



Vasantdada Sugar Institute
Department of Environmental Science
MSc (Environmental Sciences)
Program Outcomes, Course specific Outcomes

Program outcome : M.Sc. (Environment Science)	
1.	PO1. Environment Science knowledge: Apply the knowledge of Environment Science as an interdisciplinary subjects to understand the complex life processes and phenomena.
2.	PO2. Problem analysis: Identify, review research literature, and analyse complex situations of living forms.
3.	PO3. Design/development of solutions: Design processes/strategies that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4.	PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in real situations.
5.	PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and ICT tools for understanding of the subject.
6.	PO6. The Postgraduate and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7.	PO7. Environment and sustainability: Understand the impact of the natural and anthropogenic activities in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8.	PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the work/research practice.
9.	PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10.	PO10. Communication: Communicate effectively on complex life activities with the scientific community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11.	PO11. Project management and finance: Demonstrate knowledge and understanding of Environmental Aspects and management principles and apply these to one's own work, as a member and leader in a team.
12.	PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific outcome : M.Sc. (Environment Science)	
1.	Students acquire knowledge through practical work in fields as well as in laboratory.
2.	Project helps for creating research attitude among the post graduate students.
3.	Develop research oriented skills in all the fields of Environmental Science
4.	Develop the application of biostatistical techniques in research



5.	Understanding of new technology that can be implemented practically
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Course Outcomes of M.Sc (Environmental science): Semester I

Class	Course Name	Outcome
M.Sc I	EVSUT-111 Environmental Biology & Biodiversity	<ul style="list-style-type: none"> • CO1: Analyse the role of Ecological principles to manage ecosystems. • CO2: Demonstrate distinction between natural and managed ecosystems. • CO3: Empowers on tools and techniques used to analyse the status of ecosystems. • CO4: Develop skills to manage ecosystems for sustainable development. • CO5: Demonstrate importance of diversity at different levels of biological organization. • CO6: Lay foundation on basic concept of ecological and biological processes that ensures long-term stability of ecosystems. • CO7: Train on the methods for measurement of species diversity and molecular diversity. • CO8: Analyse the values of biodiversity and scientific approaches for conservation that can lead to sustainable development.
M.Sc I	EVSUT-112 Environmental Physics & Chemistry	<ul style="list-style-type: none"> • CO1: Develop understanding on the chemistry of the lithosphere, hydrosphere and atmosphere. • CO2: Gain understanding on the chemistry of various anthropogenic pollutants and basic analytical techniques • CO3: Trains on chemical analysis of water and waste water, and the scientific principle of tools and techniques used for chemical analysis. • CO4 : Knowledge of analytical instrumentations • CO5: Skill developed in the field of environmental instrumentation and analyses • CO6: Basic principle and applications of physics
M.Sc I	EVSUT-113 Earth, Ocean & Atmospheric Sciences	<ul style="list-style-type: none"> • CO1 Knowledge of structure and composition of the atmosphere and explain global atmospheric circulation • CO2 Understand the processes involved in the mixing and transport of constitutes against varied stability conditions • CO3 Recognise major chemical/ photochemical pathways of organic and inorganic gases and their implications including acid rain, smog, ozone depletion, visibility impartment • CO4 Application of knowledge in appreciating the atmosphere of large cities and global atmospheric issues • CO5 Understand the ocean physical structure and stratification • CO6 Knowledge of earth resources



M.Sc I	EVSUT-114 Environmental Statistics	<ul style="list-style-type: none"> • CO1 Knowledge of basic statistical parameters • CO2 Understanding statistical concepts required for model development. • CO3 Test model performance in terms of statistical error estimation • CO4 Understanding study univariate , bivariate and multivariate data
M.Sc. I	EVSUT-115 Practical Course	<ul style="list-style-type: none"> • CO1 The study of isolation and growth bacteria from environment factors and study og productivity in lake. • CO2 To study the working of various instruments practically by analysis of different parameters • CO3 To identify different rocks, minerals and also determine the windrows in atmospheric science. • CO4 To study implimentation of different statistical tools by solving different examples.

