DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO. ACAD/NP/M.E./Syllabi/189/2013

It is hereby informed to all concerned that, on recommendations of the Faculty of Engineering and Technology, the Hon'ble Vice-Chancellor has accepted the following **"Revised Syllabi with Cumulative Grade Point Average [CGPA]"** under the Faculty of Engineering & Technology on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994** as appended herewith :-

Sr. No.	Revised Syllabi
[1]	Revised Syllabus of M.E. [Computer Networking Engg.],
[2]	Revised Syllabus of M.E. [Structural Engineering],
[3]	Revised Syllabus of M.E. [Water Resources Engineering],
[4]	Revised Syllabus of M.E. [Environmental Engineering],
[5]	Revised Syllabus of M.E. [Software Engineering],
[6]	Revised Syllabus of M.E. [Computer Science],
[7]	Revised Syllabus of M.E. [Control System Engineering],
[8]	Revised Syllabus of M.E. [Heat Power],
[9]	Revised Syllabus of M.E. [Manufacturing Engineering],
[10]	Revised Syllabus of M.E. [Electronics],
[11]	Revised Syllabus of M.E. [Electronics & Telecommunication],
[12]	Revised Syllabus of M.E. [Embedded System],
[13]	Revised Syllabus of M.E. [Communication Engineering],
[14]	Revised Syllabus of M.E. [Digital Communication],
[15]	Revised Syllabus of M.E. [Biotechnology],
[16]	Revised Syllabus of M.E. [CAD/CAM],
[17]	Revised Syllabus of M.E. [Thermal],
[18]	Revised Syllabus of M.E. [Design Engineering],

This is effective from the Academic Year 2013-2014 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. ACAD/ NP/ M.E./
SYLLABI / 2013/14092-100
V.C.14[7] A-08.
Date:- 15-06-2013.

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Director,
Board of College and
University Development.

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Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above all syllabi on University Website [www.bamu.net].**

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [Engineering Unit],
3] The Programmer [Computer Unit-1] Examinations,
4] The Programmer [Computer Unit-2] Examinations,
5] The Superintendent, [Eligibility Unit] ,
6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
7] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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S/160613/-*

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Revised Syllabus of

ME

(ENVIRONMENTAL ENGINEERING)

[Effective from the Academic Year 2013-14 & onwards]

Dr. Babasaheb Ambedkar Marathwada University Aurangabad.

Faculty of Engineering & Technology

Rules and Regulations for M.E. & M.Tech. Courses

➢ **What is a credit system**

A credit system is a systematic way of describing an educational program by attaching credits to its components. The definition of credits in higher education systems may be based on different parameters, such as student workload, learning outcomes and contact hours.

➢ **Advantages of the Credit System**

- Represents a much-required shift in focus from teacher-centric to learner-centric education since the work load estimated is based on the investment of time in learning, not in teaching.
- Helps to record course work and to document learner work load realistically since all activities are taken into account-not only the time learners spend in lectures or seminars but also the time they need for individual learning and the preparation of examinations etc.
- Segments learning experience into calibrated units, which can be accumulated in order to gain and academic award.
- Helps self-paced learning. Learners may undertake as many credits as they can cope with without having to repeat all the courses in a given semester if they fail in one or more courses. Alternatively, they can choose other courses and continue their studies.

➢ **What is Grading?**

The word Grade derived from the Latin word gradus, meaning, step. Grading, in the educational context is a method of reporting the result of a learner's performance subsequent to his evaluation. It involves a set of alphabets which are clearly defined and designated and uniformly understood by all the stake holders. A properly introduced grading system not only provides for a comparison of the learner's performance but it

also indicate the quality of performance with respect to the amount of efforts put in and the amount of knowledge acquired at the end of the courses by the learners.

➢ CURRICULUM:

1.1 Curriculum:

Every program with specialization has a prescribed course structure which in general terms is known as Curriculum. It prescribes course to be studied in each semester; the relevant information containing course structure along with detail syllabus for each course of each program is updated periodically and is uploaded on the website.

1.2 Semesters:

The Faculty of Engineering & Technology implements a credit based curriculum and grade based evolution system for P.G. program is of four semesters. The academic courses are delivered in the first two semesters. Dissertation work is carried out by a student in the third and fourth semester. The first semester begins in the last week of July ends by the last week of November while the second semester begins in the first week of January and ends by the second week of May. Total duration for each semester is generally of 20 weeks including the period of examination, evaluation and grade declaration.

1.3 Course Credit:

Education 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 program. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All programmers are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

1.4 Course credits assignment

Each courses, 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 one credit.

Example: Course: XYZ Engg: 4 credits (3-1-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures = 3 credits

1 hours/week tutorial = 1 credit

2 hours/week practical = 2 x 0.5 = 1 credit

2 hours/week seminar = 2 x 0.5 = 1 credit

Dissertation seminar = 2 x 1= 2 credit

(3-1-2) 3 credit course = (3 h Lectures + 1 h Tutorial + 2 h Practical) per week

= 6 Contact hours per week

1.5 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.

1.6 Evaluation System

1. Semester Grade Point Average (SGPA) =

   SUM (course credits in passed courses X earned grade points)

   SUM (Course credits in registered courses)

2. Cumulative Grade Point Average (CGPA) =

   SUM (course credits in passed courses X earned grade points) of all Semester

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   SUM (Course credits in registered courses) of all Semester

3. At the end of M.E & M. Tech Program, student will be placed in any one of the divisions as detailed below.(According to AICTE Handbooks)

   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

As per AICTE Handbook (2013-14), new gradation suggested as follows,

Table 1

Grade Point	Equivalent Range
6.25	55%
6.75	60%
7.25	65%
7.75	70%
8.25	75%

Conversion of CGPA to percentage marks for CGPA ≥ 5.0 can be obtained using equations.

Percentage marks = (CGPA X10) – 7.5

An example of these calculations is given below:

Typically one example for academic performance calculations of semester -I

Table 2

Course No. (1)	Course Credit (2)	Grade Awards (3)	Earned Credit (4)	Grade Points (5)	Points Secured (6)=(4) x (5)
Subject 1	4	B	4	6	24
Subject 2	4	C	4	5	20
Subject 3	4	O	4	10	40
Subject 4	4	A+	4	8	32
Subject 5	4	C	4	5	20
Seminar	2	A++	2	9	18
Total	22		22	38	134

1. Semester Grade Point Average (SGPA) = $\frac{(134)}{(22)} = 6.09$

2. Cumulative Grade Point Average (CGPA) =
Cumulative points earned in all passed courses = 134 (past semester) + 134 (this sem.) = 268

