



Shivaji University, Kolhapur
Department of Technology
SECOND YEAR B.TECH
Environmental Science and Technology
 Scheme of Teaching and Examination
 Semester – III

Subject Code	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing \$	Scheme	Max. marks	Min. Passing
MA211	Engineering Mathematics-III	03	01	-	04	CIE	50	20	IOE	50	20
						SEE	50	20	-----	-----	-----
EN211	Surveying	04	-	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN212	Structural Mechanics	03	01	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN213 *	Building Technology	03	-	-	03	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN214	Geology and Geo-environmental eng.	04	01	-	05	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
ENL211	Lab-I Surveying	-	-	04	02	-----	-----	-----	IPE	50	20
						-----	-----	-----	EPE	50	20
ENL212	Lab-II Structural Mechanics	-	-	02	01	-----	-----	-----	EPE	50	20
						-----	-----	-----			
ENL213	Lab-III Building Technology	-	-	02	01	-----	-----	-----	EOE	50	20
ENL214	Lab-IV Geology and Geo-environmental eng.	-	-	02	01	-----	-----	-----	EPE	50	20
Total		17	03	10	25	-----	500	-----	-----	300	-----

HS222	Environmental Studies	2	-	-	-	Project	30	40	-----	-----	-----
						Theory	70				
Audit Course I											
HS211	Introduction to Performing Arts	-	-	02	-	Institute Level	-----	-----	-----	-----	-----

Total Credits: 25

Total Contact Hours/Week: 30 hrs

Note:

\$: Minimum 40% marks required in CIE to become eligible for SEE.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 18 students.

CIE – Continuous Internal Evaluation, SEE – Semester End Examination,
 IPE – Internal Practical Evaluation, EPE – External Practical Examination,
 IOE – Internal Oral Evaluation, EOE – External Oral Examination



Shivaji University, Kolhapur
Department of Technology
SECOND YEAR B.TECH
Environmental Science and Technology
 Scheme of Teaching and Examination
 Semester – IV

Subject Code	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing	Scheme	Max. marks	Min. Passing
EN221	Fluid Mechanics	03	-	-	03	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN222	Concrete Technology	04	-	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN223	Environmental Chemistry & Microbiology	04	-	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN224	Energy Systems & Technology	04	-	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN225	Environmental Instrumentation	03	01	-	04	CIE	50	20	-----	-----	-----
						SEE	50	20	-----	-----	-----
EN222	Lab-I Fluid Mechanics	-	-	02	01	-----	-----	-----	EPE	50	20
EN223	Lab-II Concrete Technology	-	-	02	01	-----	-----	-----	EPE	50	20
EN224	Lab-III Environmental Chemistry & Microbiology	-	-	04	02	-----	-----	-----	IPE	50	20
									EPE	50	20
EN224	Energy Systems & Technology			02	01				IOE	50	20
EN225	Lab-IV Environmental Instrumentation	-	-	02	01	-----	-----	-----	IOE	50	20
						-----	-----	-----			
	Total	18	01	12	25	-----	500	-----	-----	300	-----

HS222	Environmental Studies	2	-	-	-----	Project	30	40	-----	-----	-----
						Theory	70				
Audit Course II											
HS221	Introduction to foreign language	01	-	02	-----	Institute Level	-----	-----	-----	-----	-----

Total Credits: 25

Total Contact Hours/Week: 30 hrs

Note: \$: Minimum 40% marks required in CIE to become eligible for SEE.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 18 students.

CIE – Continuous Internal Evaluation, SEE – Semester End Examination,

IPE – Internal Practical Evaluation, EPE–External Practical Examination,

IOE– Internal Oral Evaluation, EOE–External Oral Examination

Detailed Examination Scheme

1. Out of total 100 theory marks, 50 marks are allotted for Continuous Internal Evaluation (CIE). In CIE minimum 20 marks are required to become eligible for Semester End Examination. (SEE).
2. CIE (50 marks) includes :
 - Internal Test – 1, of 25 marks in 5th week on 1st and 2nd unit
 - Internal Test - 2, of 25 marks in 10th week on 3rd and 4th unit
3. For the Semester End Examination (SEE), 100 marks (3 hrs.) paper will be set and finally it will be converted to 50 marks, in which student must secure minimum 40 % i.e. 20 marks as an university examination passing head.
4. Final theory marks (out of 100) will be the addition of CIE (out of 50 marks) and SEE (out of 50 marks).
5. Internal Practical Evaluation (IPE) will be assessed on the basis of Internal Oral/ Practical/Tutorials/seminar in which student must secure minimum 40% i.e. 20 marks.
6. *Semester End Examination duration will be 4 hrs.

Academic Autonomy:

1. Flexibility in deciding Structure and Contents of Curriculum with reasonable frequency for changes in the same.
2. Continuous Assessment of Students performance with newly adopted - Credit System based on Award of Grade.
3. Credits are quite simply a means of attaching relative values to courses different components. They are a currency of learning, and in general regarded as a measure of the time typically required to achieve a given curricular outcome.
4. All subjects (year-wise) under each course/discipline are unitized.

Credit system:

Education at the Institute is organized around the semester-based credit system of study. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the programme. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

Course credits assignment:

Each course, except a few special courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Practical/Laboratory: One laboratory hour per week per semester is assigned half credit.

Example: Course : Concrete Technology: 4 credits (3-0-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures = 3 credits

0 hours/week tutorial = 0 credit

2 hours/week practical = $2 \times 0.5 = 1$ credit

Also, (3-0-2) 4 credit course = (3 h Lectures + 0 h Tutorial + 2 h Practical) per week
= 5 contact hours per week

For each lecture or tutorial credit, the self study component is 1 hour/week and 2 hours/week. In the above example, the student is expected to devote $3 + 1 = 4$ hours per week on self study for this course, in addition to class contact of 5 hours per week.

Earning credits:

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average.

The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation.

Features of Credit System at Department of Technology, Shivaji University, Kolhapur:

Every subject is allotted credits based on its academic importance/weight age.

1. All subjects may not have same credits.
2. 25 Credits / Semester.
3. Absolute Grading System with 6 Passing Grades viz. AA, AB, BB, BC, CC, CD, DD and FF for failure.
4. Getting FF grades in 4 heads in the one academic year he/she considered as failed.
5. Continuous Evaluation: Internal Test 1 [25 marks], and Internal Test 2 [25 marks].
6. Standardization of courses; each course is of 6 UNITS. T1 for UNIT 1 and 2, T2 for UNIT 3 and 4, SEE for all UNITS.
7. Internal Test 1 & Internal Test 2 handled by internal; SEE mostly by external.
8. Under no circumstances will a request for re-test be entertained after internal test.
9. Re-examination after SEE; No examination for odd sem. courses in even sem. or vice-versa.

Attendance rule:

All students must attend every lecture, tutorial and practical class. However, to account for late registration, sickness or other such contingencies, the attendance requirement will be a minimum of 75 % of the classes actually held. A student with less than 75 % attendance in a course during the semester, in lectures, tutorials and practicals taken together (as applicable), will be awarded an ‘XX’ grade in that course irrespective of his/her performance in the tests.

