



# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## P.G. Program M.Sc. (Environmental Science) CBCS

Batch 2018-19

Semester

II

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME										
			THEORY				PRACTICAL			Th	T	P	CREDITS
			SEM University Exam	Term Exam	s Assessment*	SEM University Exam	s Assessment*						
MSCENV 201	PGDC	GLOBAL ENVIRONMENTAL ISSUES	60	20	20	00	00	4	0	0	4		

Legends: L-Lecture; T-Tutorial/Teacher Guided Student Activity; P-Practical; C-Credit; Q/A-Quiz /Assignment/Attendance, MST Mid Sem Test.

Teacher Assessment shall be based following components: Quiz/ Assignment / Project / Participation in Class, given that no component shall exceed more than 10 marks.

## GLOBAL ENVIRONMENTAL ISSUES

### UNIT-I: General Awareness of Environmental Issues

Environmental Issues and Movements Creation of UNEP and its role, UNFCCC, Convention on Climate Change, CoPs, CDM, Convention on Conservation of Antarctic Marine Living Resource, Global and national movements of Significance impact: Green Belt movement, Green Peace, Chipko movement, Narmada Bachao Andolan, Urja gram, Beej Bachao Andolan and related issues / case studies

### UNIT-II: Global Issues

Climate change Sea level Change- primary and secondary impacts- Adapting to Sea level changes. Global Warming and Greenhouse gases- Global and national scenario. National Action Plan on Climate Change (NAPCC), Intergovernmental Panel for Climate Change (IPCC), Climate Change and Biodiversity loss. Carbon credit. Carbon footprint.

  
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### UNIT-III: Nuclear Issues

Introduction to Nuclear Chemistry. Nuclear processes. Nuclear energy. Nuclear power, Nuclear weapons. Nuclear and radiation accidents. nuclear safety. High-level radioactive waste management.

### UNIT-IV: Green Technology


Contemporary issues Green Buildings, Organic farming, Genetic pollution, Genetically modified food controversies, Intensive farming Monoculture, Health and Diseases- Epidemics and Famines.


### Unit V: Industrial Pollution

Case studies of major environmental issues like Health problems and advanced technologies, Pollution problems and role of industrial chemicals, Impact of Urbanization over Natural environment. Environmental issues related to your city. Environmental audit of industries.

### REFERENCES

1. Asthana, D.K. and Asthana, M. (2003). Environment: Problems and Solutions, S. Chand & Co., New Delhi
2. Burroughs, W.J. (2007). Climate Change: A Multidisciplinary Approach. 2nd Edition. Cambridge University Press.
3. Cunningham, W. P. and Cunningham, M. A. (2004) Principles of Environment Science. Enquiry and Applications. 2nd Edition, Tata McGraw Hill, New Delhi.
4. Goel P. K and Sharma K. P. (1996). Environmental Guidelines and Standards in India, Techno Science Publications, Jaipur.
5. Harris, F. (2004). Global Environmental Issues. Wiley & Sons, Inc., USA.
6. Singh, J.S., Singh, S.P. and Gupta, S.R. (2006). Ecology, Environment and Resource Conservation. Anamaya Publishers, New Delhi, India.

  
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# Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Name of Program: M.Sc. (Environmental Science)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MSCENV 202	PG	Environmental Monitoring and Assessment	60	20	20	30	20	4	1	2	6

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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## Syllabus

### Unit I

**Environmental Monitoring:** What is environmental quality? Quality of environment for life on earth and man; Advantages of Environmental Monitoring, Deterioration of environmental quality with reference to anthropogenic impact; Methods of assessment of environmental quality; Short term studies/surveys; Rapid assessment; Continuous short and long term monitoring.

### Unit II

**Environmental Impact Assessment (EIA):** Need of EIA; Scope and objectives; Types of environmental impacts; Steps involved in conducting the EIA Studies; Environmental Impact Assessment techniques-Ad-hoc method, checklist method, overlay mapping method, network method, simulation and modeling technique, matrix method, and system diagram technique; Merits and Demerits of EIA studies.

### Unit III

**Remote sensing and its applications in Environmental Monitoring:** Principles and Basic concepts of Remote sensing; EMR & its interaction with matter; Aerial Photography and image recognition; Sensors & platforms; IRS satellites & their sensors; Application of remote sensing in environmental studies: land use mapping, forest survey, habitat analysis, water management, drought monitoring and flood studies, wetland survey ; rainfall estimation, pollution studies, soil conservation, watershed management and vegetation mapping.

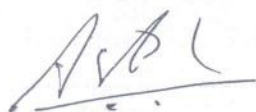
### Unit IV

**Geographical Information System (GIS):** Basic principles, Techniques Application in Environmental Sciences. Types of Geographical Data; Data Structure; Vector and Raster data: their Advantages and Disadvantages; Input, verification, storage and out put of geographical data; Importance of Geographical Information System in environmental studies. Global Positioning System (GPS): basic principles, Applications to environmental studies -Point source pollution, hazard monitoring and assessment.

### Unit V

Risk Management

Risk communication and risk perception, Comparative Risks, Risk based decision making, Risk based environmental standard setting, Risk cost benefit optimization and tradeoffs, Emergency preparedness plans, Emergency planning for chemical agent release, Design for risk management programs, Risk based remediations, risk communication, adaptive management, precaution and stake holder involvement.



