Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

HYDROLOGY AND WATER RESOURCES ENGINEERING   (GR18A3005)

III-B.Tech – I Semester

(AY 2021-22)

Dr. MOHD.HUSSAIN

Professor

Department of Civil Engineering

Gokaraju Rangaraju Institute of Engineering and Technology

Bachupally, Kukatpally, Hyderabad – 500 090.

Hydrology and Water Resources Engineering

Course File Check List

S.No	Name of the Format	Page No.
1	Syllabus	
2	Time Table	
3	Program Educational Objectives	
4	Program Objectives	
5	Course Objectives	
6	Course Outcomes	
7	Students Roll List	
8	Guide lines to study the course	
9	Course Schedule	
10	Course Plan	
11	Unit Plan	
12	Lesson Plan	
13	Tutorial Sheets	
14	Assignment Sheets	
15	Evaluation Strategy	
16	Assessment in relation to COb's and CO's	
17	Rubric for course	
18	Mappings of CO's and PO's	
19	Model question papers	
20	Mid-I and Mid-II question papers	
21	Mid-I marks	
22	Mid-II marks	
23	Sample answer scripts and Assignments	
24	Course materials like Notes, PPT's, Videos, etc,.	

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Department of Civil Engineering
HYDROLOGY AND WATER RESOURCES ENGINEERING

Course Code: GR18A3005   **L T P C**

III Year I Semester   **3 0 0 3**

Course Objectives: The objectives of this course is to make the student to
1. Describe the applications of Hydrology for Rainfall Measurement and Analysis ,Runoff measurement and analysis ,Evaporation and Evapo transpiration measurement and estimation
2. Explain the Hydrographic Analysis of Runoff
3. Explain the processes of groundwater occurrence
4. Explain the types and methods of application of irrigation water and Standards for quality and to explain the soil-water–plant relationship.
5. Explain the various methods of design of irrigation canals and design discharge over a catchment.

Course Outcomes: After completion of this course, students will be able to
1. Estimate and process rainfall data, runoff data, evaporation data, Evapo transpiration data and infiltration data
2. Design a model in a region for direct run off hydrograph, unit hydrograph, S- Curve hydrograph and synthetic unit hydrograph.
3. Calculate the discharge of radial flow to wells in a region of confined and unconfined aquifers by determining the aquifer parameters by field tests and pumping tests.
4. Design a suitable irrigation method depending on soil, water and plant conditions on the field & Prepare irrigation schedules and irrigation efficiencies for farmers on the field.
5. Design of irrigation canals and discharge by SCS Curve Number Method and analyze the regional flood frequency.

UNIT I

Introduction to engineering hydrology and its applications: Hydrologic Cycle, types and forms of precipitation, rainfall measurement, types of Rain gauges, computation of average rainfall over a basin, processing of rainfall data-adjustment of record-Rainfall Double Mass Curve. Runoff-Factors affecting Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall: Evaporation, factors effecting evaporation, Measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices'.

UNIT II

Distribution of Runoff: Hydrograph Analysis Flood Hydrograph – Effective Rainfall - Base Flow- Base Flow Separation - Direct Runoff Hydrograph– Unit Hydrograph, definition and limitations of application of Unit hydrograph, Derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa S- hydrograph, Synthetic Unit Hydrograph.

UNIT III

Ground water Occurrence: Types of aquifers, aquifer parameters,' porosity' Specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers, Types of wells, Well Construction - Well Development.

UNIT IV

Necessity and importance of irrigation: Advantages and ill-effects of irrigation, Types of irrigation, Methods of application of irrigation water, Indian Agriculture soils, Methods of improving soil fertility-Crop rotation, preparation land for irrigation, Standards of quality for irrigation water.

Soil-water-plant relationship: Vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors Affecting duty- design discharge for a water course. The depth and frequency of Irrigation, Irrigation efficiencies-Water Logging.

UNIT V

Classification of canals: Design of Irrigation canals by Kennedy's and Laceys theories, balancing depth of cutting , IS standards for canal design canal lining.

Design discharge over a catchment: completion of design discharge–rational formula ,SCS curve number method, flood frequency analysis Introductory part only. Stream gauging-measurement and estimation of stream flow.

