Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Civil Engineering

BCE505 ENVIRONMENTAL ENGINEERING

Fifth Semester, 2017-18(Odd Semester)

Course (catalog) description

The purpose of this course is tomake the students conversant with principles of water supply, treatment and distribution

Compulsory/Elective course : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45hours

Course Coordinator : Ms.B.Saritha, Assistant Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms.B.Saritha	Third year Civil	Civil Block			9.00 - 9.50 AM
Ms.L.MariaSubashini	Third year Civil	Civil Block			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : BCE406 Environmental Studies

Assumed knowledge : Basic knowledge in Environmental Science and management

Following courses : BCE055 Industrial Waste Treatment and Disposal, BCE074 Physical and Chemical Treatment of Water and Wastewater

Syllabus Contents

UNIT-I PLANNING FOR WATER SUPPLY AND SEWERAGE SYSTEMS 9

Public water supply System and Sewerage system – Design Period – Prediction of population during design period – Selection of Sources of Water supply – Conveyance of Raw Water - Treatment site – Piped Flow – Open Channel Flow – Layout of Water Treatment Plant.

UNIT-II WATER TREATMENT SYSTEMS 9

Raw water Quality – Impurities in Water – Water Quality Standards – Plain Sedimentation - Pumping to Chemical House – Coagulation – Hydraulic Jump / Flash Mixer - Clariflocculator – Rapid Sand Filtration – Iron & Manganese Removal - Post Chlorination – Clear Water Tank – Pumping to Overhead Tank.

UNIT-III WATER DISTRIBUTION SYSTEM 9

Water Distribution Layout – Service Reservoirs – Hydraulics of Flow in Pipes - Appurtenances – Construction Operation and maintenance – Leak Detection – Strom Water Network – Plumbing Work in Houses.

UNIT-IV COLLECTION AND CONVEYANCE OF DOMESTIC SEWAGE 9

Sewer Pipe Network – Sewage Treatment Site – Activated Sludge Process – Aeration Tank Design – Design of Secondary Settling Tank – Sludge Digester – Sludge Drying Beds – Re-Use of Treated Effluent – Selection of Pumps.

UNIT-V SOLID WASTE MANAGEMENT 9

Collection and Conveyance of Solid Wastes – Segregation of Solid Wastes – Sanitary Land Fill – Incineration – Recycling and Re-use Concepts – Disposal of Electronic Wastes.

TEXT BOOKS:

1. Garg S.K.Environmental Engineering, Vol.I & II, khanna Publishers, New Delhi, (1994).
2. Water Supply Engineeering, R.Pannirselvam, SPGS-Publications, Adambakkam, Chennai-600088, (2007).
3. Wastewater Engineering, SPGS-Publications, Adambakkam, Chennai-600088,(2007).
4. C.S.Shah, Water Supply Sanitation, Galgotia Publishing Company, New Delhi, (1994).

REFERENCE:

1. Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, (1999).
2. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, (1993).
3. Wastewater Engineering – Treatment and Re-Use, MetCalf & Eddy, Inc., Tata McGraw-Hill Publishing Company, New Delhi-(2003).

Computer usage: NIL

Professional component

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area: Water and Wastewater Treatment

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1st week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2nd week	Session 15 to 28	2 Periods
3	Model Test	October 2nd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

This Course is to introduce the principles of various surveying methods and applications to Civil Engineering projects.	Correlates to program outcome		
	H	**M**	**L**
1. Plan water supply system for developing area	c	d	
2. Design the various treatment plant in water supply system	c	a,d,h	
3. Treat the drinking water using advanced techniques	c	d	k
4. Design the water distribution systems	c	d	a
5. Principles of design of water supply and drainage in buildings	c	a,d	

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	**PLANNING FOR WATER SUPPLY AND SEWERAGE SYSTEMS**		
1.	Public water supply System and Sewerage system	No	[T1,T2 & R1]
2.	Design Period	Yes	
3.	Prediction of population during design period	Yes	
4.	Selection of Sources of Water supply	No	
5.	Conveyance of Raw Water	No	
6.	Treatment site	No	
7.	Piped Flow	Yes	
8.	Open Channel Flow	Yes	
9.	Layout of Water Treatment Plant	No	
UNIT II	**WATER TREATMENT SYSTEMS**		
10.	Raw water Quality – Impurities in Water	No	[T1, T2 & R1]
11.	Water Quality Standards	No	
12.	Plain Sedimentation - Pumping to Chemical House –.	Yes	
13.	Coagulation – Hydraulic Jump / Flash Mixer	Yes	
14.	Clariflocculator	Yes	
15.	Rapid Sand Filtration	Yes	
16.	Iron & Manganese Removal	No	
17.	Post Chlorination – Clear Water Tank	Yes	
18.	Pumping to Overhead Tank	No	
UNIT-III	**WATER DISTRIBUTION SYSTEM**		
19.	Water Distribution Layout	No	[T2, T4 & R1]
20.	Service Reservoirs	No	
21.	Hydraulics of Flow in Pipes	Yes	
22.	Appurtenances	No	
23.	Construction	No	
24.	Operation and maintenance	No	
25.	Leak Detection	No	
26.	Strom Water Network	Yes	
27.	Plumbing Work in Houses	No	
UNIT-IV	**COLLECTION AND CONVEYANCE OF DOMESTIC SEWAGE**		
28.	Sewer Pipe Network	No	[T1, T3 & R2]
29.	Sewage Treatment Site	No	
30.	Activated Sludge Process	No	
31.	Aeration Tank Design	No	

32.	Design of Secondary Settling Tank	Yes	
33.	Sludge Digester	No	
34.	Sludge Drying Beds	No	
35.	Re-Use of Treated Effluent	No	
36.	Selection of Pumps.	No	
UNIT-V SOLID WASTE MANAGEMENT			
37.	Collection of Solid Wastes	No	
38.	Conveyance of Solid Wastes	No	
39.	Segregation of Solid Wastes	No	
40.	Sanitary Land Fill	No	
41.	Sanitary Land Fill	No	[T1, T3 & R3]
42.	Incineration	No	
43.	Recycling Concepts	No	
44.	Re-use Concepts	No	
45.	Disposal of Electronic Wastes	No	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Attendance	-	10%
Assignmnet	-	5%
Final exam	-	70%

Prepared by: Ms.B.Saritha, Assistant Professor , Department of Civil **Dated :**

Addendum

ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:

a. An ability to apply knowledge of mathematics, science, and engineering
b. An ability to design and conduct experiments, as well as to analyze and interpret data
c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d. An ability to function on multidisciplinary teams
e. An ability to identify, formulate, and solve engineering problems
f. An understanding of professional and ethical responsibility
g. An ability to communicate effectively
h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i. A recognition of the need for, and an ability to engage in life-long learning
j. A knowledge of contemporary issues
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives

PEO1: PREPARATION

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

PEO2: CORE COMPETENCE

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

PEO3: PROFESSIONALISM

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

PEO4: SKILL

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

Course Teacher	Signature
Ms.B.Saritha	
Ms.L.MariaSubashini	

Course Coordinator **HOD/CIVIL**