

## ***Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)***

### ***Scheme of Teaching & Examination***

#### **Master of Engineering in Environmental Science and Engineering (Part Time)**

#### **Second Semester:**

S.No.	Code	Board of Studies	Subject	Periods per week			Scheme of Exam			Total	Credits L+ (T+P)/2
				L	T	P	Theory / Practical				
							ESE	CT	TA		
1	653211(53)	Environmental Science & Engg.	Environmental Management	3	1	-	100	20	20	140	4
2	653212 (53)	Environmental Science & Engg.	Environmental Geosciences and Environmental Impact assessment	3	1	-	100	20	20	140	4
3	653213 (53)	Environmental Science & Engg.	Science & Engineering of Air Pollution Control	3	1	-	100	20	20	140	4
4	653221 (53)	Environmental Science & Engg.	Environmental Geosciences and Environmental Impact Assessment Lab	-	-	4	100	-	80	180	2
<b>Total</b>				<b>9</b>	<b>3</b>	<b>4</b>	<b>400</b>	<b>60</b>	<b>140</b>	<b>600</b>	<b>14</b>

**L = Lecture, T = Tutorial, P = Practical or Term Work**

**Each period of 50 minutes, with 4 periods per day (6 to 9.20 PM) for six days in a week**

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C. G.)*

Semester: M.E. II Sem.  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 100  
Minimum number of class tests to be conducted: 02

Subject: Environmental Management  
Specialization: Environmental Science & Engg.  
Code: 653211 (53)  
Total Tutorial Periods: 12

## **Unit 1**

Methodology of environmental management – Review national and international protocols.

## **Unit 2**

Environmental quality criteria and standards significant sources of water and air pollution and indices of environmental quality – survey and hot spot identification.

## **Unit 3**

Preparation of management plan – Case studies of major river basin and metropolitan air quality improvement plans.

## **Unit 4**

Life cycle design and analysis, environmental auditing and Eco – labelling

## **Unit 5**

Evaluation of environmental management programmes – Economic incentive and disincentives as instruments for environmental management – Tax, subsidies, fee, and tradable permits.

## **Text**

1. Rosencranz, S. Divan, M.L. Noble, Environmental Law and policy in India – Cases, Material and Status, Tripathi Pvt. Ltd. Bombay, 1992.
2. S. Musharraf, Legal aspects of environmental pollution and its management, C.B.S. Publishers, Delhi 1992.

## **Reference:**

1. W.J. Banmol and W.E. Dates. The theory of Environmental policy – Cambridge University, 1988.

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**Semester:** M.E. II Sem.

**Total Theory Periods:** 40

**Total Marks in End Semester Exam:** 100

**Minimum number of class tests to be conducted:** 02

**Subject:** Environmental Geosciences and

**Environmental Impact Assessment**

**Specialization:** Environmental Science & Engg.

**Code:** 653212 (53)

**Total Tutorial Periods:** 12

## **Unit 1**

Earth materials and processes, geologic cycle, River flooding, Landslide, Earthquake, Volcanic Activity. Hydrology and human use, the Geological aspects of Environmental Health. Mineral resources and Environment, environmental aspects of Mineral Development.

## **Unit 2**

Evolution of EIA; EIA at Project, regional and Policy Levels; EIA process in India and other countries. EIA methodologies; screening and scoping criteria; Rapid and comprehensive EIA.

## **Unit 3**

Specialized areas like Environmental Health Impact Assessment, environmental Risk Analysis; Economic Valuation Methods, Cost Benefit Analysis; Expert system and GIS applications, Uncertainties.

## **Unit 4**

Practical Applications of EIA; Baseline Collection of data; Prediction and Assessment of Impacts of Physical Biological and Socio – Economic Environment, Generation of Environment Management Plan, Post Project Monitoring, EIA report and EIS, Review Process.

## **Unit 5**

Case histories of applications for Industrial, Water Resources and Irrigation projects, Ports and Harbours, Mining and Transportation and other projects sectors, Regional EIA case studies for development of coastal and industrial Zones.

