1.3.2: Courses integrates cross cutting issues
Course name: M.Sc. Environmental Science

M.Sc. Environmental Science (As per 2019 syllabus) Semester: I						
Programme Name	**Course code**	**Course Name**	**Unit**	**Topic**	**Cross active issue integrated**	**Syllabus link**
M.Sc. Environmental Science	EVSUT-111	ENVIRONMENTAL BIOLOGY & BIODIVERSITY	1	Biosphere, Ecology, Vulnerability of extinction	Human Values, Environmental ethics, Sustainability	
			5	Bioindicaters, Nitrogen fixation, Bioindicaters in manmade environment	Environment & Sustainability, Human Values	
M.Sc. Environmental Science	EVSUT-112	ENVIRONMENTAL PHYSICS AND CHEMISTRY (4 CREDITS)	4	Nuclear Physics, Radiations	Environment & Sustainability	
M.Sc. Environmental Science	EVSUT-113	EARTH, OCEAN & ATMOSPHERIC SCIENCES (4 Credits)		Atmosphere, Earth radiation Budget	Environment & Sustainability	
				Semester: II		
M.Sc. Environmental Science	EVSUT-121	Water and Soil Pollution:	1	Radioactive Pollutant, Vapor incineration	Environment & Sustainability	

			7	Noise and Vibrations	Environment & Sustainability	
M.Sc. Environmental Science	**EVSUT-122**	Environmental Pollution II: Air, Noise, and Radiation	9.	Radiation	Environment & Sustainability	
M.Sc. Environmental Science	**EVSUT-123**	Environmental Legislation, Ethics and Policy	10.	Environmental Protection, Fundamental Rights and	Environment & Sustainability, Human Values, Environmental ethics	
M.Sc. Environmental Science	**EVSUT-124**	Water and Waste water Technology	3.	Disinfection, Demineralization	Environment & Sustainability	
			9.	Pathogenic microbes, Indicator microbes	Environment & Sustainability, Human Values	
				Semester: III		
M.Sc. Environmental Science	**EVSUT-231**	EIA & Environmental Audit	5.	Air quality, prevention and control, Risk and Hazard management	Environment & Sustainability, Human Values	
	EVSUT-232	Remote Sensing & GIS	2	Radiation Laws, Natural Hazards and disasters	Environment & Sustainability, Professional ethics	

	EVSUT - 233	Restoration Ecology & Watershed Management	3	Water harvesting, water balance, Watershed inventions	Community outreach & Gender equality	
	EVSUT - 236	Environmental resource monitoring	3	Sample preservation, Handling and storage	Environment & Sustainability	
				Semester: IV		
	EVSUT - 241	Solid & Hazardous Waste Management	5 & 6	Biomedical waste, Hazardous waste, Radioactive waste	Environment & Sustainability, Human values	
	EVSUT 242	RENEWABLE & NON RENEWABLE ENERGY	1	Fossil Fuels	Environment & Sustainability	
			4	Nuclear fuels, Nuclear reactors and radioactive waste,	Environment & Sustainability, Human values	
	EVSUT 244	ENVIRONMENTAL TOXICOLOGY HEALTH &	2	Toxicology, preventive and curative measures, epidemics and their containment	Environment & Sustainability, Human values	

		SAFETY				
	EVSUT 248	CLIMATE CHANGE, POLICY & SUSTAINABILITY	1	Atmospheric green house gases, isotopes, global warming	Environment & Sustainability, Human valus	

Total number of subjects integrated the cross cutting issues in the syllabus of MSc WBAT course are 15.

Principal

1.3.2: Courses integrates cross cutting issues
Course name: M.Sc. Environmental Science

M.Sc. Environmental Science (As per 2023 syllabus) Semester: I						
Programme Name	**Course code**	**Course Name**	**Unit**	**Topic**	**Cross active issue integrated**	**Syllabus link**
M.Sc. Environmental Science	**ENV501 MJ**	**Environmental biology & biodiversity**	1	Biosphere, Ecology, Vulnerability of extinction	Environmental Sustainability Human Values, Environmental ethics	

