection in waste waters
9	Study of phytoremediation techniques to remove pollutants
10	Study of Safety instructions
11	Determination of Soil Bulk Density
12	Determination of Sludge Volume Index
13	Determination of colour and odour of industrial effluents

T.Y.B.Sc., ENV – 309 and Project work

Sr. No.	Title of Practical
1	Preparation of compost by using different methods of composting - Indore method & Bangalore method
2	Vermi-composting of farm/ other solid wastes
3	Determining the factors influencing the composting process, nutrients, moisture, temperature and air, microbial populations

4	Study of microorganisms by Standard Plate Count (SPC) method
5	Isolation of mineral leaching bacteria
6	Identification and classification of bacteria
7	Isolation of bacteria from soil and decaying matter
8	Survey of plants in and around air polluted sites
9	Automobile exhausts – analysis and impact on flowering plants
10	Study of Eutrophication effects of polluted waters on water bodies

M. Sc. I PRACTICALS RELATED TO EVSC- 101, 102, 103 & 104

Semester I

EVSUT-111 FUNDAMENTALS OF ENVIRONMENTAL BIOLOGY & BIODIVERSITY

Sr. No.	Title of Practical
1	Estimation of chlorophyll content from given plant leaves
2	Vegetation studies by line and belt and quadrates methods
3	Phytoplankton and zooplankton analysis from freshwater samples
4	Estimation of Productivity of lake
5	Preparation of media for microbial culture, Isolation and culturing of microbes from soil / water samples, Gram Staining.

EVSUT– 112 FUNDAMENTALS OF ENVIRONMENTAL PHYSICS AND CHEMISTRY

Sr. No.	Title of Practical
1	Preparation of samples and analysis using titration
2	Preparation of samples and analysis using Flame photometer
3	Preparation of samples and analysis using Spectrophotometer / UV Spectrophotometer

EVSUT – 113 EARTH, OCEAN & ATMOSPHERIC SCIENCES

Sr. No.	Title of Practical
1	Physical properties of minerals in hand specimen: Quartz, Calcite, Aragonite, Orthoclase, Mica, Haematite, Kyanite, Hornblende, Chlorite, Baryte, Halite, Gypsum, Galena, Pyrite, Anhydrite, Apatite, Fluorite, Asbestos, Staurolite.
2	Physical properties of rocks in hand specimen Igneous: Granite, Rhyolite, Basalt, Gabbro, Diorite, Dunite, Obsidian, Sedimentary: Conglomerate, Sandstone, Limestone, Shale, Laterite Metamorphic: Marble, Slate, Schist, Gneiss, BHQ
3	Textural analysis of soil & Ternary Plots

4	Drainage analysis
5	Climatic maps and diagrams – circular, graph, wind roses

EVSUT – 114 Environmental Statistics Practical

Sr. No.	**Title of Practical**
1	Grouping of data and preparation of frequency distribution. Histogram and frequency polygon
2	Calculating mean, median and mode for grouped and ungrouped data
3	Calculating variance, standard deviation and coefficient of variation for grouped and
4	ungrouped data
5	Fitting simple linear regression. Plotting scatter diagram and regression line
6	Computing correlation coefficient and testing its significance for grouped and ungrouped data

M. Sc. I PRACTICALS RELATED TO EVSC- 101, 102, 103 & 104

Semester I

EVSUT-125 PRACTICALS RELATED TO EVSC- 121, 122, 123 & 124

EVSUT-121 WATER AND SOIL POLLUTION: MANAGEMENT & MITIGATION

Sr. No.	Title of Practical
	Section I Water pollution
1	Determination of pH, Turbidity & Electrical Conductivity, Solids (TS, TDS, TSS).
2	Determination of Total Alkalinity and Total Hardness of water sample.
3	Determination of COD in given water sample
	Section II Soil pollution
1	Determination of pH & Electrical Conductivity, Solids (TS, TDS, TSS).
2	Determination of Total Alkalinity and Total Hardness of soil sample
3	Determination of Bulk density and water holding capacity of given soil sample
4	To estimate organic carbon of soil sample.
7	Texture Analysis of given soil sample.