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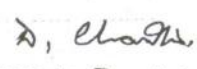


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### Text/References:

1. D. P. Lawrence (2003) Environmental Impact Assessment: Practical Solutions to Recurrent Problems, John Wiley and Sons, New Delhi.
2. Environmental Impact Analysis Handbook: J. G. Rau and D. C. Wooten; McGraw-Hill Book Co.
3. Environmental Impact Assessment, L. W. Canter, Mc Graw Hill Publication.
4. P. Morris and R. Therivel (2001), Methods of Environmental Impact Assessment, Spoon Press.
5. J. Weston (1997) Planning and EIA in Practice, Longman.
6. Jos Arts and Angus Morrison-Saunders (2004) Assessing Impact - Handbook of EIA and SEA follow-up, Earthscan, London.

  
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MSCENV-203	PG	Pollution Control Technology	60	20	20	30	20	4	1	2	6

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## Syllabus

### Unit I: Water Pollution control technologies:

Sewage and waste water treatments systems; Primary, secondary and tertiary treatments; Measurement of treatment efficiencies; Biological treatments - aerobic versus anaerobic treatments; Environmental pollution control- Bioremediation, Bioaugmentation and Biostimulation; Biofilms in treatment of waste water; Bioreactors for waste water treatments; Reactors types and design; Reactors in series; Development and optimization of membrane bioreactor process for use in sanitary and industrial sewage treatment.

### Unit II: Air pollution control technologies and devices:

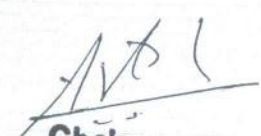
Methods to control air pollution in the environment, Limestone injection and fluidized bed combustion, Desulfurization; Catalytic converter and control of vehicular emission, Gravity settling chamber, Centrifugal collectors-cyclone collector and dynamic precipitators; Electrostatic precipitators; Fabric filters.


### Unit III: Solid waste management:

Solid waste disposal methods - open dumps, ocean dumping, Land fills, Incineration; Recycling and reuse. Organic pollutants and Hazardous waste disposal and management.

### Unit IV: Toxic, and Hazardous waste management

Management of Radiation, noise, thermal, oil and e-wastes: recycling of waste. Biosorption - Biotechnology and heavy metal pollution; Oil field microbiology; Improved oil recovery; Biotechnology and oil spills; Hydrocarbon degradation.

  
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### Unit V : Biotechnological methods to control pollution:

Bioremediation, Biotransformation Biodegradation and Phytoremediation: In situ and Ex situ bioremediation; Evaluating Bioremediation; Bioremediation of VOCs. Factors affecting process of biodegradation; Methods in determining biodegradability; Contaminant availability for biodegradation.; Use of microbes(bacteria and fungi) and plants in biodegradation and Biotransformation; Phytoremediation: Waste water treatment using aquatic plants; Root zone treatment.

### References:

1. M.H.Fulekar (2005) Environmental Biotechnology Oxford IBH Publishing cooperation.
2. M.H.Fulekar (2010) Bioremediation technology recent advances, springer
3. N.P Cheremisinoff (1996) Biotechnology for Waste and Wastewater Treatment, William Andrew Publishing, New York.
4. Bruce Rittman, Perry L. McCarty, Environmental Biotechnology: Principles and Applications, 2nd edition, McGraw-Hill, 2000.



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MSCENV-2014	PG	Green Technology	60	20	20	30	20	4	1	2	6

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## Syllabus

### Unit I

**Overview, Principle, concepts and Tools of Green technology:** Overview of green chemistry, Chemistry of the atmosphere, principles of sustainable and green chemistry. Basic principles of green technology, concepts of atom economy and carbon trading, tools of green technology. waste minimization and climate change, Zero waste technology, concept of environmentally balanced industrial complexing and industrial ecology, green house effect, climate change, photochemical smog.

### Unit II

**Green synthetic methods and designs:** catalytic methods in green synthesis, safer chemicals - different basic approaches; selection of auxiliary substances (solvents, separation agents), green solvents, solventless processes, immobilized solvents and ionic liquids; energy requirements-use of microwaves, ultrasonic energy; selection of starting materials; use of blocking/protecting groups, catalytic reagents; designing of biodegradable products.

### Unit III:

**Green Nanotechnology:** Introduction to Nanomaterials and green nanotechnology, Fullerene, carbon nanotubes, Nanoparticles; Green nanoparticle production and characterization; Biocompatibility; Nanomedical applications of green nanotechnologies; use of nanotechnologies and materials impact on biodiversity, resource conservation, ecosystems and human.

### Unit IV:


**Green technology applications I:** Biocatalysis, green chemistry in industries, fuel cell and electric vehicles, solar energy and hydrogen production, energy from alternate sources; Solar photovoltaic technology.

### Unit V:

**Green technology applications II:** Biofuel production (bio-ethanol and biodiesel), Biomass, prevention/minimization of hazardous/toxic products. Agricultural related practices and food processing, Production of biodegradable materials, concept of green building, Pollution free engineering processes.

  
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