

Course title: Water supply and sanitation						
Course code WSW 184	No. of credits 3	L-T-P distribution: 42-0-0	Learning hours: 42			
Pre-requisite of the course (if any): Passed any course that discusses water quality parameters						
Department: Department of Regional Water Studies						
Course coordinator(s): Prof Arun Kansal		Course instructor(s): Prof Arun Kansal				
Contact details: The course will enable a student to serve in water consultancy organizations.						
Course type: Compulsory Core		Course offered in: Semester 2				
Course description The course explains the impact of various water quality parameters on human health and ecosystem. Treatment choices and working of technologies for various water quality parameters are discussed. These ranges from low cost to advance options.						
Course objectives Student should be able to make technology choice to deal with water quality issues, operate and maintain working treatment systems and do troubleshooting of the problems in these systems. The student will be able to apply the knowledge gained from the subject in EIA studies for water component and water pollution control strategies.						
Course content						
Module	Topics			L	T	P
1	Introduction: Water quality parameters and their environmental and health significance. Behavior of pollutant in rivers and lakes. Waste related standards and philosophy of MINAS. Status of water supply and sanitation sector in India			7	0	0
2	Water supply systems: Water infrastructure projects; components of water distribution and sewerage systems; considerations in design of urban and rural water supply and sewerage systems including design norms and demand forecasting; introduction to drinking water treatment and sewage treatment flow-sheet			7	0	0
3	Water treatment: Methods for removal of dissolved gases, taste and odour, turbidity, fluoride, salinity, hardness, iron and manganese, and pathogens. Design principles of flash mixer, sedimentation, clari-flocculator, sand filtration units and working of adsorption, ion-exchange; electro-dialysis; and other distillation techniques			15	0	0
4	Sewage treatment: Methods for removal of floating solids, grit, settleable solids, principles of working of biological treatment systems, types of biological treatment processes; process description and design principles; removal of nitrogen and phosphorus; Sludge stabilization and dewatering systems; Low cost sewage treatment technologies; Urban waste management and sanitation challenges.			13	0	0
	Total			42	0	0
Evaluation criteria						
2 minor tests		20% each				
Assignments		10%				
End-term exam		50%				
Learning outcomes						
1. Understand water quality concepts and their effect on treatment process selection						
2. Appreciate the importance and methods of operation and maintenance of water supply systems;						
3. Communicate effectively in oral and written presentations to technical and non-technical audiences.						
Pedagogical approach						
Classroom teaching will involve black board, power point presentations, and case study analysis. The sessions will be interactive and use of scientific calculators in class is essential.						
Materials						
1. CPHEEO 1999. Manual on water Supply and treatment. 3 rd Edition						
2. Metcalf & Eddy (2003) Wastewater engineering: treatment and reuse, 4th ed. New Delhi: Tata McGraw-Hill.						
3. Nathanson, Jerry A. (2009) Basic environmental technology: water supply, waste management and pollution control, 4th ed. New Delhi: PHI Learning.						

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| <ol style="list-style-type: none">4. Qasim, Syed R., Motley, Edward M., and Zhu, Guang (2000) Water works engineering: planning, design and operation. New Jersey: Prentice Hall.5. Garg, S. K. (2007) Water supply engineering, 18th ed, Vol. I. New Delhi: Khanna Publisher.6. Garg, S.K. (2007) Sewage disposal and air pollution engineering, 20th ed, Vol. II. New Delhi: Khanna Publisher.7. Chatterjee, A. K.2010.Water supply, Waste disposal and environmental Engineering, 8th ed. New Delhi: Khanna Publisher.8. CPHEEO Manual on Sewerage and Sewage treatment, latest edition |
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Additional information (if any)
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Student responsibilities

The course require regularity in studies and reading reference material so as to participate in class discussions..

Course reviewers

1. Prof Ram Karan Singh, Department of Civil Engineering, King Khalid University, Saudi Arabia.
2. Prof Narender Kanhe, Principal, Guru Nanak Institute of Engineering and Management, Nagpur.