Department of Environmental Science & Engg, ISMU, Dhanbad

B.Tech (Environmental Engg)- VI Semester:: Dated 23-11-2008

Lecture plan: ESC 161 01: Municipal Wastewater Engineering [3-1-0]

Part-I : S K Gupta

Sl.No	Topics	Cr. hr
1.	Types of sewer system, hydraulic design of sewers.	6
2.	Construction and testing of sewer lines, sewer materials, joints and appurtenances.	4
3.	Sewage pumping and pumping stations, maintenance of sewerage system.	4
4.	Wastewater treatment -physical unit process, preliminary treatment design and operation of screening, communicators.	4
5.	Design and operation of grit chamber and flow equalisation basin.	4
6.	Design and operation of PST	4
7.	Chemical unit process.	4
8.	TOTAL	30

Books and References

1. *Wastewater Engineering: Treatment, disposal, Resuse* by Metcalf & Eddy Inc.4th ed. TMGHI, New Delhi, 2003.
2. *Environmental Engineering* by Peavy, H.S. Donald R.Rowe & G. Tchobanoglosus, MGH Int. Ed. New York, 1985.
3. *Wastewater treatment Plants: Planning, Design and Operation* by S.R..Qasim, Holt, Rinehart and Winston,NY,1985.
4. *Water & Wastewater Technology* by Mark J Hammer & Mark J Hammer, Jr., 3rd ed, PH Inc, New Jersey, USA, 1996.
5. *Environmental Engineering- A design approach* by AP Sincero & GA Sincero, PHI, New Delhi, 2002.
6. *Wastewater Treatment* by Rao & Datta, Oxford & IBH Pub Co Pvt Ltd., Calcutta, 1987.
7. *Wastewater Treatment* by Rao & Datta, Oxford & IBH Pub Co Pvt Ltd., Calcutta, 1987.

Gupta.
23/11/08

DEPARTMENT OF ENVIRONMENT SCIENCE AND ENGINEERING
INDIAN SCHOOL OF MINES, DHANBAD

B TECH (ENV ENGG), VI SEMESTER

WATER QUALITY AND TREATMENT PRACTICAL (ESC 162 05)

SL.NO.	LIST OF PRACTICAL
1.	Calibration and Standardization of different pH and Conductivity meters.
2.	Calibration and Standardization of Turbidity meter. Determination of Total Suspended Solids (TSS), Total Dissolved Solids (TDS) & establishment of their relationship.
3.	Determination of Total Hardness, Calcium Hardness & Magnesium Hardness and establishment of their relationship.
4.	Determination of Chlorine Demand, Break-point Chlorination and Free Residual Chlorine.
5.	Determination of DO and Nitrate.
6.	Determination of Fluoride and Sulphate.
7.	Determination of Optimum Coagulant Dose with the help of Jar-Test apparatus.
8.	Calibration and Standardization of AAS. Preparation of Standard Solutions & determination of heavy metals through AAS.

2/12/08

(S K Gupta)
Asstt Prof

A K Pal 2/12/08

(A K Pal)
Assoc Prof

Lecture Plan

Semester : Winter (2008-2009)
Group : B. Tech (Env. Sc. & Engg.)
Subject :... Water Quality and Treatment (ESC 161 05)

Sl. No.	Topic	Expected Lecture hours
1.	Sources of water, water quality requirements, and Indian standards	2
2.	Water Demand: Design flows, design periods, and design population, Factors affecting water consumption, variations in water demand, design capacities for various water supply components	4
3.	Assessment of yield and development of the sources and intake works; Transmission of Water: Hydraulics of conduits	6
4.	Distribution of Water: Methods of distributing water, distribution system components, distribution reservoirs, capacity and pressure requirements, design of distribution systems	6
5.	Pumps and pumping stations required for water supply systems	4
6.	Mid Sem. Exam	2
	Total	**24**

Reference Books

1. Water Resource Engineering – Larry W Mays, Willey Text Books, 2000
2. Water Quality and Treatment Handbook – American Water works Association, McGraw-Hill Pub, 1999
3. Water Supply and Sewerage - Steel and McGhee, McGraw Hill Pub., latest Ed..
4. Water Treatment Plant Design – American Society of Civil Engineering, McGraw-Hill Pub, 1997
5. Manual of Water Supply and Treatment (3rd ed) – Minister of Urban Development, New Delhi, 1991.
6. Environmental Engineering (Volume II) – Water Supply Engineering – S.K. Garg, Khanna Publisher, New Delhi
7. Water and Wastewater Technology (3rd ed.) – Mark J. Hammer and Mark J. Hammer, Jr. By Prentice-Hall, Inc., New Jersey, 1996
8. Unit Processes in Drinking Water Treatment, Willy J. Masschelein, Marcel Dekker, Inc., New York, 1992.
9. Environmental Engineering, Howard S. Peavy, Donald R. Rowe, George Tchnobanoglous, McGRAW-Hill International Editions, New Delhi, 1985.

8/12/08

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AP, ESE

Lecture Plan

Semester : Winter (2008-2009)

Group : B. Tech (Env. Sc. & Engg.), VI Sem.

Subject : **Fluid Mechanics and Hydraulics (ESC 141 02)**

Sl. No.	Topic	Expected Lecture hours
1.	Properties of fluids: Viscosity; unit, Newton's law of viscosity, Viscosity variation with temperatures, Measurement of viscosity.	2
2.	Pressure and its measurement: absolute, gauge, atmospheric and vacuum pressure; Manometers and mechanical gauges.	4
3.	Hydrostatic force and surfaces: total pressure and center of pressure for plane, inclined and curved submerged surfaces; pressure on lock gates.	4
4.	Kinematics: types of fluid flow, rate of flow, continuity equation in three dimension, velocity potential and stream function.	6
5.	Dynamics: Equation of motion, Euler's and Bernoulli's equation and their practical applications, Venturimeter, Orifice meter, Pitot tube, Momentum equation and Moment of momentum.	6
6.	Flow through orifices: Introduction, classification of orifices, concept of C_c, C_v, and C_d.	4
7.	Flow through notches: Introduction, classification of notches – rectangular, triangular, trapezoidal and stepped notches.	4
8.	Flow through pipes: loss of energy in friction, Darcy's and Chezy's equation, minor losses; Hydraulic gradient and total energy line, Pipes in series and parallel, Equivalent pipe, Power transmission through pipes and nozzles	6
9.	Viscous flow: flow through pipes, flow between two parallel plates, kinetic energy and momentum correction factor.	4
10.	Impacts of jets: force exerted by a jet on stationary, hinged and moving plates, jet propulsion.	4
11.	Mid Sem. Exam	2
	Total	**46**

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AP, ESE