TEXT BOOKS
1. A textbook of Hydrology by Dr.P. Jaya Rami Reddy , 3rd Edition, USP Publishers
2. Engineering Hydrology by Dr. K.Subramanya , Fourth Edition, Mc Graw Hill Education
3. Irrigation and Water Power Engineering – B.C. Punmia , Pande B.B. Lal , Ashok Kumar Jain , Arun Kumar Jain, Laxmi Publications , 16 th Edition
4. Irrigation Engineering and Hydraulic Structures – Santosh Kumar Garg

REFERENCES:
l. Elementary hydrology by V.P.Singh, PHI publications

2. Irrigation and Water- Resources &Water Power by P.N .Modi Standard Book House.

3. Irrigation Water Management by D.K. Majumdar , Printice Hall of Indra.

4. Irrigation and Hydraulic structures by S'K'Grag'

5. Applied hydrology by VenTe Chow, David R Maidment, Larry W Mays, Tata Mc. GrawHill'

6. Introduction to hydrology by Warren Viessvann' Jr   & Garyl Lewis
7. NPTEL Web and Video Courses

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

Department of Civil Engineering

TIME TABLE

COURSE: Hydrology and Water Resources Engineering

III YEAR I SEM   **w.e.f: 01-09-2021**

III B.TECH(GR18) – I SEMESTER   **AY: 2021-22.**   **SEC : A &B**

Day/Hour	9:00 - 9:55	9:55 - 10:50	10:50 - 11:45	11:45-12:25	12:45 - 1:15	1:15 - 2:05	2:05-2:55
MON					B section	B Section	
TUE							A-section
WED				LUNCH BREAK			
THU	B section					A Section	A Section
FRI			B section		A section		
SAT							

Signature of HOD   Signature of faculty

Date: Date:

Programme Educational Objectives (PEO's)

1. Graduates of the programme will be successful in technical and professional career.

2. Graduates of the programme will have proficiency in solving real time Civil Engineering projects.

3. Graduates of the programme will continue to engage in lifelong learning with ethical and social responsibility.

Program Outcomes (PO's)

Graduates of the Civil Engineering programme will be able to

a. apply knowledge of mathematics, science and fundamentals of Civil Engineering.
b. analyse problem and interpret the data.
c. design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
d. identify, formulate, analyse and interpret data to solve Civil Engineering problems.
e. use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
f. understand the impact of engineering solutions in a global, economic and societal context.
g. understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
h. understanding of professional and ethical responsibility.
i. work effectively as an individual or in a team and to function on multi-disciplinary context.
j. communicate effectively with engineering community and society.
k. demonstrate the management principles in Civil Engineering projects.
l. recognize the need for and an ability to engage in life-long learning.

Program Specific Outcomes (PSO's)

PSO1: Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.

PSO2: Create and develop innovative designs with new era materials through research and development.

Signature of HOD   Signature of faculty

Date: Date:

COURSE OBJECTIVES

Academic Year   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engg.   Year: III   Section: A & B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

On completion of this Subject/Course the student shall be able to:

S.No	Objectives
	Course Objectives: The objectives of this course is to make the student to
1.	Describe the applications of Hydrology for Rainfall Measurement and Analysis ,Runoff measurement and analysis ,Evaporation and Evapo transpiration measurement and estimation
2.	Explain the Hydrographic Analysis of Runoff
3.	Explain the processes of groundwater occurrence
4.	Explain the types and methods of application of irrigation water and Standards for quality and to explain the soil-water–plant relationship.
5.	Explain the various methods of design of irrigation canals and design discharge over a catchment.

Signature of HOD   Signature of faculty

Date: Date:

COURSE OUTCOMES

Academic **Y**ear : 2021-22

Semester : I

Name of the Program: B.Tech Civil Engg.   Year: III   Section: A & B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

On completion of this Subject/Course the student should be able to:

S.No	Outcomes
1	
2	**Course Outcomes:** After completion of this course, students will be able to 1. Estimate and process rainfall data, runoff data, evaporation data, Evapo transpiration data and infiltration data 2. Design a model in a region for direct run off hydrograph, unit hydrograph, S- Curve hydrograph and synthetic unit hydrograph. 3. Calculate the discharge of radial flow to wells in a region of confined and unconfined aquifers by determining the aquifer parameters by field tests and pumping tests. 4. Design a suitable irrigation method depending on soil, water and plant conditions on the field & Prepare irrigation schedules and irrigation efficiencies for farmers on the field. 5. Design of irrigation canals and discharge by SCS Curve Number Method and analyze the regional flood frequency.