Semester II

Class	Course Name	Outcome
M.Sc I	EVSUT-121 Water & Soil Pollution: Management & Mitigation	<ul style="list-style-type: none"> • CO1 Select the sources of water for various water uses • CO2 Apply the gained knowledge to practical situations. • CO3 Demonstrate soil quality maintenance practices • CO4 understanding soil pollution sources and how to control them • CO5 studying different case study related to soil
M.Sc I	EVSUT-122 Air, Noise & Radiation Pollution: Management & Mitigation	<ul style="list-style-type: none"> • CO1 Able to differentiate between primary and secondary pollutants • CO2 Familiarise with different sources and sinks of common air pollutants Develop understanding about different types of monitoring • CO3 techniques available for gaseous and particulate matter. Able to do sampling and analysis of air pollutant • CO4 Develop an understanding of working of air pollution control devices • CO5 understanding noise monitoring techniques and impact criteria
M.Sc I	EVSUT-123 Environmental Law, Ethics & Policy	<ul style="list-style-type: none"> • CO1 Understand the Indian constitutional provisions with respect to the environmental protection, division of powers, and fundamental rights • CO2 Appreciation of forest and wildlife laws and environmental laws relating to social justice (Forest Dwellers' Act of 2006; The Biodiversity Act of 2002) • CO3 Comprehensive understanding of pollution control laws (The Water Act, The Air Act and the Environment (Protection) Act of 1986), and rules • CO4 Functional understanding of international Environmental laws (Treaties and Protocols), and Indian commitments



		<ul style="list-style-type: none"> • CO5 Appreciate some case studies of environmental litigation
M.Sc I	EVSUT-124 Water & Wastewater Technology	<ul style="list-style-type: none"> • CO1 Select the sources of water for various water uses. • CO2 Explain unit operations and processes of water treatment systems • CO3 Apply the principles and design water treatment units • CO4 Apply concepts and will be able to design the water treatment plant. • CO5 Explain unit operations and processes of wastewater treatment systems • CO6 Select the sources of different industries wastewater treatment process
M.Sc I	EVSUP-125 Environmental Sciences Practical Paper	<ul style="list-style-type: none"> • CO1 Physico-chemical parameter of water • CO2 Study soil quality parameter • CO3 Monitoring of Total Suspended Particulate Matter (TSPM); monitoring of SO₂, NO₂, NH₃, CO and O₃, Exposure analysis of SO₂, NO₂ and CO • CO4 Measurement of sounds by DB meter / SLM in silent, industrial, residential and commercial zones, Determination of SPL, L_{max}, TWA, Leq, L_{dn}, L₁₀, L₅₀, L₉₀. • CO5 Field visits and its legal interpretation – submission of detailed reports • CO6 Visit and study in detail process of water and waste water treatment plant.

Semester III

Class	Course Name	Outcome
M.Sc II	EVSUT 231 Environmental Impact Analysis and Environmental Audit	<ul style="list-style-type: none"> • CO1 Explain the environment and its natural, and socio-economic and cultural components, and its temporal and spatial dimensions • CO2 Comprehensively understand of the origin and development of EIA and the developments in India • CO3 Appreciate the EIA process • CO4 Define impact and identify, and predict impacts • CO5 Understand the Indian EIA process and clearance regime and functional knowledge of environmental management plan (EMP), and environmental audit
M.Sc II	EVSUT-232 Remote Sensing and GIS	<ul style="list-style-type: none"> • CO1 To study the basics of Remote Sensing technology • CO2 To gain knowledge about basics of Aerial Photography • CO3 To study types of sensors used in Remote sensing. • CO4 To understand the types of data in GIS • CO5 To study various different applications of RS and GIS in different fields.