Cumulative earned credits = 22 (past semesters) +22 (this sem) = 44

$$\frac{\sum (134 + 134)}{\sum (22 + 22)} = 6.09$$

System Evaluation Table

Table 3

Grade	Grade Points	Marks Obtained (%)			Description Performance
		Regular Semester	Re-Examination	Summer Semester Examination/Re-appear	
O	10	91-100	--	--	Outstanding
A++	09	86-90	91-100	91-100	Excellent
A+	08	76-85	86-90	81-90	Very Good
A	07	66-75	76-85	71-80	Good
B	06	56-65	66-75	61-70	Fair
C	05	46-55	56-65	51-60	Average
D	04	40-45	40-55	40-50	Poor
F	00	Below 40	Below 40	Below 40	Fail
EE					Incomplete
WW					Withdrawal
XX	--	--	--	--	Detained
ABSENT	--	--	--	--	Absent
PP	--	--	--	--	Passed (Audit Course)
NP	--	--	--	--	Not Passed (Audit Course)

Grade Awards:

i) A ten point rating scale shall be used for the evaluation of the performance of the student to provide letter grade for each course and overall grade for the Master's Programme. Grade points are based on the total number of marks obtained by him/her in all the heads of examination of the course. These grade points and their equivalent range of marks are shown separately in Table-4.

Table 4: Ten point grades and grade description

Sr.No.	Equivalent Percentage	Grade Points	Grade	Grade Description
1	90.00 – 100	10	O	Outstanding
2	80.00 – 89.99	9	A++	Excellent
3	70.00 – 79.99	8	A+	Exceptional
4	60.00 – 69.99	7	A	Very Good
5	55.00 – 59.99	6	B+	Good
6	50.00 – 54.99	55	B	Fair
7	45.00 – 49.99	5	C+	Average
8	40.01 – 44.99	4.5	C	Below Average
9	40	4.00	D	Pass
10	<40	0.00	F	Fail

ii) Non appearance in any examination/assessment shall be treated as the student have secured zero mark in that subject examination/assessment.

iii) Minimum D grade (4.00 grade points) shall be the limit to clear/pass the course/subject. A student with F grade will be considered as 'failed' in the concerned course and he/she has to clear the course by reappearing in the next successive semester examinations. There will be no revaluation or recounting under this system.

iv) Every student shall be awarded Grade points out of maximum 10 points in each subject (based on 10 Point Scale). Based on the Grade points obtained in each subject, Semester Grade Point Average (SGPA) and then Cumulative Grade Point Average (CGPA) shall be computed. Results will be announced at the end of each semester and cumulative Grade card with CGPA will be given on completion of the course.

Proposed Coding System of M.E/M.Tech Subjects

Six Digit Code for a subject (PG Course)

	Digits ⟶	1 2 3	4	5 6
Sr. No.	**Branch ↓**	**Branch code**	**Year**	**Subject**
1	Electronics	MEX	PG I year – 6	**Semester –I/III**
2	Communication Engineering	MEC	PG II Year - 7	1-20 Theory
3	Electronics & Telecom.	MET		21-30 Practical
4	Digital Communications	MDC		31 Dissertation-I
5	Embedded System	MES		41-49 Electives
6	Structure Engineering	MSE		**Semester –II/IV**
7	Environmental Engineering	MEV		51-70 Theory
8	Water Resource Engineering	MWR		71-80 Practical
9	Computer Engineering	MCE		81 Dissertation-II
10	Computer Network	MCN		91-99 Electives
11	Software Engineering	MSW		
12	Mechanical Engineering	MME		
13	Thermal Engineering	MTE		
14	CAD/CAM	MCC		
15	Manufacturing	MMF		
16	Heat Power	MHP		
17	Machine Design	MMD		
18	M.Tech Mechanical	MTM		
19	CSE & IT	MCI		
20	Manufacturing Processing Engineering	MMP		

Note: - Kindly, Allot Same Code for same Electives/ subjects for different branches to avoid repetitions of Question papers/settings/assessments.

DEGREE OF MASTAR OF ENGINEERING
(Course with effective from academic year: 2013-2014)

I	1	The examination for the Degree of Master of Engineering will be held in four semesters, M.E. Semester-I, M.E. Semester-II, M.E. Semester-III, and M.E. Semester-IV in case of full time course.
II	**Rules & Eligibility**	
	1	Rule for admission to P.G. Degree course in Engineering and Technology as per rules and regulation of AICTE/DTE & Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
III	**Evaluation method**	
	1	Each theory course will be of 100 marks and be divided in to internal examination of 20 marks and semester examination of 80 marks (20+80=100 marks). Each practical course will be of 50 marks
	2	There shall be two class tests within a semester. First based on 40% syllabus taught and second based on 60% syllabus taught. The setting of question paper and assessment will be done by the concerned teacher who has taught the syllabus. Average marks obtained out of two examinations will be considered for the preparation of final sectional marks/ grade.
	3	The Question papers in theory subjects shall be set by the Examiners appointed for the purpose by the University on the recommendations of the Board of studies of the concerned PG Course.
	4	The assessment of the term work for any subject will be done by recognized post-graduate teacher.
	5	To pass the examination a candidate must obtain a minimum CGPA of 6.25 (CGPA to the scale of 10).
	6	Candidate who secures CGPA $\geq$ 6.25 and CGPA < 6.75 declared to have passed examination in second class.
	7	Candidate who secures CGPA $\geq$ 6.75 and CGPA < 8.25 declared to have passed examination in first class.
	8	Candidate who secures CGPA $\geq$ 8.25 declared to have passed examination in first class with distinction.

IV	1	In case candidate fails to get D grade in one or more heads of passing examination, he will be allowed at his option, to reappear for only those heads of passing in which he has failed or got less than D grade at subsequent examinations.
	2	The grades obtained by the candidate in any head of passing at the examination will be carried forward unless the candidates reappear for the head of passing in accordance with ref. IV (1)
	3	In case the candidate passes in all heads of passing under M.E. Semester-I, M.E. Semester-II examination and obtained a minimum CGPA of 6.25 in M.E. Semester-I, M.E. Semester-II taken together as required under ref. II(2) above, he will not be allowed to reappear for any head of passing under M.E. Semester-I, M.E. Semester-II in accordance with ref. IV(1)
	4	A candidate will not be allowed to appear for M.E. Semester-III examination unless he passes in all heads of passing under M.E. Semester-I, M.E. Semester-II examination and obtains a minimum CGPA of 6.25 in M.E. Semester-I, M.E. Semester-II taken together under reference II(2).
	5	Whenever a candidate reappears for M.E. Semester-III and M.E. Semester-IV examinations he will have to resubmit the dissertation with suitable modification and must also reappear for oral examination on it.
	6	A candidate registered for M.E. Examination must clear his examination within five years from the date of registration.
V	**Attendance Requirement**	
	1	Each semester of the course shall be treated as a separate unit for calculation of the attendance
	2	A candidate shall be considered to have satisfied the attendance requirement if he/she has attended not less 75% of the class in each subject of all the semesters (Theory, Laboratory, Semester Practical training and Dissertation work) actually conducted up to the end of the semester.
	3	A Candidate, who does not satisfy the attendance required, mentioned as above, shall not be eligible to appear for the Examination of that semester and shall be required to repeat that semester along with regular students later.
	4	The Principal of the concerned College shall display regularly, the list of such candidates who fall short of attendance, on the Notice Boards.

