Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of civil Engineering

BCE081 WATER AND SEWAGE CONVEYANCE
Eighth Semester, 2016-17 (Even Semester)

Course (catalog) description

To educate the students in detailed concepts related to water transmission mains, water distribution system, sewer networks and storm water drain, with emphasis on computer application

Compulsory/Elective course : Elective course for CE students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Ms. L.MARIA SUBASHINI

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms. L.MARIA SUBASHINI	Fourth year	Civil block			9.00 - 9.50 AM
Mr.S.Rajesh	Fourth year	Civil block			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites **:** BCE 502 Applied Hydraulic Engineering

Assumed knowledge : Basic knowledge in water transmission

Following courses :

Syllabus Contents

UNIT I PRINCIPLES OF HYDRAULICS **9hrs**

Fluid properties; fluid flow – continuity principle, energy principle and momentum principle; frictional head loss in free and pressure flow, major and minor head loss, formula for estimation of head loss – pumping of fluids – selection of pumps – Flow measurement.

UNIT II WATER TRANSMISSION AND DISTRIBUTION **9hrs**

Planning factors – Water transmission main design – pipe material – economics – water hammer analysis; water distribution pipe networks - methods for analysis and optimization - Laying and maintenance, insitu lining – appurtenances – corrosion prevention – minimization of water losses – leak detection.

UNIT III WASTEWATER COLLECTION AND CONVEYANCE **9hrs**

Planning factors – Design of sanitary sewer; partial flow in sewers, economics of sewer design; sewer appurtenances; material, construction, inspection and maintenance of sewers; Design of sewer outfallsmixing conditions; conveyance of corrosive wastewaters.

UNIT IV STORM WATER DRAINAGE **9hrs**

Planning – run-off estimation, rainfall data analysis, storm water drain design – rain water harvesting

UNIT V CASE STUDIES AND COMPUTER APPLICATIONS **9 hrs**

Computer applications for water transmission, water distribution and sewer design.

Total 45 hours

TEXT BOOK AND REFERENCES:

1. G.S.Bajwa, Practical Handbook on Public Health Engineering, Deep Publishers, Shimla, 2003.
2. "Manual on water supply and Treatment", CPHEEO, Ministry of Urban Development, Gol, New Delhi, 1999.
3. "Manual on sewerage and Sewage Treatment', CPHEEO, Ministry of Urban Development, Gol, New Delhi, 1993.
4. B.A. Hauser, Practical Hydraulics Handbook, Lewis Publishers, New York, 1991.

Computer usage: Microsoft office Excel

Professional component

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

Broad area : Water transmission main design, run-off estimation.

Test Schedule

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

Mapping of Instructional Objectives with Program Outcome

To educate the students in detailed concepts related to water transmission mains, water distribution system, sewer networks and storm water drain, with emphasis on computer application	Correlates to program outcome		
	H	**M**	**L**
1. To make them understand the fundamentals of hydraulic engineering and the various fluid flow phenomenon	a,		j
2. To understand about the methods of water transmission and distribution and the economics related to water transmission	a,f	d	k
3. To understand in detail about the waste water collection and conveyance and also the maintenance of sewers and design of sewer outfalls	h	b	
4. To improve the knowledge on the planning and estimation of storm water flow	a,f		l
5. To know about the basics of the Case Studies and Computer applications for water transmission..	d	b	

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

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	**PRINCIPLES OF HYDRAULICS**		
1.	Fluid properties; fluid flow	No	[R3]
2.	continuity principle	No	
3.	energy principle	No	
4.	momentum principle;	No	
5.	frictional head loss in free	No	
6.	pressure flow, major and minor head loss,	No	
7.	formula for estimation of head loss	No	
8.	pumping of fluids	No	
9.	selection of pumps – Flow measurement.	No	
UNIT II	**WATER TRANSMISSION AND DISTRIBUTION**		
10.	Planning factors	No	[R1]
11.	Water transmission main design	No	
12.	pipe material – economics	No	
13.	water hammer analysis;	No	
14.	water distribution pipe networks	No	
15.	methods for analysis and optimization	No	
16.	Laying and maintenance, insitu lining	No	
17.	appurtenances – corrosion prevention	No	
18.	minimization of water losses – leak detection	No	
UNIT III	**WASTEWATER COLLECTION AND CONVEYANCE**		
19.	Planning factors	No	[R1]
20.	Design of sanitary sewer; partial flow in sewers,	No	
21.	economics of sewer design	No	
22.	sewer appurtenances;	No	
23.	material, construction, inspection	No	
24.	maintenance of sewers;	No	
25.	Design of sewer outfalls	No	
26.	mixing conditions;	No	
27.	conveyance of corrosive wastewaters.	No	
UNIT IV	**STORM WATER DRAINAGE**		
28.	Planning – run-off estimation,	No	[R2]
29.	Planning – run-off estimation,	No	
30.	rainfall data analysis,	No	
31.	rainfall data analysis,	No	
32.	storm water drain design	No	
33.	storm water drain design	No	
34.	storm water drain design	No	
35.	rain water harvesting	No	
36.	rain water harvesting	No	

UNIT V	CASE STUDIES AND COMPUTER APPLICATIONS		
37.	Computer applications for water transmission	No	[R3]
38.	Computer applications for water transmission	No	
39.	Computer applications for water transmission	No	
40.	Computer applications for water transmission	No	
41.	Computer applications for water transmission	No	
42.	Water distribution and sewer design.	No	
43.	Water distribution and sewer design.	No	
44.	Water distribution and sewer design.	No	
45.	Water distribution and sewer design.	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%
assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: Mr S.Rajesh Asst Prof , Department of CE **Dated :**

Addendum

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

a) The ability to apply knowledge of mathematics, science, and engineering fundamentals.

b) The ability to identify, formulate, and solve engineering problems

c) The ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d) The ability to design and conduct experiments, as well as to analyze and interpret data

e) The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

f) The ability to apply reasoning informed by the knowledge of contemporary issues

g) The ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

h) The ability to understand professional and ethical responsibility and apply them in engineering practices

i) The ability to function on multidisciplinary teams

j) The ability to communicate effectively with the engineering community and with society at large

k) The ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.

Program Educational Objectives

PEO1: PREPARATION:
To provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the chosen field of Engineering and Technology.

PEO2: CORE COMPETENCE:
To enhance the skills and experience in defining problems in the appropriate field of Engineering and Technology, designing, implementing, analyzing the experimental evaluations, and finally making appropriate decisions.

PEO3: PROFESSIONALISM:
To enhance their skills and embrace new thrust areas through self-directed professional development and post-graduate training or education.

PEO4: SKILL:
To provide Industry based training for developing professional skills and soft skills such as proficiency in languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS:
Apply the ethical and social aspects of modern Engineering and Technology innovations to the design, development, and usage of new products, machines, gadgets, devices, etc.

Course Teacher	Signature
Ms. L.MARIA SUBASHINI	
Mr.S.Rajesh	

Course Coordinator **HOD/Civil**