## **Text**

1. Keller E. A., Environmental Geology, CBS Publishers.
2. G.J. Rau and C.D. Wooten, Environmental impact analysis hand book, Mc Graw Hill 1980.

## **Reference**

1. L. Canter, Environmental impact Assessment, McGraw Hill, 1977.
2. Ministry of Environment and Forests, GOI, Current Documents on Guidelines for EIA.
3. Meyers A. Robert (Eds.) Encyclopedia of Environmental Analysis and Remediation Vol. 1-8, John Wiley & Sons.

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Semester: M.E. II Sem.  
Total Theory Periods: 40  
Total Marks in End Semester Exam: 100  
Minimum number of class tests to be conducted: 02

Subject: Science & Engineering of air Pollution Control  
Specialization: Environmental Science & Engg.  
Code: 653213 (53)  
Total Tutorial Periods: 12

## **Unit 1**

Meteorology: influence of solar radiation and wind fields, lapse rate and stability conditions, characteristics of stack plumes, effective stack heights and spatial concentration distributions, Measurement techniques. Characteristics of various air pollutant particulates, health and nuisance/aesthetic considerations (PM<sub>2.5</sub> and PM<sub>10</sub>) and gaseous pollutants (CO, SO<sub>x</sub>, NO<sub>x</sub>, etc.), their behaviour in the atmosphere, monitoring..

## **Unit 2**

Control of gases and vapours: adsorption, absorption, combustion, and incineration. Control of sulphur oxides and oxides of nitrogen, desulphurisation, kinetics of NO<sub>x</sub> formation.

## **Unit 3**

Photochemical reactions, role of nitrogen and hydrocarbons in photochemical reactions, air toxics, mobile sources of air pollutants, noxious pollutants, and odour control. Emissions trading.

## **Unit 4**

Control of particulate emissions by mechanical collectors, bag filters, electrostatic precipitators and wet scrubbers.

## **Unit 5**

Air pollution control systems for selected industries – fertilizer, cement paper, refinery, mineral and metallurgical processes

## **Text**

1. G.M.Masters, Introduction to Environmental Engineering & Science, Prentice Hall, New Delhi, 1997
2. J.G. Henry and G. W. Heike, Environmental Science & Engineering”, Prentice Hall International Inc., New Jersey, 1996.
3. N.de Nevers: Air Pollution control Engineering, McGraw Hill, 1995.

## **Reference**

1. H.E. Hesketh, Air Pollution control second edition, Ann Arbor Science, 1992.
2. A.J. Buonicore and W.T. Davis, Air Pollution Engineering manual, Nan Nostened, 1993.

# *Chhattisgarh Swami Vivekanand Technical University, Bhilai (C. G.)*

Semester: M.E. II Sem.

Total Theory Periods: 40

Total Marks in End Semester Exam: 100

Minimum number of class tests to be conducted: 02

Subject: Environmental Geosciences and

Environmental Impact Assessment

Specialization: Environmental Science & Engg.

Code: 653221 (53)

Total Tutorial Periods: 12

## *Practical of Environmental Geosciences and Environmental Impact Assessment*

1. Use of High volume sampler for determining various air pollution parameters Collection of particulate matter using Air sampler.  
Determination of NO<sub>x</sub> and SO<sub>x</sub>  
Determination of carbon monoxide.  
Determination of relative humidity of atmosphere.
2. Stack monitoring kit for determining common stack pollution parameters
3. Analysis of air quality (SPM, Temperature)
4. Analysis of air samples for metals (using AA spectrometer)
5. Tour of an analytical lab and/or air pollution treatment facility
6. Visit to industrial plants in Bhilai City and any other place to see the working of air pollution control equipments.

## *FIELD STUDY*

In-depth study of environmental issues at least one environmentally sensitive site relevant to the discipline of the student and preparation of a report thereupon.

## *Text*

1. H.H. Ramp and H. Krist, Laboratory manual for the Examination of water, waster water and soil, VCH Publishers, 1988.
2. S.S. Dara, Experiments and Calculations in Environmental Chemistry, S.Chand, 2000.