	5	The list of the candidates falling short of attendance shall be sent to the University at least one week prior to the commencement of theory/practical examination, whichever is earlier.
VI		The following are the syllabi in the various subjects of the examination for the Degree of Master of Engineering.

FACULTY OF ENGINEERING AND TECHNOLOGY

Proposed Revised Structure of M.E. (Environmental Engg)

SEMESTER - I		CONTACT HRS.PER /WEEK				EXAMINATION SCHEME						
SUB Code.	SUBJECT	L	T	P	TOTAL	TH.	CT	TW.	P	TOTAL	Th. Exam (HRS)	CREDITS
MEV601	Computational and statistical methods in Environment Engg	3	1	-	4	80	20	-	-	100	3	4
MEV602	Environmental chemistry And Microbiology	3	1	-	4	80	20	-	-	100	3	4
MEV603	Advance water treatment technology	3	1	-	4	80	20	-	-	100	3	4
MEV604	Environmental management	3	1	-	4	80	20	-	-	100	3	4
MEV641	Elective-I	3	1	-	4	80	20	-	-	100	3	4
MEV621	Laboratory-1	-		4	4	-	-	50	-	50	-	1
MEV622	Laboratory -2	-		2	2	-	-	-	50	50	-	2
MEV623	Seminar -1	-		2	2	-	-	-	50	50	-	1
	Total	**15**	**5**	**8**	**28**	**400**	**100**	**50**	**100**	**650**	**-**	**24**

SEMESTER - II		CONTACT HRS.PER /WEEK				EXAMINATION SCHEME						
SUB Code	SUBJECT	L	T	P	TOTAL	TH.	CT	TW.	P	TOTAL	Th. Exam (HRS)	CREDITS
MEV 651	Air pollution and control	3	1	-	4	80	20	-	-	100	3	4
MEV 652	Advanced waste water treatment technology	3	1	-	4	80	20	-	-	100	3	4
MEV 653	Solid waste and Hazardous Waste Management	3	1	-	4	80	20	-	-	100	3	4
MEV 654	Environmental Geo-technology	3	1	-	4	80	20	-	-	100	3	4
MEV 691	Elective-II	3	1	-	4	80	20	-	-	100	3	4
MEV 671	Laboratory-III	-	-	2	2	-	-	50	-	50	-	1
MWE672	Laboratory -IV	-	-	4	4	-	-	-	50	50	-	2
MWE673	Seminar -II	-	-	2	2	-	-	-	50	50	-	1
	Total	**15**	**5**	**8**	**28**	**400**	**100**	**50**	**100**	**650**	**-**	**24**

FACULTY OF ENGINEERING AND TECHNOLOGY
Proposed Revised Structure of M.E. Second Year (ENVIORNMENTAL.ENGG)

SEMESTER - III		CONTACT HRS.PER /WEEK				EXAMINATION SCHEME						
SUB Code.	SUBJECT	L	T	C H	TOTAL	TH.	CT	TW.	P	TOTAL	Th. Exam (HRS)	CREDITS
MEV731	Dissertation– I	-	-	12	12	-	-	50	50	100	-	12
	Total	**0**	**0**	**12**	**12**	**0**	**0**	**50**	**50**	**100**	**-**	**12**

SEMESTER - IV		CONTACT HRS.PER /WEEK				EXAMINATION SCHEME						
SUB Code.	SUBJECT	TH	T	C H	TOTAL	TH.	CT	TW.	P	TOTAL	Th. Exam (HRS)	CREDITS
MEV781	Dissertation– II	-	-	20	20	-	-	100	200	300	-	20
	Total	**0**	**0**	**20**	**20**	**0**	**0**	**100**	**200**	**300**		**20**
	Total of Semester I to IV									**1700**		**80**

L. = Theory, P = Practical, CH= Contact Hours , CT = Class Test, TW = Term Work

Term Work of Dissertation part – II of Semester IV should be assessed jointly by the pair of internal and external examiner during oral examination.

Elective –I is to be chosen from the following:

1) Industrial wastewater treatment
2) Operation and maintenance of environmental facilities
3) Water resources engineering and applied hydraulics

Elective –II is to be chosen from the following:

1) Occupational safety and health
2) Non – point sources of pollution and management
3) Remote sensing and GIS in environmental engineering

MEV601: Computational and statistical methods in environmental Engg.

Teaching Scheme:

Lectures: 3 Hours/Week

Tutorial: 1 Hours

Credit: - 4

Examination Scheme:

Theory Paper: 80 Marks

Test: 20 Marks

UNIT-I

Linear system – Finite Difference, Gaussian elimination and Gauss, Jordan methods, matrix inversion, Gauss seidel method – Nonlinear equations – Regula falsi and Newton- Raphson methods, interpolation – Newton's and Lagrange's interpolation

UNIT-II

Linear Programming, Graphical and Simplex methods, Measures of central tendency, dispersion,

UNIT-III

Moments, Skewness and Kurtosis, Probability, conditional probability, Bayes' theorem

UNIT-IV

Random variable – two dimensional random variables – standard probability distributions Binomial

Poisson and normal distributions - moment generating function

UNIT-V

Sampling distributions – confidence interval estimation of population parameters – testing of hypotheses – Large sample tests for mean and proportion – t-test, F-test and Chi-square test – curve fitting-method of least squares

UNIT-VI

Regression and correlation – rank correlation – multiple and partial correlation – analysis of variance-one way and two way classifications – experimental design – Latin square design, Time series analysis.

Recommended Books:

1. Bowker and Liberman, Engineering Statistics, Prentice-Hall, 1972.

2. Venkatraman, M.K., Numerical Methods in Science and Engineering, National Publisher Company.

3. Numerical Methods by Krishna Raju

4. Shanthakumar M.S. Numerical Methods & Analysis

5. Berthouex, P.U., "Statistics for Environmental Engineers ", Lewis Publ., 1994

6. Freund, J.E. and Miller, I.R., "Probability and Statistics for Engineers ", Prentice Hall India, 5th Edition, New Delhi, 1994.

7. Gupta, S.C. and Kapur, V.K., "Fundamentals of Mathematical Statistics ", Sultan Chand & Sons, New Delhi, 1999.

8. Ang, A.H.S. and Tang W.H., "Probability concepts in Engineering Planning and Design – Basic Principles Vol.1 ", John Wiley and Sons, Inc. New Delhi, 1975.