Signature of HOD   Signature of faculty

Date: Date:

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

STUDENT ROLL LIST

B.Tech CIVIL Engg. IIIyr-I Sem- Section A (GR18) 2021-22

S.NO	Roll No	Name
1	18241A0151	SOHEB PATEL
2	18241A0152	SRIAM SHIVA ADITYA
3	19241A0101	RUHAIL AHMAD LONE
4	19241A0102	AITHA SAI TEJA
5	19241A0103	BARISETTY SHIVA KARTHIK
6	19241A0104	BENDHI VARUN THEJA GOUD
7	19241A0105	BHUKYA VAMSHI
8	19241A0106	BOGE VENKAT ROHITH
9	19241A0107	BONTHA PRANEETHKUMAR
10	19241A0108	CHILUKA RAHUL
11	19241A0109	DANDI KIRAN
12	19241A0110	DAYYA RAGNESH
13	19241A0111	E MANISH GOUD
14	19241A0112	ERRAM SAI PRIYA
15	19241A0113	G DEEPIKA
16	19241A0114	GORANTALA SAI
17	19241A0115	GUGULOTHU SANTHOSH
18	19241A0116	GURIJALA SAI KUMAR
19	19241A0117	GURUJALA SRIDHAR
20	19241A0118	IRUVANTI HEMANTH KUMAR
21	19241A0119	JANGITI VYSHNAVI
22	19241A0120	JARUPLA CHERAN
23	19241A0122	JETTI SREEVANI
24	19241A0123	K SOWMYA
25	19241A0124	KADALI KRISHNASRI SAI
26	19241A0125	KAMAREDDY AKSHAY
27	19241A0126	KATTA SAI KUMAR
28	19241A0127	KOLLURI.TEJASWI
29	19241A0128	KONDAPURAM SRIJA
30	19241A0129	KOTTE VIVEK
31	19241A0130	KRUTHIKA VIJAY PALANGE
32	19241A0131	MADA AKHIL REDDY
33	19241A0132	MADARAM SHRAVAN KUMAR REDDY
34	19241A0133	MADDIGATLA AJAY SAGAR
35	19241A0134	CHANDANA MALPATEL
36	19241A0135	MANDALA CHINNI
37	19241A0136	MIREGILLA VIJAYAKUMAR
38	19241A0137	MOHD OBAID KASHIF
39	19241A0138	NARAPAKA MADHAV KUMAR
40	19241A0139	NIMMALA ARSHITHA
41	19241A0141	P SIDDARTHA

S.No.	Roll No	Name
42	19241A0142	PAGIDIPALLY AJAY KUMAR
43	19241A0143	PALLAPU NAVEEN
44	19241A0144	PALLE SANATH KUMAR
45	19241A0145	PANTANGI PRANAY
46	19241A0146	PATIL SWAPNIL
47	19241A0147	POLISETTY SAAHAS
48	19241A0148	S.SAITEJA
49	19241A0149	SAI NEERAJ M
50	19241A0150	SATYA SAI PRASANNA REDDY SOLIPETA
51	19241A0151	SHAIK BILAL
52	19241A0152	SHAIK FIRDOUS AYESHA
53	19241A0153	SOORA VIKAS
54	19241A0154	TELLAM SRI SAI PAVANA ROSHINI
55	19241A0155	THALLAPALLY SWARANYA
56	19241A0156	THUMATI VENKATA VAYUNANDHAN
57	19241A0157	UDUMULA NIKHIL REDDY
58	19241A0158	VELISHALA GAYATHRI
59	19241A0159	VENKATA SIDDHARTHA RAJU VEGESNA
60	19241A0160	YASWANTH KURUVA