The course coordinator will award ‘XX’ grade to the student who is deficient in attendance taking into account the consolidated attendance record for the whole semester. For the purpose of attendance calculation, every scheduled practical class will count as one UNIT irrespective of the number of contact hours.

Attendance record will be maintained based upon roll calls (or any equivalent operation) in every scheduled lecture, tutorial and practical class. The course coordinator will maintain and consolidate attendance record for the course (lectures, tutorials and practicals together, as applicable).

Evaluation system:

1. Semester Grade Point Average (SGPA) =

$$\frac{\sum (\text{course credits in passed courses} \times \text{earned grade points})}{\sum (\text{Course credits in registered courses})}$$

2. Cumulative Grade Point Average (CGPA) =

$$\frac{\sum (\text{course credits in passed courses} \times \text{earned grade points}) \text{ of all Semesters}}{\sum (\text{Course credits in registered courses}) \text{ of all Semesters}}$$

3. At the end of B. Tech Program, student will be placed in any one of the divisions as detailed below (According to AICTE Handbook):

I st Division with distinction:	CGPA ≥ 8.25 and above
I st Division	: CGPA ≥ 6.75 and < 8.25
II nd Division	: CGPA ≥ 6.75 and < 6.25

An example of these calculations is given below:

Typical academic performance calculations - I semester

SHIVAJI UNIVERSITY, KOLHAPUR – Syllabus w. e. f. 2012-13

Course no.	Course credits	Grade awarded	Earned credits	Grade points	Points secured
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6 (col4 *col5)
MALXXX	5	CC	5	6	30
CSLXXX	4	CD	4	5	20
PHLXXX	4	AA	4	10	40
PHPXXX	2	BB	2	8	16
MELXXX	4	FF	0	0	00
TTNXXX	2	AB	2	9	18
Total	21		17	38	124

1. Semester Grade Point Average (SGPA) =

$$\frac{(124)}{(21)} = 5.90$$

2. Cumulative Grade Point Average (CGPA) =

Cumulative points earned in all passed courses = 124 (past semesters) + 124 (this sem.) = 248

Cumulative earned credits = 23 (past semesters) + 21 (this sem.) = 44

$$\frac{\sum (124 + 124)}{\sum (23 + 21)} = 5.63$$

System of Evaluation

Grade	Grade Points	Range	Description of Performance
AA	10	91-100	Outstanding
AB	09	86-90	Excellent
BB	08	76-85	Very Good
BC	07	66-75	Good
CC	06	56-65	Fair
CD	05	46-55	Average
DD	04	40-45	Poor
FF	00	Below 40	Fail (Eligible for Re-exam)
XX	--	--	Insufficient attendance
AB	--	--	Absent
\$	--	--	Passed in I st attempt

Audit Courses:

Additional courses shall be included as audit courses from the third semester onwards. While the performance of the student in audited courses shall be included in the Grade Card. These grades are not contributed to SGPA or CGPA of the concerned student.



Shivaji University, Kolhapur
Department of Technology
B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

MA211 ENGINEERING MATHEMATICS – III

Teaching Scheme: L: 3 hrs/week

Credits: 4

: T: 1 hrs/week

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40
	IOE		
	50		

UNIT 1

7 hrs

Linear Differential Equations: Linear Differential Equations with constant coefficients, Homogenous Linear differential equations

UNIT 2

6hrs

Applications of Linear Differential Equations: Applications of Linear Differential Equations with constant coefficients to Enviromental Science and Technology problems (Cantilever, Strut and beam).

UNIT 3

6 hrs

Partial differential equations: Four standard forms of partial differential equations of first order.

UNIT 4

7 hrs

Curve Fitting: Fitting of Curves by method of Least-squares, Coefficient of correlation, Spearman's rank correlation coefficient and lines of regression of bivariate data.

UNIT 5

6 hrs

Probability: Random variable, Probability mass function and probability density function, Binomial, Poisson and Normal distributions.

UNIT 6

7 hrs

Vector Calculus:

Vector Differentiation: Differentiation of vectors, Gradient of scalar point function, Directional derivative, Divergence of vector point function, Curl of a vector point function. Irrotational and solenoidal vector field.

Vector Integration: The line integral, Surface integral, volume integral, Gauss's Divergence theorem, Stoke's theorem, Green's theorem (Without proof).

Reference Books:

1. J. N. Wartikar & P. N. Wartikar , “A text book of Applied Mathematics” Vol. I, II and III, Vidyarthi Griha Prakashan, Pune.
2. Dr. B. S. Grewal, “Higher Engineering Mathematics”.
3. Erwin Kreyszig, “Advanced Engineering Mathematics”.
4. Ashok Saxena and N. Ch. S. N. Iyengar , N. P. Bali, “A textbook of Engineering
5. Mathematics”, Laxmi Publication, Delhi.
6. S. C. Gupta, “Fundamental of Statistics”.



EN211 SURVEYING

Teaching Scheme: L: 4 hrs/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 **9 hrs**

- a) **Introduction:** Construction and Permanent adjustments of Dumpy Level, Tilting & Auto Level.
- b) Sensitivity of Bubble Tube; Correction for curvature and refraction.
- c) Reciprocal levelling
- d) **Precise Levelling:** Study of Precise level, classification based on precision limits, Field Procedure.

UNIT 2 **8 hrs**

- a) Contouring Methods and application of contour maps for alignments and capacity of reservoir.
- b) **Planimeter:** Types, Theory, concept of zero circle, Study of Digital Planimeter.
- c) Computation of Areas and Volumes.

UNIT 3 **9 hrs**

Plane Table Survey: Equipment and Accessories, methods, Two point and Three point problems, and contouring with plane table. Use of Tangent Clinometer and Telescopic Alidade.

UNIT 4 **10 hrs**

- a) **Theodolite:** Vernier, Micro optic and electronic. Vernier Theodolite- Construction, Adjustments and uses. Methods of horizontal and vertical angle measurement. Use of Electronic Theodolite.
- b) **Trigonometric Levelling:** Single and Double Plane Method.
- c) **Theodolite Traversing:** Objectives and types. Closed traverse- balancing, correction, Gale's Traverse table. Omitted Measurements.
- d) **Tacheometric Surveying**

UNIT 5 **8 hrs**

Curves -

- a) **Horizontal curves:** Elements, Setting out of simple curves by linear and angular methods. Simple, compound, reverse and transition curves.

Transition Curves- Types, Elements, Length, and concept of ideal transition curve.

- b) **Vertical curves:** Types, Introduction to compound reverse and combined curves. Methods of setting out.

UNIT 6

8 hrs

Modern Surveying Instruments

Electromagnetic waves and their properties, phase, phase comparison, Modulation, Types of Electromagnetic Distance Meters [E.D.M.] – Geodimeter, Tellurometer, Distomat. Total Station and its uses and all other minor instruments.

Note - Due emphasis should be given to numerical problems during the course work and examinations.