9. Taha, H.A., " Operations Research: An Introduction ", Prentice – Hal of India, 6th Edition, New Delhi, 1997.

10. Wayne, R. Ott Environmental Statistics and Data Analysis, CRC Press. (1995)

11. Spiegel M. R., and Stephens L.J. Schaum's outline of theory and problems of Statistics. McGraw Hill, Singapore, 1999.

MEV6O2: ENVIRONMENTAL CHEMISTRY AND MICROBIOLOGY

Teaching Scheme	**Examination Scheme**
Lectures: 3 Hours/Week	Theory Paper: 80
Term Work: 25	Test: 20 Marks
Tutorial: 1 Hours/Weeks	Credit: - 4

UNIT I: ENVIRONMENTAL CHEMISTRY

Concept and scope of environmental chemistry, introduction definition of important term: pollutant, contaminant, receptor, sink, aerosols, particulates, carcinogens, chemistry of decaying compounds Significance of Environmental Chemistry in Environmental Engineering, Units of Measurement.

UNIT II: PRINCIPLES OF OPTICAL METHODS

Absorption, Spectrophotometry, Flame photometry, Fluorometry Principles of Chromatographic Methods such as Gas chromatography, High Performance Liquid Chromatography and Ion chromatography

UNIT III:GLOBAL ISSUES

Ozone depletion: Causes and effects , Global warming: Major green house gases, causes and effects ,Acid rain: Causes and effects

UNIT IV:MICROBIOLOGY OF DRINKING WATER

Bacteriological examination of domestic water ,Distribution of microorganisms, indicator organisms, coliforms - fecal coliforms - E.coli, Streptococcus fecalis and Clostridium welchii, differentiation of coliforms - significance - MPN index, M.F. technique, standards.Virus- concentration techniques. Algae in water supplies - problems and control.

UNIT V:INDUSTRIAL MICROBIOLOGY

General types of industrial processes, Microbial deterioration, Biodeterioration of buildings and industrial infrastructures

UNIT VI:HUMAN DISEASES

Tuberculosis, typhoid fever, Cholera, Influenza, AIDS, Chikungunya, Swine flu, Malaria

Recommended Books:

1. C.N. Sawyer, P.L. McCarty and G.F. Parkin, Chemistry for Environmental Engineering and Science, Tata McGraw-Hill, Fifth edition, New Delhi, 2003.
2. G.W. Vanloon and S.J. Duffy 'Environmental chemistry – a global perspective, Oxford University press, New York., 2000.
3. Tortora. G.J, B.R. Furke, and C.L. Case, "Microbiology-An Introduction" (4th Ed.),Benjamin/Cummings Publ. Co., Inc., California, 1992.
4. Pelczar, M.J.,Chan E.C.S. and Krieg, N.R.Microbiology,Tata McGraw Hill, New Delhi,1993

5. Benefield L.D., Judkins J.F. and Weaned R.L., Process Chemistry for Water and Wastewater Treatment, Prentice Hall, Inc. London, 1987.

6. R.E. McKinney, "Microbiology for Sanitary Engineers", McGraw Hill Book Company, 1962.

7. W.G. Walter and R.H. McBee, "General Microbiology", East West Edition, 1969.

8 .Environmental Chemistry : Dr. B.K.Sharma and Dr. H. Kaur

9. Chemistry for Environmental Engineers :Swayer and Mc. Carty

10. Environmental Chemistry :A.K.Dey

11. Air Pollution :M.N.Rao and H.V.N.Rao

MEV603: Advance Water Treatment Technology

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme :
Theory Paper: 80 Marks
Test: 20 Marks

UNIT I : WATER QUALITY

Physical, chemical and biological parameters of water- Water Quality requirement - Potable water standards - Wastewater Effluent standards -Water quality indices. Water purification in natural systems

UNIT II: PHYSICAL UNIT OPERATIONS

Factors in selection of unit operations and processes - Principal type of Reactors - Flow measurement – Screening - Flow Equalisation - Mixing - Static and Mechanical mixers - Coagulation and Flocculation - Perikinetic and Orthokinetic flocculation

UNIT III: SEDIMENTATION AND FLOATATION

Sedimentation - Type of settling - Removal ratio - Tray and Titled plate settlers - Flotation - Dissolved air flotation

UNIT IV: FILTRATION AND GAS TRANSFER

Filtration - Type of filters - Headloss through filters - Carmen-Kozeny equation - Gas Transfer - Two film Theory - Mass transfer coefficient - Oxygenation. Capacity.

UNIT V: CHEMICAL UNIT PROCESS

Chemical precipitation - phosphate removal - Adsorption - Activated carbon - Isotherms - Disinfection – Factors Influencing - Breakpoint chlorination – Dechlorination

UNIT VI: BIOLOGICAL UNIT PROCESSES

Kinetic of Biological growth - Suspended and attached growth processes - Aerobic and Anaerobic - Determination of kinetic coefficients.

Recommended Books:

1. METCALF & EDDY, INC. " Wastewater Engineering - Treatment, Disposal, and Reuse ",Third Edition, Tata McGraw-Hill Publishing CompanyLimited, New Delhi 1995.

2. CASEY. T.J. " Unit Treatment Processes in Water and Wastewater Engineering ", John Wiley & Sons England 1993.

MEV6O4: ENVIRONMENTAL MANAGEMENT

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNITI:GENERAL

Global and Indian scenario. National environmental policy.

UNIT II: SUNTAINABLE DEVELOPMENT. Environmental organization for planning and implementation.

UNIT III: LIFE CYCLE ASSESSMENT AND ENVIRONMENTAL MANAGEMENT SYSTEMS

Elements of LCA - Life Cycle Costing - Eco Labelling - Design for the Environment – International Environmental Standards - ISO 14001 - Environmental audit. Environmental organization for planning and implementation.

UNIT IV:ENVIRONMENTAL IMPACT ASSESSMENT

Developmental Activity and Ecological factors.EIA, EIS, FONSI, Need for EIA studies, Baseline information, step-by-step procedure for conducting EIA, limitation of EIA.

UNIT V:FRAMEWORK OF IMPACT ASSESSMENT

Development project in environmental setting.Objectives and scope of EIA. Contents of EIA, methodolies,Techniques of EISA.Assessment and prediction of impacts on Attributes air,water,noise,land,ecology soil, cultural and socio-economic environment, IAA guidelines for development projects, Public participation in environmental decision making. Practical considerations in preparing Environmental Impact Assessment and statements.