SECTION - B

S.No.	Roll No	Name
1	19241A0161	ABDUL RAHEEM
2	19241A0162	ANEMONI MURALI MANOHAR
3	19241A0163	ASKANY HARISH SAGAR
4	19241A0164	BODLA AKSHITH
5	19241A0165	BURRA VAMSHI KRISHNA
6	19241A0166	CHERLAKOLA AKHILA
7	19241A0167	CHINTAPALLI VIKRAM
8	19241A0168	CHIRRIBOYINA DHANYA
9	19241A0169	D SREE MADHURI
10	19241A0170	GADDAM SAHITHI
11	19241A0171	GAJJALA SUKENDHAR REDDY
12	19241A0172	YASHASWI GANGAVARAM
13	19241A0173	GINDHAM ADITYA KUMAR
14	19241A0174	GUDHETI NARENDAR REDDY
15	19241A0175	GUMMADI SAI PRATEEK REDDY
16	19241A0176	HANMAPUR DHEERAJ GOUD
17	19241A0177	JAVVAJI AISHWARYA
18	19241A0178	JULAPALLY NITHIN RAO
19	19241A0179	K NAVEEN
20	19241A0180	K RAJESHWARI
21	19241A0181	KACHAVA SURENDAR
22	19241A0182	KODATHALA INDU
23	19241A0183	KOTARU SRINIVASA VARAPRASAD
24	19241A0184	MALOTH RAHUL
25	19241A0185	MATURI SATHVIK
26	19241A0186	MD ABDUL MAAJID
27	19241A0187	MEDARI DAYANA
28	19241A0188	NARSINGA SANDEEP

29	19241A0189	PALANATI ROHITH
30	19241A0190	PURALASETTY BHAVANA
31	19241A0191	RODDA MALAVIKA REDDY
32	19241A0192	SAPRAM NAGA SRILOWKYA MUKTHA
33	19241A0193	SHAIK PARVEZ ANSARI
34	19241A0194	SIDDELA THARUN KUMAR
35	19241A0195	TALARI CHANDANA SREE
36	19241A0196	VALLEPU KALYAN
37	19241A0197	VRASHAB PATEL
38	19241A0198	YELLAVULA NARENDER
39	19241A0199	BADDELA SAI THARUN
40	20245A0101	Aamanchi Bowmi
41	20245A0102	Aviraboina Sai Chaithanya
42	20245A0103	Bairy B S Anirudh
43	20245A0104	Daddu Tejasree
44	20245A0105	Dopathi Raviteja
45	20245A0106	Eruventi Niharika
46	20245A0107	Gaddamidi Aanil
47	20245A0108	Gandla Rishik Raj
48	20245A0109	Gone Naveen Kumar
49	20245A0110	Kota Vishal
50	20245A0111	Kummari Mahesh
51	20245A0112	Lakavath Anil
52	20245A0113	Madavaram Rohith
53	20245A0114	Mandala Akshitha
54	20245A0115	M Manjunath
55	20245A0116	Porandla Nababhushanam
56	20245A0117	Pulishetty Bhavani
57	20245A0118	Racha Kranthi Ranadeer
58	20245A0119	S Manoj Kumar
59	20245A0120	Samudrala Manideep
60	20245A0121	Sangepaga Goutham
61	20245A0122	Sodadasi Rahul
62	20245A0123	Vanga Harshith
63	20245A0124	Choleti Vineetha
64	20245A0125	Gangula Grishma
65	20245A0126	Bollampalli Sai Poojith
66	20245A0127	Pamulapati Sumanth
67	20245A0128	T Sanghamithra
68	20245A0129	Abeda Akanksha
69	20245A0130	Doppalapudi Ramvineeth Sai
70	20245A0131	Pilly Uday Kiran

Signature of HOD   Signature of faculty

Date: Date:

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

GUIDELINES TO STUDY THE COURSE/SUBJECT

Academic Year   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering.   Year: III   Section: A & B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

Guidelines to students:

Guidelines to study the course: Hydrology and Water Resources Engineering

The course helps the students to learn and understand about the design of various structural elements of buildings by using Limit state method. The course makes the students to understand the design procedure of Beams, Slabs, Columns, Footings, Stairs and Canopy. It also makes the students to understand the design of beams and slabs for Limit state of serviceability.

The students should have the prerequisites:
- Knowledge of Concrete and Steel.
- Knowledge of various structural elements of Buildings.