			5	Bioindicaters, Nitrogen fixation, Bioindicaters in manmade environment	Environment & Sustainability, Human Values	
M.Sc. Environmental Science	**ENV 502 MJ**	**Environmental physics and chemistry (4 credits)**	4	Nuclear Physics, Radiations	Environment & Sustainability	
M.Sc. Environmental Science	**ENV 505 MJ**	**Fundamentals of atmospheric sciences**	1	Net radiation and latitude heat balance	Environment & Sustainability	
M.Sc. Environmental Science	**EVSUT -113**	**Earth, ocean & atmospheric sciences**		Atmosphere, Earth radiation Budget	Environment & Sustainability	
				Semester: II		
M.Sc. Environmental Science	**ENV 551 MJ**	**Water and Soil Pollution:**	**1**	Radioactive Pollutant, Vapor incineration	Environment & Sustainability	
			7	Noise and Vibrations	Environment & Sustainability	
M.Sc. Environmental Science	**ENV 552 MJ**	**Environmental Pollution II: Air, Noise, and Radiation**	9.	Radiation	Environment & Sustainability	
M.Sc. Environmental	**ENV 553 MJ**	**Environmental Law**	10.	Environmental Protection, Fundamental Rights and	Environment & Sustainability, Human Values, Environmental	

Science					ethics	
M.Sc. Environmental Science	**ENV 560 MJ**	**Water and Waste water Technology (Basic)**	**3.**	Disinfection, Demineralization	Environment & Sustainability	
			9.	Pathogenic microbes, Indicator microbes	Sustainability, Human Values,	
				Semester: III		
M.Sc. Environmental Science	**ENV 601 MJ**	**EIA & Environmental Audit**	**5.**	Air quality, prevention and control, Risk and Hazard management	Environment & Sustainability, Human values	

	ENV 602 MJ	**Remote Sensing & GIS**	2	Radiation Laws, Natural Hazards and disasters	Environment & Sustainability, Professional ethics	
	ENV 603 MJ	**Watershed management**	3	Water harvesting, water balance, Watershed inventions	Community outreach & Gender equality	
	ENV 610 MJ	**Environmental resource monitoring**	3	Sample preservation, Handling and storage	Environment & Sustainability	
				Semester: IV		
	ENV 651 MJ	**Solid & Hazardous Waste Management**	**5 & 6**	Biomedical waste, Hazardous waste, Radioactive waste	Environment & Sustainability, Human values	
	ENV 652 MJ	**Renewable & non-renewable energy**	1	Fossil Fuels	Environment & Sustainability	
			4	Nuclear fuels, Nuclear reactors and radioactive waste,	Environment & Sustainability, Human values	
	ENV 660 MJ	**Environmental toxicology**	2	Toxicology, preventive and curative measures, epidemics and their	Environmental Biology	

		health & safety		containment		
	ENV 661 MJ	**Climate change, policy & sustainability**	**1**	Atmospheric green house gases, isotopes, global warming	Environment & Sustainability, Human valus	

Total number of subjects integrated the cross cutting issues in the syllabus of MSc WBAT course are 16.

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Dist. Pune - 412 307

1.3.2: Courses integrates cross cutting issues

Course name: MSc WBAT

MSc WBAT (As per 2023 syllabus) Semester: I						
Programme Name	**Course code**	**Course Name**	**Unit**	**Topic**	**Cross active issue integrated**	**Syllabus link**
MSc WBAT	WT 511	Microbiology of Alcohol, Beer and Wine	1	Sterilization and Disinfection	Sterilization and disinfection- Radiation, Chemical agents	
			2	Industrially important fermented products	Mycelia, bacteria,yeast, antimicrobial substances	
MSc WBAT	WT 513 MJ	Vineyard Technology	I	Soil and Grapevine planting materials and propagation	Irrigation, water supply	
			II	Vineyard establishment, Grapevine pests and diseases, Developmental stages of grapes and Harvesting	Irrigation, Pest control,	
	WT 515 MJ	Viticulture (Optional)	I	Soil management & planting	Effect of climate at different growth stages	
			II	Developmental stages of grapes, Harvesting, Post-Harvest management & Scenario of grapes	Development of grape varieties resistant to various biotic and abiotic stresses	
MSc WBAT	WT 516 MJ	Alcohol Technology-I	I	Raw material for alcoholic fermentation and its manufacturing	Alcohol production	