Reference Books

1. Agor, “Surveying”, Khanna Publications, Delhi.
2. Alak De, S.Chand and Company “Plane Surveying”.
3. Basak, Tata Mcgraw Hill, “Surveying and Levelling”.
4. B.C.Punmia, “Surveying”, Laxmi Publications New Delhi. Vol.1 & 2
5. Jawaharlal Sharma, “Surveying”, Publishers,Delhi.
6. K.R. Arora, “Surveying”, Vol.1 &2.
7. Plane and Geodetic, David Clark, Surveying.
8. Raymond and Baker, “Surveying”, Pearson Education.
9. S.K.Duggal, Tata Mcgraw Hill Publications, New Delhi, Vol.1&2. “Surveying”.
10. T.P.Kanetkar and S.V.Kulkarni, “Surveying and Levelling”, Vidhyarthi Griha Prakashan, Pune, Vol.1 & 2.



EN 212 Structural Mechanics

Teaching Scheme: L: 3 hrs/week

Credits: 4

T: 1 hr/week

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Introduction , Stresses & strains (10Hours)

Scope of the subject, Engineering properties of different materials, St. Venant's principle. Simple and complementary Shear stress, Poission's ratio, Normal Stresses & strains in three dimensions, elastic constants, relation between elastic constants. Simple stress & strains, Hooks law, stress strain behavior for ductile & brittle material, working stress, Factor of safety, Composite sections under axial loading: compound bars, temperature stresses in Composite sections.

UNIT 2 Shear force & bending moment diagram (7 Hours)

Analysis of statically determinate beams: S.F & B.M. diagrams for beams subjected to point load (inclined load also), uniformly distributed load, uniformly varying load and couples. Relation Between intensity of load, shear force & bending moment. Virtual work approach for computation of S.F & B.M.

UNIT 3 Thin walled cylinders and spheres (3 Hours)

Thin walled cylinders and spheres, change in volume, wire wound thin cylinders.

UNIT 4 Bending stresses in beams (6 Hours)

simple bending theory, pure bending of beams, flexure formula, moment of resistance of different cross sections, built- up sections, Rectangular, circular and flanged sections, bending stresses in composite beams of two different materials, Equivalent sections

UNIT 5 Shear stresses in beams (3 Hours)

Distribution of shear stresses in beams of various commonly used sections such as rectangular, T, circular and I sections.

UNIT 6 Strain energy & Analysis of pin jointed trusses (10Hours)

Strain energy due to axial force gradually applied and impact load, Resilience. Strain energy due to shear force, bending moment.

Assumptions, method of joints and method of sections.

TEXT BOOKS:

1. S.B. Junnarkar, “Mechanics of Structure” (Vol. I & II) Advi, Charotar publication
2. R.C. Hibbler, “Mechanics of Materials” Pearson Education
3. Gere and Timoshenko, “Mechanics of Materials” CBS publishers
4. Punmia, Jain, “Mechanics of Materials” Vol I & II Laxmi Publications
5. S Ramamrutham, “Strength of Materials” Dhanapat Rai Publications
6. S.S.Bhavikatti, “Strength of Materials” New Age Publications

REFERENCE BOOKS:

1. J.B. Popov, Prentice, “Introduction to Mechanics of Solids” Hall publication
2. F. L. Singer and Pytel, “Strength of Material” Harper and Row publication.
3. Beer and Johnston, “Mechanics of Material” Mc Graw Hill publication.



Shivaji University, Kolhapur
Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)
EN 213 BUILDING TECHNOLOGY

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Planning , Building Planning Byelaws & regulations (10 Hours)

Residential and public buildings, Different types of Residential buildings – Bungalows, Row houses, Apartments, Complex, Different types of Public buildings – Institutional, Assembly, Business, Offices, Commercial centers, Industries, Store houses and Hazardous structures, Water supply and sanitary engineering structures.

Building Planning Byelaws & regulations as per National Building code of India. Planning of Residential Building (Bungalows, Row Bungalows, Apartments and Twin Bungalows) Procedure of Building Permission, significance of commencement, plinth completion or occupancy certificate.

UNIT 2 Principles of Building planning (5Hours)

Site Selection criteria.

Principles of Building planning. Significance Sun diagram. Wind Diagram. Orientation, Factors affecting, criteria under Indian condition.

UNIT 3 Plumbing & Electrical Services (9 Hours)

Water Supply Services - Plumbing systems – Internal Plumbing works and external plumbing works, Water supply systems (hot and cold)- Selection, quality control and Economics
Building Services- Electrification – Power requirements of buildings, Open and Concealed wiring systems, concepts of earthing, Protection Devices, Emergency Power Supply.

UNIT 4 Preparation of Service layouts (5Hours)

Service plans, elevations & sections of water supply works, sewage disposal system and drawings of building plumbing services.

UNIT 5 Detail drawing of Environmental Engineering Structures & Ventilation and Air

Conditioning (4 Hours)

Ground storage reservoir, overhead reservoirs, septic tanks, ETP, etc.

Methods of Ventilation & Types of Air Conditioning systems, Heating & cooling system components & installation.

UNIT 6 Rain water Drainage , Drainage System & Effect of Environmental Factors(6 Hours)

Rain water Management-Drainage, Collection, water Harvesting and Ground water Recharging
Drainage & Solid Waste Disposal and Systems

Introduction to global climate factors, Principles of thermal design, Annual wind shifts, earth's thermal balance, influence of topography, etc.

REFERENCE BOOKS:

1. Shah, Kale, Patki , “Building Drawing” Tata McGraw- Hill
2. Y. S. Sane, “ Building Design and Drawing” Allied Book Stall, Pune
3. SP 7- National Building Code Group 1 to 5- B.I.S. New Delhi
4. I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings
5. Manual of Tropical Housing and Building – Climatic Design - Koenigsberger, Ingersoll, Mayhew, Szokolay (Mehta Book Sellers)
6. G.S.Birdie, J.S.Birdie, “ Water supply and Sanitary Engineering” Dhanpat Rai Publishing Company.
7. B. C. Punamia “Building construction”
8. Nageshwar Rao and Kumarswamy “Planning of Residential Buildings”
9. Shah, Kale and Patki “Building Drawing”
10. Time savers Standards
11. Maruti S.K. “A to Z of Building Construction”
12. S.K. Garg “Water Supply and Drainage”
13. Y.S.Sane “Building Drawing”
14. National Building Code – SP7: 2005
15. S.G Deolalikar “Plumbing – Design & practice”, TMH publications



Shivaji University, Kolhapur

Department of Technology**Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)****EN 214 Geology and Geo-environmental Engineering****Teaching Scheme: L: 4 hrs/week****Credits: 5****T: 1 hr/week**

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Introduction to Geology**(10Hours)**

The dynamic earth systems, classification of geological materials, weathering, Engineering geology of soil formation and erosion, surface water, ground water, oceans and coast lines. Exploration and classification of rocks. Techniques of terrain evaluation, geological studies for pollution abatement.

UNIT 2 Significance of geological structures**(9 Hours)**

Significance of geological structures in engineering applications. Geology of dam sites, Geology of reservoir sites.
Landslides: causes, geological formations.

UNIT 3 Soils and Soil hydraulics**(10 Hours)**

Three phase structure, index properties, classification.
Soil hydraulics: Permeability, factors affecting, Darcy law, seepage, seepage pressure, quick condition.

UNIT 4 Consolidation process**(8Hours)**

Coefficient of consolidation, Compaction, factors affecting, standard proctor test, Shear strength, introduction, direct shear test. Introduction to earth pressures, stability of slopes.