M.Sc II	EVSUT 233 Restoration Ecology and Watershed Management	<ul style="list-style-type: none"> • CO1 Ability to think and function as a prudent professional soil scientist. • CO2 Generate and analyse soil quality data towards sustainable solutions. • CO3 Ability to respond flexibly towards restoration of problematic soils of specific areas • CO4 Understanding watershed management techniques structure and functions, traditional and modern methods of managements • CO5 study successful stories of watershed managements.
M.Sc II	EVSUT 234 Practical Course from EVSUT- 231 to 233	<ul style="list-style-type: none"> • CO1 To study collection of baseline data for any project • And revise a casestudy for environmental audit. • CO2 To study various softwares related to GIS and hand on practical's to study basic protocol of software. • CO3 To study the mapping of watershed and watershed planning exercise at milliwatershed level.
M.Sc II	EVSUT-236 Environmental Resource Monitoring	<ul style="list-style-type: none"> • CO1 To study basics of Air quality parameters and monitoring • CO2 To study water quality sampling and analysis • CO3 To determine various soil sampling sites, quality parameters and need of analysis • CO4 To measure different parameters of tree from forest area • CO5 to study various wildlife monitoring technique.
M.Sc II	EVSUT-237 Practical based on EVSUT-236	<ul style="list-style-type: none"> • CO1 To determine noise level from various site • CO2 To study water and soil sampling technique. • CO3 To study Air quality parameter
M.Sc II	EVSUT-238 Implant Training	<ul style="list-style-type: none"> • CO1 The students complete 45 days implant training to get hands on experience about practical knowledge based on different environmental field like Industry, soil and water testing lab, waste water treatment plant, environmental audit and EIA consultancy.

Semester IV

Class	Course Name	Outcome
M.Sc II	EVSUT-241 Solid and Hazardous Waste Management	<ul style="list-style-type: none"> • CO1 Understand the characteristic of wastes and the systems, and processes of waste management. • CO2 Identify the case specific issues related to pollution potentials of solid wastes • CO3 Address solid waste management practices through a cradle-to-grave approach • CO4 Apply understanding to generate recourses from wastes • CO5 Make appropriate decisions through application of waste management principles



M.Sc II	EVSUT-242 Renewable and Non-renewable Energy	<ul style="list-style-type: none"> • CO1 Understanding of solar radiation's spectrum and the energy available from solar radiations • CO2 Should be able to make a distinction between conventional and renewable energy sources • CO3 Understanding of the principles of energy conversion in case of each of the energy sources • CO4 Should be able to state how the consumption of fossil fuels and biomass leads to adverse impact on health and climate. • CO5 Should have an understanding of the implications of large scale production of power from sources such as hydro, solar, wind etc.
M.Sc II	EVSUT-243 Practicals based on EVSUT-241 and 242	<ul style="list-style-type: none"> • CO1 To get knowledge about composting technology, also to determine the solid waste parameters • CO2 To study different renewable energy calculations.
	EVSUT-244 Environmental Toxicology, Health and Safety	<ul style="list-style-type: none"> • CO1 understanding health and safety management • CO2 study toxic compound, hazardous material and measurement • CO3 evaluation methods of toxicology • CO4 Internalize ISO 18000 • CO5 Learn and disseminate issues related to occupational health and hazards. • CO6 Protocol development for an industry on disaster prevention, health issues, safety measures and environment management.
M.Sc II	EVSUT-246 Practical Based on EVSUT-244	<ul style="list-style-type: none"> • CO1 To study lethal dose effect of toxic substance on living organisms • CO2 To study different assay techniques • CO3 To demonstrate fire protection practical
	EVSUT-247 Environmental Biotechnology and Nanotechnology	<ul style="list-style-type: none"> • CO1 Knowledge on scope of biotechnology in environmental applications • CO2 Knowledge of microbiology and biochemistry • CO3 Ability to perform various molecular biological applications, and knowledge of equipment used in molecular biological techniques • CO4 Ability to apply molecular biological techniques in pollution management and industrial applications • CO5 Knowledge of advanced biotechnological applications, and biosafety in analytical procedures • CO6 understanding Role of biotechnology in environment protection • CO7 Ability to apply biotechnological techniques in treatment of water & waste water • CO7 study different types of Biosensors • CO8 Study of basics in Environmental Nanotechnology



	EVSUT-249 Practical Based on EVSUT-247	<ul style="list-style-type: none">• CO1 To study DNA extraction and various PCR analysis techniques, also to synthesize and characterize different nanoparticles.
M.Sc II	EVSUT-250 Dissertation and Project Work	<ul style="list-style-type: none">• CO1 The aim of the Project work is to acquire practical knowledge on the particular subject, successful completion of this course, the student should be able to work with practical knowledge/computer-based system, process, component, or program to meet desired. To encourage students to supplement their knowledge and to motivate them to continue their career in Research.



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