UNIT VI:SALIENT FEATURES OF THE PROJECT ACTIVITY

Environmental parameters-Activity relationships-matrices.EIA for water resource development projects, Nuclear power plant project, mining project (coal, aluminum, iron ore, bauxite), Thermal power plant (coal based) project, Pharmaceutical industries, etc. Evolution of EIA-Concept- Methodologies screening-Scoping-Baseline

Recommended Books:

1. Canter R.L., Environmental Impact Assessment, McGraw Hill International Edition, 1997.
2. John G. Rau and David C. Wooten (Ed), Environmental Impact Analysis Handbook, McGraw Hill Book Company.
3. Cutter, S.L., Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
4. Kolluru Rao, Bartell Steven, Pitblado R and Stricoff, Risk Assessment and Management Handbook, McGraw Hill Inc., New York, 1996.
5. Kofi Asante Duah, Risk Assessment in Environmental management, John Wiley and sons, Singapore, 1998.
6. Kasperson, J.X. and Kasperson, R.E. and Kasperson,R.E., Global Environmental Risks, V.N.University Press, New York, 2003.
7. Risks and Decisions for Conservation and environmental management, Mark Burman, Cambridge

University Press.

8. Susan L Cutter, Environmental Risks and Hazards, Prentice Hall of India, New Delhi, 1999.

9. Joseph F Louvar and B Diane Louver, Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey, 1997.

MEV641. (Elective-I). INDUSTRIAL WASTE WATER TREATMENT

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNIT I: Sources of Pollution

Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters –Effects of industrial effluents on sewers and treatment plants.

UNIT II: Pre and Primary Treatment

Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT III: Waste Water Treatment Methods

Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste.

UNIT IV: Manufacturing process and sources of effluent from the process of industries Fertilizer, petroleum, petro -chemical, paper, sugar, distillery, textile, tannery food processing, dairy and steel manufacturing.

UNIT V: Characteristics and composition of effluent and different methods of treatment & disposal of effluent

Steel, Petroleum Refineries, Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries.

UNIT VI: Common Effluent Treatment Plants (CETPs)

Location, Need, Design, Operation & Maintenance Problems and Economical aspects.

Recommended Books:

1. W. Wesley Eckenfelder Jr., Industrial Waste Water Pollution Control.
2. Arceivala, S.J., Wastewater Treatment for Pollution Control, McGraw-Hill, 1998.
3. Frank Woodard, Industrial waste treatment Handbook, Butterworth Heinemann, New Delhi
4. M.N.Rao & Datta, Waste water treatment.
5. N.L. Nemerow, Liquid waste of Industry, Addison Wesely. 1996
6. Callegly, Forster and Stafferd, Treatment of Industrial Effluent, Hodder and Stonghton. 1988
7. Hardam S. Azad, (ED), Industrial Wastewater Management Hand Book 1988.
8. Indian standards: IS: 2490 (1963), IS: 3306 (1065).

MEV642 .(Elective-I). OPERATION AND MAINTENANCE OF ENVIRONMENTAL FACILITIES

Teaching Scheme:	**Examination Scheme:**
Lectures: 3 Hours/Week	Theory Paper: 80 Marks
Tutorial: 1 Hours/Weeks	Test: 20 Marks
Credit: - 4	

UNIT-I

Importance of Operation & Maintenance: Basic Principles, Objectives, Requirements, Corrective and Preventive Maintenance.

UNIT-II

Data Base of Facilities for O&M – Detailed Plans, Drawings, Operation Manuals, Record keeping, standard operating procedure

UNIT-III

Computer Applications in O&M – MIS and SCADA systems

UNIT-IV

Operation & Maintenance Planning - Organisational Structure, Work Planning, Preparation and Scheduling, Cost Estimates.

UNIT-V

O&M of Water Supply Facilities: Operational Problems and Corrective Measures in Different Units of Treatment. Use of Network Models – CPM and PERT.

O&M of Wastewater Facilities: Operational Problems and Corrective Measures in Different Units of Treatment.

O&M of Air Pollution Control Facilities: Operational Problems and Corrective Measures in Different Units of Treatment.

UNIT-VI

Risk and Vulnerability Assessment – Water and Wastewater treatment systems

REFERENCES:

1. Metcalf and Eddy Inc., (2003), **"Wastewater Engineering- Treatment and Reuse"**, 4th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

2. Hammer M.J., and Hammer Jr. M.J., (2008), **"Water and Wastewater Technology"**- Prentice Hall of India Pvt. Ltd., New Delhi.

3. CPHEEO Manual., (1991) **"Water Supply & Treatment"**, GOI Publication.

4. CPHEEO Manual., (1995) on **Sewerage & Sewerage Treatment,** GOI Publication,.

5. National Safety Council and Associate (Data) Publishers Pvt. Ltd., (1991), **"Industrial Safety and Pollution Control Handbook"**

MEV643 .(Elective-I). WATER RESOURCES ENGINEERING AND APPLIED HYDRAULICS

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNIT-I

Introduction

Water resources of the world, India and Maharastra, National Water Policy.

UNIT-II

Hydrology - Hydrologic cycle, estimation of missing precipitation and rain guage density.

Hydrograph theory - Unit hydrograph – derivation, flow routing, low flow analysis.

UNIT-III

Urban Hydrology - Run-off estimation – Design of Stormwater Drains.

Basics and applications of Remote Sensing in water resources management.

UNIT-IV

Unsteady Flow through Conduits - Water hammer analysis, Water hammer protection methods - surge tanks.

UNIT-V

Flow Measurements – Area –Velocity method, Weir method, flumes, end-depth method & chemical and radioactive tracers method

UNIT-IV

Groundwater - Basic equations of flow, confined and unconfined aquifers, sea water intrusion, artificial recharge, groundwater pollution, borewells - types & design principles, open wells – types, yield tests.

REFERENCES:

1. Raghunath H.M.(1988), **"Advanced Hydrology"**, Wiley Eastern Ltd New Delhi
2. Subramanya K.S(1994)., **"Advanced Hydrology".Tata Mc Graw Hill, New Delhi**
3. David Keith Todd(1980), **"Ground Water Hydrology"**.2nd Edition John Wiley & Sons New Delhi
4. Sabins F.F(1997)., **"Remote Sensing – Principles and Interpretations"**, W.H. Freeman & Co.
5. Anji Reddy, (2001), **"Remote Sensing and GIS"**, B.S. Publications, Hyderabad.
6. Ven T. Chow (1988), **"Hand Book of Applied Hydrology"**, 1st Edition Mc Graw Hill Publications
7. Hammer M.J, and Mackichan K.A.(1981), **"Hydrology and Quality of Water Resources"**, Newyork:Wiley.
8. John Permankian, **"Water Hammer Analysis"**.
9. Linsley, Franzini, Freyberg, Tchobanoglous G.(1992), **"Water Resources Engineering"**, TATA McGraw Hill Series.
10. Linsley, Kohler and Paulhes(1975), **"Hydrology for Engineers"**, McGraw Hill.
11. Mays L.W. (2004), **"Water Resources Engineering"**, John Wiley and Sons Publications.