UNIT 5 Introduction to geosynthetics**(8 Hours)**

Classification, functions, properties-physical, mechanical, hydraulic, environmental, application of geosynthetics.

UNIT 6 Environmental geotechniques**(7Hours)**

Introduction to environmental geotechniques. Applications of Geo-Environmental Engineering Ground improvement techniques.

REFERENCE BOOKS –

1. Soil mechanics: Punmia
2. Soil mechanics – Murthy
3. A texty book of geology – Mukherjee
4. Engineering Geology - Bangar

Note- More emphasis would be given on Numericals in the course work.

RECOMMENDED BOOKS

1. A.K. Jain, “Fluid Mechanics”, Khanna Pub., Delhi.
2. Arora, “Fluid Mechanics”
3. Franzini and Fennimore, “ Fluid Mechanics”, Engineering applications Daugherty,
4. Garde-Mirajgaonkar, “ Fluid Mechanics”, Nemchand & Bros., Roorkee
5. H. Rouse , “Elementary Fluid Mechanics”, Toppan C. Ltd. Tokyo
6. Modi / seth, “Fluid Mechanics – Hydraulic & Hydraulic Mechanics”, Standard Book House, Delhi
7. Shames, “ Fluid Mechanics”, McGraw-Hill International Book Co., Auckland
8. S. Nagathanam, “ Fluid Mechanics”, Khanna Pub., Delhi
9. Streeter, “ Fluid Mechanics”, Tata McGraw-Hill International Book Co., Auckland



Shivaji University, Kolhapur

Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

Laboratory-I

ENL 211 SURVEYING

Teaching Scheme: P: 4 hrs/week

Credits: 2

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EPE: 50

Experiments:

1. Use of Dumpy Level, Auto Level and Tilting Level.
2. Reciprocal Levelling
3. Sensitivity of Bubble Tube using Dumpy Level
4. Illustration of Permanent adjustment of Dumpy Level.
5. Evaluation of constant of Planimeter.
6. Use of Digital Planimeter for measurement of areas.
7. Study of Theodolite
8. Measurement of horizontal angle , various methods
9. Measurement of Magnetic bearing and vertical angle , theodolite
10. Study and use of Minor Instruments
11. Methods of Plane Table Survey
12. Two Point and Three Point Problems
13. Study and use total station
14. Tachometric Survey.

Projects

1. Block contouring project
2. Theodolite Traversing Project



Shivaji University, Kolhapur
Department of Technology
Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

Laboratory-II

ENL 222 STRUCTURAL MECHANICS

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: EPE: 50

Minimum Passing Marks: 20

A. Experiments (any five):

1. Tension test on Mild and TOR steel.
2. Compression test on different metals.
3. Compression test on Timber (parallel & across the grains).
4. Shear test on Mild steel.
5. Brinell and Rockwell Hardness test on different metals.
6. Impact test on different metals.

B. Experiments (any Two):

1. Bending test on Mild steel.
2. Flexure test on flooring tiles.
3. Water absorption & compression test on Burnt brick.

C. At least one numerical assignment on each UNIT.



SHIVAJI UNIVERSITY, KOLHAPUR – Syllabus w. e. f. 2012-13

Shivaji University, Kolhapur

Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

Laboratory-III

ENL 213 BUILDING TECHNOLOGY

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: EOE: 50

Minimum Passing Marks: 20

PRACTICALS: (FULL IMPERIAL SHEETS)

Sheet - 1 Line plans of any two Residential buildings

Sheet – 2 Line plans of any two Public Buildings

Sheet – 3 Planning & design of residential building (G+1).

Sheet – 4 Full set of drawings for the building planned in 2

(a) Municipal Submission drawing.

(b) Working Drawings:

- Foundation / Center Line Drawing.
- Furniture layout plan.
- Electrification plan
- Water supply & drainage plan.

Sheet – 5 Plumbing Services – Water supply and Drainage key plan with enlarged Plan and Section of one Utility Room (Industrial Unit only)

Sheet – 6 Ceiling Plan of Electrification with Plan and Section of any Industrial Building unit

Site visit to any one of Residential, Commercial, Public, Industrial and Institutional Building and report on the same.



Shivaji University, Kolhapur
Department of Technology
Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

Laboratory-IV

ENL 213 GEOLOGY AND GEO-ENVIRONMENTAL ENG.

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

Experiments:

1. Study of Identification and Physical properties of the following minerals. Varieties of
2. Silica, Orthoclase, Plagioclase, Zeolite, Muscovite, Biotite, Augite, Hornblende, Olivine,
3. Talc, Chlorite, Kyanite, Asbestos, Beryl, Garnet, Calcite, Gypsum, Fluorite, Corundum,
4. Hematite, Magnetite, Limonite, Pyrite, Psilomelane, Chromite, Chalcopyrite, Galena,
5. Malachite, Graphite
6. 2. Study of Identification and Physical properties of the following Rocks.
7. Igneous Rocks: Plutonic Rocks: Granite, Pink Granite, Porphyritic Granite, Syenite,
8. Diorite, Gabbro, Hypabyssal Rocks: Pegmatite, Dolerite, Volcanic
9. Rocks: Rhyolite, Pumic, Trachyte, Andesite, Varieties of Basalt, Obsedian,
10. Secondary Rocks: Laterite, Bauxite, Conglomerate, Braccia, Sandstone, Grit, Shale,
11. Limestone, Oolitic, Fossil ferrous Limestone, Metamorphic Rocks: Slate, Phyllite, Mica
12. Schist, Biotite schist, Chlorite Schist, Kyanite Schist, Granite
13. Gneiss, Augen Gneiss, Marble, Quartzite
14. Study of different Types of Geological Maps, Sections and Their Engineering Significances
15. Determination average annual rainfall
16. Educational Visits from Environmental Geology point of view.
17. Submission of visit report is mandatory.



Shivaji University, Kolhapur

Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester III)

HS 221 INTRODUCTION TO PERFORMING ARTS

Teaching Scheme: P: 2 hrs/week

This course will introduce students to problems of performing arts & theatrical representation. It will include readings from ancient & modern performing arts & engage with some of leading theorists. Students will be exposed to the generic difference between different forms of drama / music / dance.

Students will be encouraged to stage scenes from well-known plays / music's / dances as a part of assessments.



EN 214 FLUID MECHANICS

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Fluid properties and Hydrostatic forces (6 Hours)

Fluid properties and its measurements. Hydrostatic forces acting on surfaces, Buoyancy and floatation.

UNIT 2 Fundamentals of fluid flow (7 Hours)

Basic principles, continuity equation, Streamlines, flow net, Equations of motion, Energy equation, Application of Bernoulli equation, Impulse – momentum equation.

UNIT 3 Flow over notches and weirs, Flow through pipes (7 Hours)

Flow over notches and weirs: triangular, rectangular, broad crested.
Flow through pipes: types, of flow, Darcy-Wiesbach and other formulae, Hydraulic gradient and total energy lines.

UNIT 4 Laminar and Turbulent flow (6 Hours)

Laminar flow, Hagen-Poiseuille law, flow through parallel plates and porous media. Turbulent flow.

UNIT 5 Flow in Open Channels (6 Hours)

Types of flow, Economical section, specific energy and critical depth, Hydraulic jump.

