

Academic Course Description

BHARATH UNIVERSITY Faculty of Engineering and Technology Department of civil Engineering BCE603- IRRIGATION ENGINEERING Sixth Semester, 2017 - 18 (even Semester)

Course (catalog) description

To expose the student to different phases in Water Resources Management and National Water Policy. Further they will be imparted required knowledge on Reservoir planning, management and economic analysis including Irrigation and Irrigation management practices

Compulsory/Elective course : Compulsory for CE students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Mr.S.Rajesh

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Mr.S.Rajesh	Third year CE			Rajeshskr06@gmail.com	9.00 - 9.50 AM
B.Kaviya	Third year CE				12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : BCE 304 Fluid Mechanics

Assumed knowledge : Basic knowledge in Water Resources Management

Following courses : BCE 502 Applied Hydraulic Engineering

Syllabus Contents

UNIT I IRRIGATION AS A SCIENCE

9hrs

Definition, Need, Benefit, Historical Development, Scope in the country and the state - Sources for irrigation, wells, springs, rivers, streams, tanks, reservoirs - Flow and Lift irrigation. Methods of flow irrigation - Devices and equipments for lift irrigation - Duty, different concepts of duty and factors affecting duty.

UNIT II CROP WATER REQUIREMENTS

9hrs

Soil – plant – water relationship – Evapo transpiration – consumptive use - Perennial, Annual and Seasonal crops - Principal irrigated, dry and wet irrigated crops - Assessment of crop water requirements - Effective rainfall - Net irrigation requirements for principal crops -Irrigational quality - Salt resistant crops - Water logging, remedial measures.

UNIT III CONVEYANCE AND DISTRIBUTION OF IRRIGATION WATER

9hrs

Head works – Diversion and storage structures -Canals unlined and lined. Canal alignments -contour ridge, Branch canals, minors, water course and notches - Control structures - drops, escapes, shutters and operating devices, division boxes - Cross drainage structures- under tunnels, aqueducts, siphons, siphon aqueducts - Cross masonry structures - road and railway bridges.

UNIT IV IRRIGATION WATER MANAGEMENT

9hrs

Need for optimization of water use - Management and productivity - Minimizing irrigation water losses - Operational rules for regulation - physical structures for management on farm development works - Participatory Irrigation Management (PIM) - Water Users Associations (WUA) - Training the water users.

UNIT V DESIGN OF IRRIGATION STRUCTURES

9 hrs

Sluices and surplus weirs in tanks - Earth dam section, homogenous and zoned. Anicuts and weirs on solid and permeable foundation - Head regulators, canal drops, canal siphons and aqueducts, under tunnels - Simple design of masonry and earth dams- Designing channels- Computer aided designs.

Total 45 hours

TEXT BOOKS:

1. Sharma R.K, "Irrigation Engineering and Hydraulic Structures", Oxford and IBII Publishing Company, New Delhi, 2002.
2. Sathyanarayanan Murthy, "Irrigation Design and Drawing", Published by Mrs.L.Banumathi, Tuni, East Godavari District. A.P. 1998.

REFERENCES:

1. Michael A.M,"Irrigation – Theory and practice", Vikas Publishing House, 2000.
2. Hand Book on irrigation system operation Practices, Water Management and training Project Technical Report No.33. CWC, 1990.
3. Hand Book for improving Irrigation System Maintenance Practices, Water Management and Training Report No.19A, CWC, Delhi, 1989.

Computer usage:

Professional component

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

Broad area : Water Resources Management | Design cross drainage works

Test Schedule

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

Mapping of Instructional Objectives with Program Outcome

To expose the student to different phases in Water Resources Management and National Water Policy. Further they will be imparted required knowledge on Reservoir planning, management and economic analysis including Irrigation and Irrigation management practices	Correlates to program outcome		
	H	M	L
1. Estimate water requirements for irrigation and drinking	d	a	
2. Estimate consumptive use of water for irrigation	d	a	
3. Perform water resources and prepare water budget	d	a	
4. Prepare irrigation scheduling and water distribution for various crops.	d,c	a	
5. Design cross drainage works	d	a	

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

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I IRRIGATION AS A SCIENCE			
1.	Definition, Need, Benefit, Historical	No	[T1] [R3]
2.	Development, Scope in the country	No	
3.	The state - Sources for irrigation	No	
4.	wells, springs, rivers, streams, tanks, reservoirs	No	
5.	Flow and Lift irrigation	No	
6.	Methods of flow irrigation	No	
7.	Devices and equipments for lift irrigation	No	
8.	Duty, different concepts of duty	No	
9.	factors affecting duty	No	
UNIT II CROP WATER REQUIREMENTS			
10.	Soil – plant – water relationship	No	[T1] [R1]
11.	Evapo transpiration, consumptive use	No	
12.	Perennial, Annual and Seasonal crops	No	
13.	Principal irrigated dry and wet irrigated crops	No	
14.	Assessment of crop water requirements	No	
15.	Effective rainfall	No	
16.	Net irrigation requirements for principal crops	No	
17.	Irrigational quality , Salt resistant crops	No	
18.	Water logging, remedial measures	No	
UNIT III CONVEYANCE AND DISTRIBUTION OF IRRIGATION WATER			
19.	Head works, Diversion and storage structures	No	[T1] [R1]
20.	Canals unlined and lined	No	
21.	Canal alignments -contour ridge, Branch canals	No	
22.	minors, water course and notches	No	
23.	Control structures - drops, escapes,	No	
24.	shutters and operating devices, division boxes	No	
25.	Cross drainage structures- under tunnels, aqueducts	No	
26.	siphons, siphon aqueducts	No	
27.	Cross masonry structures - road and railway bridges.	No	
UNIT IV IRRIGATION WATER MANAGEMENT			
28.	Need for optimization of water use	No	[T1] [R1]
29.	Management and productivity	No	
30.	Minimizing irrigation water losses	No	
31.	Operational rules for regulation	No	
32.	physical structures for management	No	
33.	on farm development works	No	
34.	Participatory Irrigation Management (PIM)	No	

35.	Water Users Associations (WUA)	No	
36.	Training the water users.	No	
UNIT V DESIGN OF IRRIGATION STRUCTURES			
37.	Sluices and surplus weirs in tanks	No	[T2] [R1]
38.	Earth dam section, and	No	
39.	homogenous and zoned	No	
40.	Anicuts	No	
41.	weirs on solid and permeable foundation	No	
42.	Head regulators, canal drops, canal siphons and	No	
43.	aqueducts, under tunnels		
44.	Simple design of masonry and earth dams-		
45.	Designing channels- Computer aided designs.	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
Mr.S.Rajesh	
Ms.B.Kaviya	

Course Coordinator

HOD/Civil