MEV621: LABORATORY-I

Teaching Scheme:
Practical: 02 Hours / Week
Credit: - 1

Exam Scheme:
Term work: 50 Marks

- Microscopic Examination of Microorganisms-study experiment
- Determine the Examination of Microorganisms with the help of pour plate metal
- Determine the Examination of Microorganisms with help of E-Coli test

MEV621: LABORATORY -II

Teaching Scheme:
Practical: 02 Hours / Week
Credit: - 2

Exam Scheme:
Practical Exam: 50 Marks

- Determine the residual chlorine present in the drinking water
- Determine the hardness of portable water
- Determine the solids in water using gravimetric analysis
- Determine the alkalinity of portable water
- Determination of phosphate by spectrophotometer

MEV622: SEMINAR –I

Teaching Scheme:
Practical: 02 Hours / Week
Credit: - 1

Exam Scheme:
Practical Exam: 50 marks

Each candidate is required to give one seminar on any chosen topic connected with the field of specialization. The topic shall be chosen in Consultation with the concerned Faculty and Head of the Department. Preparation and presentation of a seminar is intended to investigate an In depth review of literature; to prepare a critical review and to develop Confidence for making a good presentation. A report has to be submitted in the prescribed format and the seminar shall be evaluated by the respective department committee.

Seminar shall be a term work submitted in the form of technical report of research, analysis and design on any current topic in the concerned or allied field. It is expected that the students should refer the journals, and proceedings of National and International seminar / conference. Student should follow standard practice of seminar report writing (International journals). The candidate will deliver a talk on the topic and the assessment will be made on the basis of term work and the talk thereon by internal examiner appointed by the Principal of the Institution. Seminar topics from text and reference books will not be accepted.

MEV651: AIR POLLUTION CONTROL TECHNOLOGY

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
T heory Paper: 80 Marks
Test: 20 Marks

UNIT- 1.INTRODUCTION

Air pollutants – Sources and classification of pollutants and their effect on vegetation and property- Effects - Reactions of pollutants and their effects Smoke, smog and ozone layer disturbance - Greenhouse effect – Ambient and stack sampling Air quality standards -

UNIT- II.CONTROL OF PARTICULATES

Settling chambers, cyclone separation, Wet collectors, fabric filters Electrostatic precipitators and other removal methods like absorption and adsorption

UNIT-III. METEOROLOGY

The Measurements of a meteorological variable. Meteorology and Air pollution: Atmospheric stability and inversions- turbulence,-plume behavior - plume rise estimation

UNIT-IV. MODELING OF DISPERSION OF AIR POLLUTANTS

Dispersion of Air pollutants. Theories on modeling of Air pollutants. Gaussian model etc. Effective stack height and mixing depths.

UNIT-V.AUTOMOBILE POLLUTION

Sources of pollution, composition of auto exhausts, Control methods.

UNIT VI. NOISE CONTROL

Noise Standards; measurement, control and preventive measures

Recommended Books:

- H. C. Perkins, Air Pollution.
- Peavy and Rowe, Environmental Engineering, Mc-Graw Hill Publication.
- N.D. Nevers, Air Pollution Control Engineering, Mc-Graw Hill Publication.
- M. N. Rao et al. Air Pollution, Tata Mc-Graw Hill Publication.
- Noel de Nevers, Air Pollution control Engineering, Mc-Graw Hill Publication,New York.
- Richard W. Boubel et al., Fundamentals of Air Pollution, Academic Press, NewYork.
- KVSG Murali Krishna. Air pollution and control, Kaushal and Company Jagannaickpur, Kakinada-2.
- Davis. Environmental Engineering, Mc-Graw Hill Publication.

MEV652. Advance Waste Water Treatment Technology

Teaching Scheme:

Lectures: 3 Hours/Week

Tutorial: 1 Hours/Weeks

Credit: - 4

Examination Scheme:

Theory Paper: 80 Marks

Test: 20 Marks

UNIT-I Waste Water Characteristics:

Physical, Chemical, Biological characteristics of waste water, sampling, flow measurement.

UNIT-II Physical and Chemical Treatment of Waste Water: Screening, Grit removal, Flow equalization, Chemical precipitation, other solids removal operations. Disinfection with Chlorine compound, Aeration, Control of odour, Control of volatile organic compounds

**UNIT-III Aerobic Treatment of Waste Water: **

Design and construction aspects and the relevant parameters of significance of the following units. Activated Sludge Process, Trickling Filters,Aerated Lagoons, Rotating Biological Contactors, Sequential Batch Reactors (SBR) and Stabilization pond.

UNIT-IV Anaerobic Treatment of Waste Water:

Sludge digestion theory and principles, Septic tank design and Effluent disposal. Disposal of digested sludge, Anaerobic ponds, UASB reactors and various modifications in UASB process and anaerobic filters.

UNIT-V Construction Operations and Maintenance Aspects: Construction and Operational Maintenance problems – Trouble shooting – Planning, Organising and Controlling of plant operations – capacity building, Case studies – sewage treatment plants – sludge management facilities.

UNIT-VI Conventional and sewage treatment plants :

Industrial water treatment plants – Sludge management facilities – Wastewater reclamation plants

Reference Books:

1. Metcalf and Eddy, Wastewater Engineering, Treatment and Reuse, Tata McGrawHill Publication, New Delhi, 2003.

2. Arceivala S. J. Wastewater Treatment for Pollution Control, TMH, New Delhi, Second Edition, 2000.

3. Manual on "Sewerage and Sewage Treatment" CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.

4. Qasim S. R. Wastewater Treatment Plant, Planning, Design & Operation, Technomic Publications, New York, 1994.

MEV653. Solid waste and Hazardous Waste Management

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNIT-I. Introduction:

Definition of solid waste - waste generation in a technological society -major legislation, monitoring responsibilities, sources and types of solid waste - sampling and characterization - Determination of composition of MSW- storage and handling of solid waste

UNIT-II. Waste processing:

Collection of Solid Waste: type of waste collection systems, analysis of collection system - alternative techniques for collection system. Separation and Processing and Transformation of Solid Waste: unit operations used for separation and processing, Materials Recovery facilities, Waste transformation through combustion and anaerobic composting, anaerobic methods for materials recovery and treatment - Energy recovery - Incinerators.

UNIT-III. COLLECTION AND TRANSPORT OF SOLID WASTE:

Transfer and Transport: need for transfer operation, transport means and methods, transfer station types and design requirements. Landfills: Site selection, design and operation, drainage and leachate collection systems - requirements and technical solutions, designated waste landfill remediation - Integrated waste management facilities.

UNIT-IV. HAZARDOUS WASTE MANAGEMENT:

Definition and identification of hazardous wastes - sources and characteristics - hazardous wastes in Municipal Waste - Hazardous waste regulations -minimization of Hazardous Waste- compatibility, handling and storage of hazardous waste - collection and transport

UNIT-V. HAZARDOUS WASTE TREATMENT AND DESIGN:

Hazardous waste treatment technologies - Design and operation of facilities for physical, chemical and thermal treatment of hazardous waste - Solidification, chemical fixation and encapsulation, incineration. Hazardous waste landfills: Site selection, design and operation- remediation of hazardous waste disposal sites.