UNIT 6 Pumps and Turbines (7 Hours)

Pumps: Type of pumps, centrifugal pumps, types, head of pump, pump performance and characteristic curves, cavitation, trouble shootings, Vertical Turbine pump.
Turbine: Introduction, Classification.

RECOMMENDED BOOKS

1. A.K. Jain, “Fluid Mechanics”, Khanna Pub., Delhi.
2. Arora, “Fluid Mechanics”
3. Franzini and Fennimore, “ Fluid Mechanics”, Engineering applications Daugherty,
4. Garde-Mirajgaonkar, “ Fluid Mechanics”, Nemchand & Bros., Roorkee
5. H. Rouse , “Elementary Fluid Mechanics”, Toppan C. Ltd. Tokyo

SHIVAJI UNIVERSITY, KOLHAPUR – Syllabus w. e. f. 2012-13

6. Modi / sesh, “Fluid Mechanics – Hydraulic & Hydraulic Mechanics”, Standard Book House, Delhi
7. Shames, “ Fluid Mechanics”, McGraw-Hill International Book Co., Auckland
8. S. Nagrathanam, “ Fluid Mechanics”, Khanna Pub., Delhi
9. Streeter, “ Fluid Mechanics”, Tata McGraw-Hill International Book Co., Auckland



Shivaji University, Kolhapur
Department of Technology
 Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

EN 222 CONCRETE TECHNOLOGY

Teaching Scheme: L: 4 hrs/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1:

9 hrs

Ingredients of Concrete

- a) **Cement:** Physical properties of cement such as fineness, consistency test, Initial and final setting time, soundness, compressive strength, specific gravity. Hydration of cement, chemical compounds of cement. Grades of cement, Types of cement- Ordinary Portland, Portland pozzolana, Rapid Hardening Portland Cement, Quick setting cement, Sulphur resisting cement, Super sulphated cement, Expansive cement, Rediset cement, High strength cement, High Alumina, Low heat, White, Coloured, Oil well, Hydrophobic cement.
- b) **Aggregates:** Physical properties such as sieve analysis and fineness modulus, specific gravity and water absorption, silt content, Bulking of sand, Bulk density, moisture content, Flakiness index, Elongation index. Mechanical properties such as Crushing, Impact and Abrasion value, Alkali – Aggregate reaction, Grading of Aggregate, Artificial and recycled aggregate.
- c) **Water:** Specifications of water as per IS 456 – 2000.

UNIT 2:

9 hrs

Fresh Concrete: Batching, Mixing, Transportation, Placing of concrete including pumping and compaction techniques for good quality concrete, Workability of concrete and methods of measuring workability, Factors affecting workability, Segregation and bleeding, Curing of concrete, Different methods of curing, Temperature effects on fresh concrete.

UNIT 3:

6 hrs

Admixtures: Types of admixtures, Plasticizers and superplasticizers and their effects on workability, Air entraining agents, Retarders, their effects on proportion of concrete, Pozzolanic admixtures, Fly ash, fly ash on fresh concrete, Silica fume, Metalaolim, Ground Granulated Blast Furnace Slag.

UNIT 4:

9 hrs

Hardened Concrete: Strength of concrete, w/c ratio, Gel-space ratio, Effect of maximum size of aggregate, Factors affecting strength of concrete, Characteristic strength - compressive, tensile and flexure

strength, Relation between compressive & tensile strength. Modulus of elasticity, Relation between modulus of elasticity & strength, Creep and shrinkage of concrete

UNIT 5:

10 hrs

Concrete Mix Design: Nominal Mix Concrete, Objectives of mix design, Factors governing mix design, Methods of expressing proportions, statistically quality control. Mix design , ACI 211.1-91 method, IS code method as per 10262 & 456, DOE method and acceptance criteria

Durability of concrete: Minimum & Maximum cement content, Strength & durability relationship, Volume change in concrete, Impact of w/c ratio on durability, permeability, Exposure to different conditions as per IS 456, Sulphate attack, Alkali aggregate reaction, Chloride attack, Corrosion of steel (chloride induced), Corrosion Control.

UNIT 6

9 hrs

Special concrete: Light weight concrete, No fines concrete, High density concrete, Fibre reinforced concrete and different types, Polymer concrete, High performance concrete, Self compacting concrete, Cold weather concreting, Hot weather concreting, Vacuum concrete, Shotcreting,

Nondestructive testing: Schmidt's rebound hammer – Mechanical & digital, Ultrasonic pulse velocity method, techniques of measuring & factors affecting the measurement of pulse velocity, Corrosion meter, Cover meter.

Referance Books:

1. M. S. Shetty, “ Concrete Technology” , S. Chand & Company Ltd, New Delhi
2. M. L. Gambhir, “ Concrete Technology” , Tata McGraw-Hill publishing Company Ltd, New Delhi
3. M. Neville, “ Concrete Technology” , Pearson Education, New Delhi
4. Orchard, “ Concrete Technology” , Asia publication, New Delhi
5. Handoo, Puri & Kaila, “ Concrete Technology” , Satya Prakashan, New Delhi
6. R. S. Varshnay, “ Concrete Technology” , New Chand & Brathers, New Delhi
7. K. T. Krishnaswamy, “Concrete Technology” , Dhanpat Rai Publication, New Delhi
8. V. N. Vazirani, “ Concrete Technology” , Khanna Publication, New Delhi

REFERANCE CODES:

1. IS 456 – 2000 , Plane reinforced concrete
2. IS 10262 – 2007 Doc: CED 2 (7288), Guidelines for Concrete Mix Proportioning
3. Concrete Mix Design, Code No. 21, All India Council for Technical Education, New Delhi



Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

EN 223 Environmental Chemistry & Microbiology

Teaching Scheme: L: 4 hrs/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Importance of Chemistry in Environmental Engineering (10 Hours)

Basic concepts from general Chemistry, Qualitative Quantitative, physical and colloidal Chemistry.

Basic concepts of organic Chemistry Structural and Ring formulae of common organic compounds, their properties and significance.

UNIT 2 Biochemistry, Biochemical Energetic (10 Hours)

Degradation, synthesis of carbohydrates, fats and proteins.

Biochemical Energetic Oxidation – Reduction potential, Half Reactions and coupling of Reaction.

UNIT 3 Physical and chemical characteristics (5 Hours)

Analysis and Significance of various physical and chemical characteristics of water and waster water.

UNIT 4 Survey of microbial life and Algae (10 Hours)

characteristics and classification of bacteria, cell morphology, Reproduction and growth of bacteria, Growth rate curve, culture Techniques, Gram staining, Microscopic methods, MPN and plate count. Membrane filter techniques.

Algae Classification, Role of algae in symbiosis, factors affecting algal growth and control of algae, Fungi, molds, protozoa and higher animals, their role in waster water treatment.

UNIT 5 Microbial population (4 Hours)

Control of Microbial population, Physical and Chemical methods.

UNIT 6 Enzymes and Metabolism (9 Hours)

Enzyme composition, types, factors affecting enzyme reactions, Michaelis Manton equation, Inhibition, Activation and specificity of Enzymes.

Metabolism Aerobic, Anaerobic metabolisms, energy transfer processes in metabolism, energy Rich compounds.