EVSUT – 122 ENVIRONMENTAL POLLUTION II: AIR, NOISE AND RADIATION

Sr. No.	Title of Practical
	Air pollution
1	Determination SOX concentration in air.
2	Determination NOX concentration in air
3	Determination PM Concentration in air.
	Noise pollution
1	Measurement of sounds by DB meter / SLM in silent, industrial, residential and commercial zones

EVSUT – 123 ENVIRONMENTAL LEGISLATION, ETHICS AND POLICY

Sr. No.	Title of Practical
1	Study of case studies and its interpretations - submission of detailed reports

EVSUT – 124 WATER & WASTE WATER TECHNOLOGY

Sr. No.	Title of Practical
1	Physico-chemical analysis of waste water to determine quality of sewage and effluent
2	MLSS, SVI study for waste water
3	Jar test for coagulation determination

M.Sc.(Part II) Semester 3,

- **Practical Paper EVSUP - 234, Based on EVSUT -231 - 233.**

Sr. No.	Name of Practical
Practicals based on EVSUT-231	
2	Case study of any one project
Practicals based on EVSUT-232	
1	Aerial photo image interpretation
2	Aerial photo geometry, scale, measurement of relief numerical
3	Google Earth
4	GPS: collection of field data
5	Installation and familiarisation with QGIS free software
6	Browsing and downloading data: From LANDSAT, BHUVAN
13	Satellite image interpretation
Practicals based on EVSUT-233	

1	Mapping of watershed (marking of ridge areas and drainage lines), estimating area and slope.
2	Watershed Planning exercises at milli-watershed level, location specific with identifying specific Watershed interventions required.

- **Practical Paper EVSUP - 237, Based on EVSUT -235 and EVSUT-236**

Sr. No.	Name of Practical
Practicals based on EVSUT-235	
1	Case studies for LCA: 3 different sectors
2	Case studies for environmental design of products
3	Case studies for environmental design of buildings
4	Case study of implementation of EMS in industry
Practicals based on EVSUT-236	
1	Visit to a weather station to study Meteorological Instruments
2	Estimation of Air pollutants (any one parameter) concentration in ambient air.
3	Demonstration of source emission monitoring. (air/monitoring)
4	Measurement of Noise by Sound level meter (L10,L50,L90) at different zones.
5	Water sampling, handling, storage and preservation.
6	Soil sampling, handling, storage and preservation.
7	Preparation of Forest Inventory
8	Calculation of carbon sequestration by using AGB and BGB.

M.Sc.(Part II) Semester IV, Practical Paper EVSUP - 243, Based on EVSUT -241 & 242.

Sr. No.	Name of Practical

practical's based on EVSUT-241	
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practical's based on EVSUT-242	
1	Estimation of calorific value of given wood sample /solid waste.
2	Visit to landfill site/waste processing site
3	Estimation of monthly average of daily solar radiations incident on earth surface of University campus (Sunshine Recorder)
4	Study of carbonization processes (Charcoal making) by technique of wood pyrolysis
5	Analysis of wind power available for installation of wind mill
6	Estimation of out heat of combustion of given fuel sample
7	Study of waste segregation and recycling

M.Sc.(Part II) Semester IV, Practical Paper EVSUP - 246, Based on EVSUT -244& 245.

Sr. No.	Name of Practical
Practical based on EVSUT-244	
1	Study on effect of heavy metal toxicants on the germination of Ground nut.
2	Determination of LC 50 of any toxicant.
5	Basic Toxicity Assays: Ames Assay
10	First Aid Practices.
11	Safety Practices in scientific Laboratories
practical's based on EVSUT-245	
1	To be included…

M.Sc.(Part II) Semester IV, Practical Paper EVSUP - 249, Based on EVSUT -247& 248.

Sr. No.	Name of Practical
Practical's based on EVSUT-247	
1	Genomic DNA extraction of Bacteria/ plants/ water/soil/ contaminated samples
4	Synthesis of nanoparticles- Physical, Chemical and Biological methods
5	Characterization of synthesized nanoparticles
Practical's based on EVSUT-248	
4	Introduction to General Circulation Models
6	Survey based studies of change in socio-economic shifts
7	RS-GIS based Land Use-Land Pattern Change
8	Numericals related to carbon sequestration, carbon and water footprints and trading