UNIT-VI. Environmental Waste monitoring:

Elements of integrated waste management. Economy and financial aspects of waste management. Other Waste Types: Nuclear and Radio Active Wastes. TCLP tests and leachate studies

Recommended Books:

1. Hilary Theisen and Samuel A, Vigil, George Tchobanoglous, Integrated Solid Waste Management, McGraw- Hill, New York, 1993

2. CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000

3. Michael D. LaGrega, Philip L Buckingham, Jeffrey C. E vans and Environmental

4. Resources Management, Hazardous waste Management, Mc-Graw Hill International edition, New York, 2001.
5. Vesilind P.A., Worrell W and Reinhart, Solid waste Engineering, Thomson Learning Inc., Singapore, 2002.
6. Charles A. Wentz, Hazardous Waste Management, Second Edition, Pub: McGraw Hill International Edition, New York, 1995..
7. George Techobanoglous et al, "Integrated Solid Waste Management ", McGraw- Hill Publication, 1993.
8. Charles A. Wentz; "Hazardous Waste Management ", McGraw-Hill Publication, 1995.

EV654. Environmental Geotechnology

Teaching Scheme:

Lectures: 3 Hours/Week

Tutorial: 1 Hours/Weeks

Credit: - 4

Examination Scheme:

Theory Paper: 80 Marks

Test: 20 Marks

UNIT-I. INTRODUCTION:

Introduction to Environmental Geotechniques Environmental cycles and their interaction-Soil water environment interaction relating to geotechnical problems-Effect of pollution on soil water behaviourSources,production and classification of wastes-Environmental regulations in India-Case studies of foundation failures by ground contamination

UNIT-II. SITE SELECTION AND METHOD OF DISPOSALS: Criteria for selection of sites for waste disposal facilities-parameters controlling the selection of wastes disposal sites-current practices for waste disposal, subsurface disposal techniques-Passive contaminant systems-Leachate contamination-applications of geomembrane and other techniques in solid and liquid waste disposal-rigid or flexible membrane liners.

UNIT-III. HYDROLOGY OF CONTAMINANTS:

Transport phenomena in saturated and partially saturated porous media-contaminant migration and contaminant hydrology-Hydrological design for ground water pollution control-Ground water pollution downstream for landfills Bearing capacity of compacted fills-foundation for waste fill ground-pollution of aquifers by mining and liquid wastes-protection of aquifers

UNIT-IV. HAZARDOUS WASTE DISPOSAL:

Hazardous waste control and storage system-Stabilization/Solidification of wastes-Processes and Functions-Monitoring and performance of contaminant facilities-Environmentally safe disposal of solid and liquid waste

UNIT-V. REMEDIAL MEASURES:

Ground modification techniques in waste fill, Remedial measures for contaminated grounds- Remediation technology-Bioremediation.

Recommended Books:

1. Wentz,C.A., " Hazardous Waste Management ", McGraw Hill, Singapore, 1989.

2. Daniel,B.E., " Geotechnical Practice for Waste disposal ", Chapman and Hall, London, 1993.

3. " Proceedings of the International symposium of Environmental Geotechnology (Vol.I and Vol.II) ", Environmental Publishing Co., 1986 and 1989.

4. Ott, W.R., " Environmental Indices ", Theory and Practice, Ann, Arbor, 1978.

5. Fried, J.J., " Ground Water Pollution ", Elsevier, 1975.

6. ASTM Special Technical Publication 874, " Hydraulic Barrier in Soil and Rock ", 1985.

7. Westlake, K., (1995), " Landfill Waste Pollution and Control ", Albion Publishing Ltd., England, 1995.

8. Lagrega, M.D., Buckingham, P.L. and Evans, J.B., " Hazardous Waste Management ", McGraw Hill, Inc., Singapore, 1994.

MEV691.(Elective-II).OCCUPATIONAL SAFETY AND HEALTH

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNIT I. Introduction,

Occupational Safety and Health Act, Occupational Safety and Health Administration, Right to know Laws.

UNIT II. Indian Acts And Accident

Labour Act, Factories Act, OSHA, Causation, investigation methods and different models.

UNIT III. Ergonomics

Need, Task Analysis, Preventing Ergonomic Hazards,Ergonomics Programme.

UNIT IV. Occupational Hazard and Control

Hazard Analysis, Human Error and Fault Tree Analysis, Emergency Response. Hazards and their control in different manufacturing and processing industries.

UNIT V. Fire Prevention and Protection

types of Fire, Fire Development and its Severity, Effect, Extinguishing Fire, Electrical Safety, Product Safety.

UNIT VI. Occupational Health And Health problems in different types of industries

Health and Safety Considerations, Personal Protective Equipment. – construction, textile, steel and food processing, pharmaceutical, occupational Health and Safety considerations in Wastewater Treatment Plants.

Recommended Books:

1. Goetsch D.L., (1999), "Occupational Safety and Health for Technologists", Engineers and

Managers", Prentice Hall.

2. Heinrich H.W.(1959), "Industrial Accident Prevention", McGraw Hill Publication , Newyork.

3. Colling D.A.(1990), "Industrial Safety Management and Technology", Prentice Hall, New Jersey.

4. Della D.E., and Giustina, (1996), "Safety and Environmental Management", Van Nostrand Reinhold

International Thomson Publishing Inc.

5. CPHEEO, (1999) Manual on Sewerage and Sewage Treatment, Ministry of Urban Development, GOI,

New Delhi.

6. National Safety Council and Associate (Data) Publishers Pvt. Ltd., (1991), "Industrial Safety and

Pollution Control Handbook"

MEV692.(Elective-II).NON – POINT SOURCES OF POLLUTION AND MANAGEMENT

Teaching Scheme:	**Examination Scheme:**
Lectures: 3 Hours/Week	Theory Paper: 80 Marks
Tutorial: 1 Hours/Weeks	Test: 20 Marks
Credit: - 4	

UNIT-I

Introduction – Non-point Pollution, Problem, definitions, magnitude of Non-point Pollution, Non-point Pollution Control Laws, Waste Assimilative Capacity and Stream Standards

UNIT-II

Pollution From the Atmosphere – Atmospheric Inputs – fall out, rainfall,

UNIT-III

Groundwater Pollution – Sources of Groundwater Contamination, Groundwater Movement.

Pollution from impervious urban areas – Introduction Deposition and Accumulation of Pollutants on Impervious Surfaces

Removal of Solids from street Surfaces, Porous Pavement.