Reference Books:

1. Chemistry for Environmental Engineers – C. N. Sawyer & M. C. Carty.
2. Outlines of Biochemistry : Conn and Stump.

3. Microbiology of Sanitary Engineers : Ross E. Mc-Kinney.
4. Microbiology : Pelzer and Reid.
5. Standard methods of Examination of : APHA water & waster water.



EN 224 ENERGY SYSTEMS AND TECHNOLOGY

Teaching Scheme: L: 4 hrs/week

T: 1 hr/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1

8 hrs

Introduction: Energy chains, Energy demand, Energy crises, Worlds production & consumption of energy resources, Impact of energy on sustainable development Energy Management & planning: Energy management principles, Energy & pollution trade off, objectives of energy management, energy strategy & energy planning.

UNIT 2

9 hrs

Solar Energy: Introduction, utilization methods, merits & demerits of solar energy utilization, potential of solar energy, solar radiation, data for India, solar thermal collectors, concentrators & reflectors, collector efficiency, application of solar energy, solar cooker, solar water heating, solar dryer, solar distillation, solar photovoltaic systems, solar pond.

Wind Energy: Introduction, potential & scope, classification & types of wind machines, application of wind energy, merits & limitations of wind energy. Site selection for wind farm, wind map of India, wind energy station in India.

UNIT 3

9 hrs

Geothermal Energy: Introduction, types of geothermal resources, potential of geothermal resources in India & world. Environmental problems in utilization of geothermal resources.

UNIT 4

8 hrs

Tidal Energy: Tides, tidal range, tidal power, suitably sites & prospects. Types of tidal power plants, single basin, modulated single basin & double basin schemes, main equipments, energy storage.

UNIT 5

9 hrs

Biomass Energy Resources: Biomass energy, biomass energy from cultivated crops & from waste organic matter, biomass conversion processes, incineration & thermo

chemical, biochemical conversion of biomass, urban solid waste to energy by incineration & from landfill biogas projects, pyrolysis plants, biogas plants.

UNIT 6

8 hrs

Hydro Energy: Introduction, India's Hydro reserves, merits & limitations, low head , medium head, high head schemes, hydro turbines, economics.

Nuclear Energy: Atomic structure, fusion & fission nuclear reactor, radioactive waste Management

Reference Books:

1. Environmental studies: Benny Joseph
2. Environmental Biology: K. C. Agarwal
3. Environmental Encyclopedia: Cunningham, W. P. Cooper, T. H. Hepworth (Jaico Pub.)
4. Energy & Ecology : David M.Gates (Sinaur Associates)
5. Non Conventional Energy Sources: G.D.Rai
6. Power Technologies : Stephenson
7. Energy Technology: S.Rao & B.B.Parulekar



Shivaji University, Kolhapur
Department of Technology
 Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

EN 225 ENVIRONMENTAL INSTRUMENTATION

Teaching Scheme: L: 3 hrs/week

T : 1 hrs/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Measurement of P^H (4 Hours)

Definition, methods for determination - P^H Indicator and potentiometric methods, Instrumentation-potentiometric type and direct reading type, application.

UNIT 2 Flame photometry (5 Hours)

Principle, components, types of flame photometers, interference and applications of flame photometry.

UNIT 3 AAS (5 Hours)

Principle, components, operation, single and double beam AAS, interference and applications of AAS photometry

UNIT 4 Nephelometry , turbidimetry and Polarography (9 Hours)

Introduction, selection, factor affecting measurement, components and application
Polarography Introduction, Apparatus, working, factor affecting limiting current, cells, and application

UNIT 5 Chromatographic methods of analysis (4 Hours)

Introduction, classification, Gas chromatography- principal Components, applications. HPLC-elements, working, application, Ion chromatography

UNIT 6 Visible spectroscopy , Mass spectroscopy & N.M.R. Spectroscopy (12 Hours)

Introduction, types, Absorption laws (Lambert – Beer Law), Components, Single beam and double beam instrument Application

UV spectroscopy - Components, working, application

Mass spectroscopy Introduction, theory, components Application

N.M.R. Spectroscopy Principle and theory, instrumentation (brief) chemical Shift, Environmental effects on NMR spectra, Applications of Proton NMR. C-13 NMR (Brief idea)

REFERENCE BOOKS:

1. Douglas A. Skoog, "Fundamentals of Analytical Chemistry", Donald M. West, James F. Holler & Stanley R. Crouch ISBN 0-534-41797-3
2. F.W. Fifield, D. Kealey, "Principles and Practice of Analytical Chemistry", Publisher: Nelson Thornes; ISBN: 0216929202
3. Hobart H. Willard, Lynne L. Merritt Jr, John Dean, Frank A. Settoe Jr "Instrumental Methods of Analysis", Publisher: Wadsworth; ISBN: 0534081428
4. Chatwal, Anand, "Instrumentation methods of chemical analysis"



Shivaji University, Kolhapur
Department of Technology
Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

Laboratory-I

ENL 222 FLUID MECHANICS

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: EPE: 50

Minimum Passing Marks: 20

At least Ten experiments from the following.

- 1) Verification of Bernoulli's Theorem
- 2) Determination of metacentric heights
- 3) Plotting of streamlines, flownets
- 4) Calibration of an orifice / mouthpiece
- 5) Calibration of venturimeter / orificemeter
- 6) Study of factors affecting coefficient of friction for pipe flow (at least for two different materials and two different diameters)
- 7) Determination of loss of head due to i) Sudden expansion ii) Contraction iii) Elbow iv) Bend v) Gate Valve etc.
- 8) Study of Laminar flow
- 9) Study of Monogram / Moodys' Chart
- 10) Calibration of rectangular and broad-crested weir.
- 11) Study of specific energy diagram for variation weir dia-chart
- 12) Study of hydraulic jump
- 13) Study of centrifugal pump and turbine.



SHIVAJI UNIVERSITY, KOLHAPUR – Syllabus w. e. f. 2012-13

Shivaji University, Kolhapur

Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)
Laboratory-II

ENL 223 CONCRETE TECHNOLOGY

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: EPE: 50

Minimum Passing Marks: 20

Experiments:

1. Testing of cement: Consistency, fineness, setting time, Specific Gravity, Soundness and strength.
2. Testing of fine aggregate: Specific Gravity, sieve analysis and zoning, bulking of fine aggregate, bulk density, silt content.
3. Testing of coarse aggregate: Specific Gravity, sieve analysis, bulk density, flakiness index, elongation index, water absorption & moisture content, soundness of aggregate.
4. Concrete Mix design , ACI 211.1-91 method, IS code method as per 10262- 2007 & 456-2000, DOE method Tests on Concrete- Workability tests – Slump cone test, compaction factor test,
5. Vee-bee consistometer test, flow table test, strength tests- compressive strength, flexural strength, split tensile strength.
6. Effects of Admixture - Accelerator, Retarder, Super Plasticizer.
7. Nondestructive Testing - Rebound Hammer test, Ultrasonic Pulse Velocity test.
8. Testing of cement: Consistency, fineness, setting time, Specific Gravity, Soundness and strength.
9. Testing of fine aggregate: Specific Gravity, sieve analysis and zoning, bulking of fine aggregate, bulk density, silt content.
10. Testing of coarse aggregate: Specific Gravity, sieve analysis, bulk density, flakiness index, elongation index, water absorption & moisture content, soundness of aggregate.
11. Concrete Mix design , ACI 211.1-91 method, IS code method as per 10262- 2007 & 456-2000, DOE method Tests on Concrete- Workability tests – Slump cone test, compaction factor test,
12. Vee-bee consistometer test, flow table test, strength tests- compressive strength, flexural strength, split tensile strength.
13. Effects of Admixture - Accelerator, Retarder, Super Plasticizer.
14. Nondestructive Testing - Rebound Hammer test, Ultrasonic Pulse Velocity test.