			II	Chemistry of alcohol	Acetaldehyde, Acetic acid, Acetic-Anhydride, Butanol, Ethyl acetate, Butyl acetate, acetone, Ethyl ether, Diethyl oxalate	
MSc WBAT	WT 517 MJ	Food Technology (Optional)	I	Introduction to Food	Food additives-Preservatives	
			II	Food Microbiology & Food health	Food spoilage-effect of spoilage & microbes in fermented food, Food adulteration & food poison.	
Semester: II						
MSc WBAT	WT 521 MJ	Enology-I	II	Principal constituents of grape juice & wine	Glycerol, aldehydes & ketones	
MSc WBAT	WT 522 MJ	Brewing Technology-I	II	Basic raw materials of brewing-Water	Brewery water consumption, Inorganic Constituents, and organic constituents of Water	
MSc WBAT	WT 523 MJ	Alcohol Technology	I	Yeast maintenance and propagation in distillery	Acidification / pretreatment practices	

			II	Details of alcoholic fermentation	Post – fermentation practices/scrubbing	
MSc WBAT	WT 525 MJ	Brewing Microbiology (Optional Subject)	I	The microflora of barely & malt	Health Hazards	
			II	Wild yeast in brewing	Detection of microbial spoilage	
MSc WBAT	WT 526 MJ	Green Technology (Optional Subject)	II	Green product formation	Formation of Ethanol, Lactic acid, Poly hydroxyl alkanoates, Hydrogen & Butanol, Waste to wealth Production of Bio CNG, Biocompost & Hydrogen	
MSc WBAT	WT 527 MJ	Equipment in alcoholic beverages (Optional Subject)	I	Winery & brewery Sanitization	Sanitization, pest controllers	
MSc WBAT	WT 528 MJ	Fermentation Technology (Optional Subject)	I	Introduction to Fermentation	Fermenter sterilization, Media sterilization	

Total number of subjects integrated the cross cutting issues in the syllabus of MSc WBAT course are 19

MSc WBAT (As per 2019 syllabus) Semester: III						
Programme Name	**Course code**	**Course Name**	**Unit**	**Topic**	**Cross active issue integrated**	**Syllabus link**
MSc WBAT	**WT 3.1-**	**Alcohol Technology-II**	I	**Characteristics of various alcohols, denaturation and by-products of alcohol**	Denaturation of spirit – Denaturating agents O.D.S, S.D.S.	
			II	**Manufacture of Extra Neutral Alcohol, Anhydrous alcohol/Fuel ethanol**	Effect of traces of entrainer (benzene, cyclohexane, monoethylene glycol) on fuel ethanol	
MSc WBAT	**WT 3.2**	**Brewing technology-II**	II	Sanitation and Pest Control:	Types of pest encountered, integration of sanitation and pest control methods, insects control methods, insect monitoring method, safety.	

	WT 3.3	**Enology- II**	II	**Microbiological spoilage of wine & its control**	Definition of microbiological spoilage ,Origin of wine spoilage microorganism, Spoilage by yeast & its control, Spoilage by LAB & its control, Spoilage by AAB & its control	
Semester IV						
MSc WBAT	WT 4.1	**Industrial Waste Treatment & Environmental Management**	I	**Biological treatment fundamentals**	Characteristics of distillery effluents & CPCB norms for disposal	
			II	**Winery & brewery sanitization and waste disposal regulations**	Winery sanitization- The Importance of Cleaning and Sanitation in the Winery, Basic Cleaning, Water Quality, The Solution: Cleaning Compounds, Cleaning Equipment, Sanitizing and Sanitizers, Sterilizing and Sterilizers	
			III	Waste water treatment methods	Solid and Liquid Waste	

					Disposal	
MSc WBAT	WT 4.6	Advance Enology	I	**Wine Defects/ Wine faults/ Cork**	Acetaldehyde, acetic acid, ethyl acetate Sulfur compounds: Sulfur oxides, hydrogen sulfide, mercaptans, dimethyl Sulfide Study of various practical techniques to solve defects during processing --phenolic wine harsh	

Total number of subjects integrated the cross cutting issues in the syllabus of MSc WBAT course are 8.

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