UNIT-IV

Non point Pollution Simulation Models- Basic Concepts Brief Description available Nonpoint Pollution Simulation Models

UNIT-V

Land use and non-point pollution - Effects , Comparative Assessment of Pollution Impact from land use, agricultural runoff, mining area runoff, Effect of hydrologic Modifications

Management Practices of Non-point pollution control- Introduction, Source Control Measures Collection Control and Reduction of Delivery

UNIT-VI

Planning for Nonpoint Pullution Control – Introduction, Water Quality Planning Process, Selection of Best Management Practices for Non Point Source Pollution Control – detention ponds, exfiltration and infiltration trenches, vegetative swales.

REFERENCES:

1. Novotny V., and Chesters G., (1981), " **Hand Book of Non-point Pollution, Sources and Management",** Van Nostrand Reinhold Environmental Engineering Series, New York.

2. Pavoni J L, (Ed) (1977), "Hand Book of **Water Quality Management Planning",** Van Nostrand Reinhold, Environmental Engineering Series.New York

2. Pluarg, Pollution from Land Use Activities Reference Group Novotny V and Chesters G, (1981), "**Hand Book of Non-point Pollution, Sources and Management",** Van Nostrand Reinhold Company.

MEV693. (ELECTIVE-II).REMOTE SENSING AND GIS IN ENVIRONMENTAL ENGINEERING

Teaching Scheme:
Lectures: 3 Hours/Week
Tutorial: 1 Hours/Weeks
Credit: - 4

Examination Scheme:
Theory Paper: 80 Marks
Test: 20 Marks

UNIT-I

Remote Sensing: Definition – Ideal Remote Sensing System – Sensors and Types – Remote Sensing Satellite – IRS and INSAT specifications – Applications of remote sensing – DIP Techniques.

UNIT-II

GIS: Definition – Data and Types – Sources of data - Global Positioning System (GPS) – Data Structure – Types of Analysis – Errors – Applications of GIS.

UNIT-III

Optimal Routing of Solidwastes using GIS – Case Study.

UNIT-IV

Environmental Siting of Industries and Zoning Atlas Development.

Re-modelling of Water Distribution System using GIS – Case Study.

UNIT-V

Sustainable Urban Development Planning using GIS.

Environmental Degradation Assessment using RS and GIS.

UNIT-VI

Ground water vulnerability modeling using GIS

REFERENCES:

1. Burrough P.A., (1986), **"GIS for Land Resource Assessment"**, Oxford University Press, U.K.

2. Star J.L., and Estes J.E., (1990), **"Geographic Information Systems; An Introduction"**, Prentice Hall Publications.

3. Laurini R. and Thompson D., (1992), **"Fundamentals of Spatial Information Systems"**, Academic Press.

4. Mishra H.C., (1997), **"GIS Handbook"**, GIS India, Shanthi Nivas, Hyderabad.

5. Anji Reddy, (2001), **"Remote Sensing and GIS"**, B.S. Publications, Hyderabad.

6. Floyd F.Sabins,(1996) **"Remote Sensing – Principles and Interpretations"**, W.H. Freeman & Co.

7. Michael N. Demas, (2000), **"Fundamentals of GIS"**, John Wiley & Sons, Inc.

MEV771: LABORATORY- III

Teaching Scheme:

Practical: 02 Hours / Week

Credit: - 1

Exam Scheme:

Term work: 50 marks

ANALYSIS OF A AIR AND NOISE

- Ambient air quality Analysis: Determination of SPM, CO, NOx and SOx.
- Ambient noise quality
- Dust fall measurement by tile
- Dust fall measurement by dust sampler

MEV772: LABORATORY- IV

Teaching Scheme:

Practical: 02 Hours / Week

Credit: - 2

Exam Scheme:

Practical Exam: 50 marks

Part A: Visits of any three of the following: Dairy, Fertilizer, Distillery, Sugar, Pulp & Paper, Iron & Steel, Metal Plating, Refining, Thermal Power Plants, Water and Wastewater Treatment Plant.

Part B: Design of any 4 components of treatment units of the same industry or treatment plant visited

MEV773: SEMINAR- II

Teaching Scheme :

Practical: 02 Hours / Week
Credit: - 1

Exam Scheme :

Practical Exam: 50 marks

Topic of the seminar II shall be decided in such a way that it will enhance the knowledge of the student in a particular topic which is not covered in the syllabus. It is expected that the students should refer the journals, and proceedings of National and International seminar/conferences. Student should follow International Practice of seminar report writing (International Journals). The candidate will deliver a talk on the topic and the assessment will be made on the basis of term work and the talk thereon by internal examiner appointed by the Principal of the Institution. Seminar topics from text and reference books will not be accepted.

SEMISTER – III

MEV731: DISSERTATION PART-I

Teaching Scheme:
Practical: 12 Hours / Week

Credit :- 12

Exam Scheme :
Term work : 50 marks
Practical : 50 marks

It will be taken up by the student at the end of the second semester and the duration would be six months. This is aimed at training the students to analyze independently any problem posed to them. The work may be analytical, experimental, design or combination of these. The dissertation
report is expected to exhibit clarity of thought and expression, critical appreciation of the existing literature and analytical and/or experimental or design skill. The evaluation of dissertation will be based on continuous internal assessment comprising three seminars, one internal Viva-voce and
an external Viva-voce examination.
The dissertation shall consist of a report on any research work done by the candidate or a comprehensive and critical review of any recent development in the subject or detailed report of the project work consisting of experimentation/ numerical work, design and or development work that the candidate has executed.

- In part I dissertation it is expected that the student should decide a topic of dissertation which is useful in field or practical life. It is expected that the students should refer the journals, and proceedings of National and International seminar/conferences. Emphasis should be given to the introduction of topic, literature review, objective of the study along with some preliminary work/experimentation carried out on dissertation topic.

- Student should submit part I dissertation report (soft bound) in three copies covering the content discussed above and highlighting the features of the works to be carried out part II of the dissertation. Student should follow standard practice of dissertation writing.

- The candidate will deliver a talk on the topic and the assessment will be made on the basis of term work and the talk thereon by internal examiner appointed by the Principal of the Institution.

SEMISTER - IV

MEV 781: DISSERTATION PART - II

Teaching Scheme:
Practical: 20 Hours / Week

Credit: 20

Exam Scheme:
Term work: 100 Marks
Practical: 200 Marks

The part II of dissertation will be in continuation of part I after completion of work satisfactorily the examinee shall submit the dissertation in soft bound two copies to the head of department. The examinee shall present the pre synopsis of the dissertation work before two internal examiners out of which one will be guide. The suggestion given by these two examiners should be incorporated before submitting the final four copies of the head of the institution. The term work marks should be submitted to the university by the internal guide, examinee should take into account the opinion of other two examiners who were present at time of pre synopsis.

Viva-voce examination shall consist of defense presented by the examinee on his/her work in the presence of other teachers and students and two examiners appointed by the university , one of whom will be the guide and second will be external examiner.