Shivaji University, Kolhapur
Department of Technology
Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

Laboratory-III

ENL 224 ENVIRONMENTAL CHEMISTRY & MICROBIOLOGY

Teaching Scheme: P: 4hrs/week

Credits: 2

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EPE: 50

Experiments:

PRACTICALS:

Laboratory work consisting of

1. Analysis of water and waster water
2. Microscopic Examinations, Identification of Micro flora.
3. M. P. N. and plate count Tests.
4. Gram staining Techniques.

SHIVAJI UNIVERSITY, KOLHAPUR – Syllabus w. e. f. 2012-13

Shivaji University, Kolhapur



Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

Laboratory-IV

ENL 225 ENERGY SYSTEMS & TECHNOLOGY

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IOE: 50

Minimum Passing Marks: 20

A journal consisting of study of at least six Experiments, Two visit Reports



Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

Laboratory-IV

ENL 225 ENVIRONMENTAL INSTRUMENTATION

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IOE: 50

Minimum Passing Marks: 20

A journal consisting of study of at least six instruments, their Principle, working, calibration & applications based on theory.



Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

HS 211 INTRODUCTION TO FOREIGN LANGUAGES

Teaching Scheme: P: 2hrs/week

General Information:

This is a special introductory course of Foreign Language meant for the regular Engineering students of **B. Tech** (3rd Semester) of Shivaji University, Kolhapur.

This course builds the skill sets needed to understand the basics of both language and communication. It is also interested in exploring the relationship between the two categories (language and communication) in order to work out how they relate to each other, it will include introductory concepts in semantics, semiotics, syntax, lexicography, and discourse analysis. It will also include an analysis of philosophical problems of reference, representation, rhetoric, sense, speech acts, and taxtuality. Students will have to submit a term paper and make an oral presentation on any aspect of language and/or communication that they wish to explore at length. Workshops are also included to help students internalize the concepts of communication to which they have been introduced.

AIMS & OBJECTIVES:

1. Introduction of Foreign alphabet, basic Foreign Grammar & Phonetic rules.
2. The Course is aimed at developing the listening, reading and writing skills in the learners.
3. The learner must be able to translate simple texts from and into foreign language.
4. Exposing the learners to simple aspects of life and culture of the foreign people.

SYLLABUS :

Translation:

A passage (approx. 100 words) from Foreign into English/Marathi.

Separate sentences from English into Foreign Language

COMPOSITION:

Simple Grammatical Exercises:

Topics: Recognising *gender* of noun, Formation of *Plural* noun, Inserting *pronouns* in correct forms, *Conjugation* of Verbs, Correct use of foreign *adjectives*, Use of correct *Case forms*.



Shivaji University, Kolhapur

Department of Technology

Second Year B. Tech (ENVIRONMENTAL SCIENCE AND TECHNOLOGY) (Semester IV)

HS 222 ENVIRONMENTAL STUDIES

Teaching Scheme

Lectures: 2 Hrs/week

Examination Scheme

Theory : 70 Marks

Project : 30 Marks

Terms of References

In pursuance of the verdict of the Hon'ble Supreme Court, (Writ Petition (Civil) No. 72/1998) the University Grants Commission has formed a Committee of experts on Environmental Studies. The Committee has looked into all the pertinent questions, issues and other relevant matters. This was followed, framing of the core module syllabus of Environmental Studies for all undergraduate courses. The UGC has made it compulsory to all universities and colleges in India as per the directives of the Hon'ble Supreme Court of India. (UGC DO No. F.13-1/2000 (EA/ENV/COS-I) 24 July 2002). The Directorate of the Higher Education, Government of Maharashtra through its letter No. NGC/2003/32224/MV-1, Higher Education, 14 January 2004 has also made it compulsory to comply with the decision of Hon'ble Supreme Court.

Hon'ble Vice-Chancellor has endorsed the scheme to the Dean of Social Science faculty for designing the Course Curricula. Accordingly it has been studied thoroughly and the Scheme of its implementation has been prepared & forwarded to the colleges.

Vision

The importance of environmental science and environmental studies cannot be disputed. The need for sustainable development is a key to the future of mankind. Continuing the problems of pollution, loss of forest, solid waste disposal, degradation of environment, issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues. The UNITED Nations Conference on World Summit on Sustainable Development at Johannesburg in 2002 have drawn the attention of people around the globe to the deteriorating condition of our environment. It is clear that no citizen of the earth can afford to be ignorant of environmental issues. Environmental management has captured the attention of health care managers. Managing environmental hazards has become very important.

Human beings have been interested in ecology since the beginning of civilization. Even our ancient scriptures have emphasized about practices and values of environmental conservation. It is now even more

critical than ever before for mankind as a whole to have a clear understanding of environmental concerns and to follow sustainable development practices.

India is rich in biodiversity which provides various resources for people. It is also the basis for biotechnology.

Only about 1.7 million living organisms have been described and named globally. Still many more remain to be identified and described. Attempts are made to conserve them in ex-situ and in-situ situations. Intellectual property rights (IPRs) have become important in a biodiversity-rich country like India to protect microbes, plants and animals that have useful genetic properties. Destruction of habitats, over-use of energy resources and environmental pollution have been found to be responsible for the loss of a large number of life-forms. It is feared that a large proportion of life on earth may get wiped out in the near future.

In spite of the deteriorating status of the environment, study of environment has so far not received adequate attention in our academic programmes.

Recognizing the significance of the Environmental Studies, as a new paper has to be introduced at the Second Year Degree Course in all faculties.

Application

A new paper on Environment Studies has been introduced at all the Second Year Degree Course as a compulsory certificate course in Environment Studies from the academic year 2005-06 with a duration of six months. The examination will be conducted during the second term of the academic year. The total marks allotted to this course is 100 mark including a field work reporting of 30 Marks.

There will be two streams of the students offering to this course.

- a) One will be of self-study in nature. Reading material will be supplied to a student, the University. Each student offering this stream has to attend 20 contact periods spread in six months of the first term and has to pay a fee of Rs. 150/-. The honorarium of these contact lectures will be paid, the college out of the fees collected at the rate of Rs. 100/- per lecture hour. Out of the collected Rs. 50/- should be transferred to the University.
- b) The students offering to another stream has to pay Rs. 250/- as fee of the course. Under the stream students will be taught as per the syllabus, regularly in 40 lecture hours, plus 10 hours of field work. Out of the fees collected Rs. 50/- per student has to be transferred to the University. The remaining amount can be used for payment of honorarium to a teacher teaching the said course at the rate of Rs. 100/- per lecture.
- c) The external students have to appear for the said certificate course.
- d) The Project Report has to be submitted as per the guideline given below.

e) The field project is to be carried out individually , every student under the supervision of the concerned teacher. The project topic is expected to be on the local/ regional environmental issue. the project theme is to be essentially need based, time bound (six months) and result / action oriented. Model topics/ themes along with methodology will be given in the resource material of the course.

