Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Civil Engineering

BCE084-HYDROLOGY

Eighth Semester, 2016-17 (Even Semester)

Course (catalog) description
To impart knowledge on hydrological cycle, spatial and temporal measurement and analysis of rainfall and their applications including flood routing and ground water hydrology
Compulsory/Elective course : Elective for Civil students

Credit/ Contact hours : 3 credits / 45 hours

Course Coordinator : Ms.B.Kaviya, Assistant Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms.B.Kaviya	Final year Civil-A	Civil Block		kaviyacivil@bharathuniv.ac.in	9.00 - 9.50 AM
Mr.S.Rajesh	Final year Civil-B	Civil Block			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : BCE 304 Fluid Mechanics

Assumed knowledge : Basic knowledge in Hydrologic Cycle and Rainfall Measurements

Following courses : Ground water Hydrology

Syllabus Contents

UNIT I HYDROMETEOROLOGY 9
Hydrological cycle -Hydro meteorological factors -Cloud formation- Winds and their movement -types of precipitation.- Forms for precipitation- Density and Adequacy of rain gauges – Recording and nonrecording gauges.
UNIT II PRECIPITATION AND ABSTRACTIONS 9
Spatial distribution – Consistency analysis – Frequency analysis – Intensity, duration, frequency relationships- Evaporation – Infiltration- Norton's equation Infiltration indices – Types of streams – Stage discharge relationships – Flow measurements – Currents meter method for velocity measurements.
UNIT III HYDROGRAPH ANALYSIS 9
Factors affecting the shape of hydrograph- Components of DRH. Baseflow- Unit hydrograph -Scurve hydrograph- Synthetic unit hydrograph.
UNIT IV GROUND WATER HYDROLOGY 9
Occurrence of ground water – Types of aquifer – Dupuifs assumptions – Darcy's law – Estimation of aquifer parameters – Pump tests..
UNIT V FLOOD ANALYSIS 9
Flood estimation – Gumbel's method – log Pearson types III method – Reservoir flood routing, Channel routing, Other methods of routing.

TEXT BOOKS:

Subramanya K. Engineering Hydrology, Tata McGraw Hill. Publishing Company Limited, 2006

REFERENCE:

1. Raghunath H M, Hydrology, Witey Eastern Limited, New Delhi 1998. Vijay Singh P, Elementary Hydrology -Prentice Hall of India, 1998.
2. Mutreja K N, Applied Hydrology, Tata McGraw Hill Publications, New Delhi, 1998.
3. Jayaram Reddy P Hydrology, Tata McGraw Hill Publications, New Delhi, 1998.

Computer usage:

Professional component

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

Broad area: Flood routing| Rainfall Measurements

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

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. Measure the rainfall intensity , duration and frequency	a,c,g	e	

2. Assess the losses of precipitation due to evaporation	A,c,e		
3. Prepare the unit hydrograph for surface runoff	A,c,f	B,e	
4. Solve the flood routine and channel routine problems	A,c,d,e		
5. Conduct yield test on aquifers	A,c,e		

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

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I HYDROMETEOROLOGY			
1.	Hydrological cycle	NO	[T1, R2]
2.	Hydro meteorological factors	NO	
3.	Cloud formation	NO	
4.	Winds and their movement	NO	
5.	types of precipitation.	NO	
6.	Forms for precipitation	NO	
7.	Density and Adequacy of rain gauges	YES	
8.	Recording and nonrecording gauges.	NO	
9.	Recording and nonrecording gauges.	NO	
UNIT II PRECIPITATION AND ABSTRACTIONS			
10.	Spatial distribution	YES	[T1, R1 & R3]
11.	Consistency analysis	YES	
12.	Frequency analysis	Yes	
13.	Intensity, duration, frequency relationships	YES	
14.	Evaporation	YES	
15.	Infiltration- Norton's equation Infiltration indices –	YES	
16.	Types of stream Stage discharge relationships	NO	
17.	Flow measurements	NO	
18.	Currents meter method for velocity measurements.	NO	

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT III	**HYDROGRAPH ANALYSIS**		
19.	Factors affecting the shape of hydrograph	NO	[T1, R1,R2,R3]
20.	Components of DRH.	NO	
21.	Baseflow	YES	
22.	Unit hydrograph -S	YES	
23.	Unit hydrograph -S	YES	
24.	-Scurve hydrograph- S	YES	
25.	-Scurve hydrograph- S	YES	
26.	Synthetic unit hydrograph.	YES	
27.	Synthetic unit hydrograph.	YES	
UNIT GROUND WATER HYDROLOGY			
28.	Occurrence of ground water	NO	[T1, R1,R2,R3]
29.	Types of aquifer	NO	
30.	Dupuifs assumptions –	YES	
31.	Darcy's law	NO	
32.	Darcy's law	NO	
33.	Estimation of aquifer parameters	NO	
34.	Estimation of aquifer parameters	YES	
35.	Pump tests.	YES	
36.	Pump tests.	NO	
UNIT V FLOOD ANALYSIS			[T1, R1,R2,R3]
37.	Flood estimation	YES	
38.	Gumbel's method	YES	
39.	Gumbel's method	YES	
40.	log Pearson types III method –	YES	
41.	log Pearson types III method –	YES	
42.	– Reservoir flood routing,	YES	
43.	– Reservoir flood routing,	YES	
44.	Channel routing,	YES	
45.	Other methods of routing	YES	

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: Ms.B.Kaviya, 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.Kaviya	
Mr.S.Rajesh	

Course Coordinator **HOD/CIVIL**