The project report is to be prepared as per the prescribed format, in typed form and with spiral binding. The project report is to be submitted prior to the written examination. Central evaluation procedure is to be followed for the assessment of the project reports.

Examination Pattern

In the case of awarding the marks, the question paper will carry 100 marks. The structure of the question paper being:

- | | | |
|---|--|----------|
| 1 | Objective/To the point./Exercise Type answers | 10 marks |
| 2 | Short answer pattern (3 out of 5) | 15 marks |
| 3 | Short Notes (3 out of 5) | 15 marks |
| 4 | Essay type questions with internal choice
(one question of 10 marks shall be on field work) | 30 marks |
| 5 | Field Work Reporting | 30 marks |

Field Work Reporting

A format of field work Report shall be of the following in nature.

<p>Cover Page : Name of the College and Department Title of the Project Name of the Student Name of the Supervisor Year of Submission</p> <p>Second Page Declaration of the Student</p> <p>Third Page Certificate of the Supervisor (countersigned by the Head & Principal)</p>	<p>Content Page : Contents List of Tables, Diagrams, Figures, Photographs etc.</p> <p>Chapter – I : Research Methodology</p> <p>Chapter – II : Reporting</p> <p>Last Chapter : Summary and Findings Bibliography</p>
--	--

The field work reporting will be the exclusive work of the students to be submitted under the guidance of the Department faculty. The reports will be assessed , the Panel of Examiners in the respective subjects prepared , the BOS and approved , the 32 (5) and BOE.

Medium of Instruction

The medium of instruction for Law, Science, Medical and Engineering faculties will be English and for Arts, Social Sciences and Commerce medium of instruction will be English or Marathi.

Qualifications of the Teacher

The paper is to be taught in 4 lectures per week. The qualifications to teach the paper of the teachers will be as under:

1. P. G. with B+ in Environment Science

2. If qualified teacher is not available initially, temporary arrangements can be made from the permanent teachers, who has published work or expository articles or books written on Environmental Studies or completed workshops/refresher course/training programme of three weeks duration on Environmental Studies.

Declaration of the Result, Issuing of the Certificate, Re-appearing for the Examination and Grades.

- 1 The certificate course can be cleared in the third year. If candidate remains absent or fails in the course in the second year of the degree course.
- 2 The candidate will have to pass in the examination of the certificate course in Environmental Studies in order to obtain degree certificate from the University.
- 3 Results of the theory examination will be declared only after submission of the field work report to the college.
- 4 A candidate has to pass this paper in order to obtain degree certificate. If the candidate passes in all subjects of degree course but fails in this paper, he will not obtain degree certificate.
- 5 The marks obtained , a student will be converted into grades as bellow
Grade 0 - above 75
A - 61 to 75 B - 51 to 60 C - 40 to 50
6. Certificate with grade obtained will be issued , the University.
7. The scheme is made applicable start from a academic year 2005-06 for second year students of all faculties.
8. The Principal can appoint Course Coordinator to organize teaching and evaluation.

SYLLABUS

1. Nature of Environmental Studies

Definition, scope and importance. (2 lectures)

Multidisciplinary nature of environmental studies

Need for public awareness.

2. Natural Resources and Associated Problems.

a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Usage and exploitation, environmental effects of extracting and using mineral resources.

- d) Food resources: World food problem, changes caused , agriculture effects of modern agriculture, fertilizer-pesticide problems.
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.
- f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- g) Role of an individuals in conservation of natural resources. (8 lectures)
- h) Equitable use of resources for sustainable lifestyle.

3. Ecosystems

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids.

Introduction, types, characteristics features, structure and function of the following ecosystem:-

- a) Forest ecosystem,
- b) Grassland ecosystem,
- c) Desert ecosystem,
- d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) (8 Lectures)

4. Biodiversity and its Conservation

- Introduction – Definition: genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Western Ghat as a bio-diversity region.
- Hot-spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. (8 Lectures)

5. Environmental Pollution

Definition : Causes, effects and control measures of:

- a) Air pollution,
- b) Water pollution,
- c) Soil pollution,
- d) Marine pollution,
- e) Noise pollution,
- f) Thermal pollution,
- g) Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies
- Disaster management : Floods, earthquake, cyclone and landslides. Tsunami (8 Lectures)

6. Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns.
- Environmental ethics: Issue and possible solutions.
- Climate change, Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Wasteland reclamation.
- Consumerism and waste products. (8 Lectures)

7. Environmental Protection

- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Population Growth and Human Health, Human Rights. (8 Lectures)

8. Field Work (10 Lectures)

- Visit to a local area to document environmental assetsriver/ forest/grassland/hill/mountain or
- Visit to a local polluted site – Urban/rural/Industrial/Agricultural or
- Study of common plants, insects, birds. or
- Study of simple ecosystems-ponds, river, hill slopes, etc.

(Field work Equal to 10 lecture hours)

Total = 60 hours

References

1. Agarwal, K. C. 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380013, India, Email:mapin@icenet.net (R)
3. Brunner R. C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R. S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W. P. Cooper, T. H. Gorhani, E. & Hepworth, M. T. 2001,
6. Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A. K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment (R)
9. Gleick, H., 1993, Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 473p
10. Hawkins R.e.,Encyclopedia of Indian Natural History,Bombay Natural History Society,Bombay (R)
11. Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge Univ.Press 1140p.
12. Jadhav, H.& Bhosale, V.M.1995,Environmental Protection and Laws,Himalaya Pub.House,Delhi 284p.
13. Mckinney, M. L. & Schoel. R. M. 1996, Environmental Science Systems & Solutions, Web enhanced edition, 639p.
14. Mhskar A. K., Matter Hazardous, Techno-Science Publications (TB)
15. Miller T. G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)
16. Odum, E. P. 1971, Fundamentals of Ecology, W. B. Saunders Co. USA, 574p.
17. Rao M. N. & Datta, A. K. 1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd., 345p.
18. Sharma B. K., 2001, Environmental Chemistry, Goel Publ. House, Meerut
19. Survey of the Environment, The Hindu (M)
20. Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
21. Trivedi R. K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R)
22. Trivedi R. K. and P. K. Goel, Introduction to air pollution, Techno-Science Publications (TB)
23. Wagner K. D., 1998, Environmental Management, W. B. Saunders Co. Philadelphia, USA 499p.
(M) Magazine
(R) Reference
(TB) Textbook
24. Paryavaram Swhastra – Gholap T. N.
25. Paryavaram Shastra - Gharapure.
26. Paryavaran Vighyan - V. R. Ahirrao - Nirali Prakashan, Pune.
27. Paryavaram Shastra Parichay - Jay Kumar Magar Vidya Prakashan, Nagpur.
28. Desh Ka Paryavaran - Anupam Misra, Ganolai santi Pratisthan. New Delhi.