Where will this subject help?
- Useful in knowing the difference between Limit State method and Working Stress method.
- Useful in determining the area of steel, spacing between the bars and size of elements such as beams, slabs, footings, stairs and canopy for the given moment/Loads.
- Useful in determining the capacity of structural elements for the given size of section and area of steel.

Books/Material

1. Limit state design of Reinforced Concrete by P.C.Varghese, Printice Hall of India, New Delhi.
2. Reinforced Concrete Design by N.Krishna Raju and R.N.Pranesh, New Age International Publishers, New Delhi.
3. Reinforced Concrete Design by S.Unnikrishna Pillai & Devada Menon, Tata Mc.Graw Hill, NewDelhi.

Reference Books
1. Fundamentals of Reinforced Concrete Design by M.L.Gambhir, Printice Hall of India, New Delhi.
2. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications Pvt.Ltd., New Delhi.

Course Design and Delivery System (CDD):

- The Course syllabus is written into number of learning objectives and outcomes.
- These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.
- Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
- The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

- Understand the principles of Learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, unit and lesson plans
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback to students using various methods of Assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD   Signature of faculty

Date: Date:

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE SCHEDULE

Academic **Y**ear   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	**UNIT-1** Concepts of Engineering Hydrology	18/08/21	30/09/21	9
2.	**UNIT-II** Distribution of Runoff	30/09/21	08/10/21	6
3.	**UNIT-III** Groundwater	19/10/21	26/10/21	5
4.	**UNIT-IV** Irrigation	29/10/21	12/11/21	10
5.	**UNIT-V** Design of canals	23/11/21	7/12/21	11

Total No. of Instructional periods available for the course: Hours / Periods

Signature of H.O.D   Signature of faculty

Date :   Date:

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE SCHEDULE

Academic Year   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: B

Course/Subject: Hydrology and Water Resources Engineering   Course Code:
GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. of Periods
		From	To	
1.	**UNIT-1** Concepts of Engineering Hydrology	19/08/21	16/09/21	9
2.	**UNIT-II** Distribution of Runoff	17/09/21	27/9/21	8
3.	**UNIT-III** Groundwater	27/9/21	4/10/21	8
4.	**UNIT-IV** Irrigation	7/10/21	30/10/21	10
5.	**UNIT-V** Design of canals	30/10/21	7/12/21	11

Total No. of Instructional periods available for the course: <u>46</u> Hours / Periods

Signature of H.O.D   Signature of faculty

Date :   Date:

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic Year   :   2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

S.No	Date	Unit No	Session Duration	Topics	Objectives & Outcomes Nos.	References
1	18/8	1	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY ENGINEERING HYDROLOGY**	CobNos:1 CoNos:1	**Hydrology Text books by Dr.Jayarami Reddy& Dr.K.Subrahmanya & Irrigation Engg by Punmia et.al**
2	20/8	1	1	Definitions & Applications of Engineering Hydrology,Hydrological Cycle,Types and Forms of Precipitation	CobNos:1 CoNos:1	
3	27/8	1	1	Rainfall Measurement,Types of Raingauges,Computation of Average Rainfall over a Basin & Problem Solving	CobNos:1 CoNos:1	
4	28/8	1	1	Processing of Rainfall data – Adjustment of Record – Rainfall Double Mass Curve & Problem Solving	CobNos:1 CoNos:1	
5	14/9	1	1	Runoff - Factors affecting Runoff – Runoff over a catchment – Empirical and Rational Formulae	CobNos:1 CoNos:1	
6	16/9	1	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY EVAPORATION,EVAPOTRANSPIRATION AND INFILTRATION**	Cobs:1 CoNos:1	
7	16/9	1	1	Abstraction from rainfall – Evaporation, Factors affecting Evaporation ,Measurement of Evaporation	Cobs:1 Cos: 1	
8	17/9	1	1	Evapotranspiration-Penman and Blaney & Criddle Methods	Cobs:1 Cos: 1	
9	23/9	1	1	Infiltration –Factors affecting infiltration,Measurement of Infiltration ,Infiltration indices	Cobs:1 CoNos:1	
10	30/9	2	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DISTRIBUTION OF RUNOFF**	Cobs: 2 Cos: 2	
11	30/9	2	1	Distribution of Runoff – Hydrograph Analysis – Flood Hydrograph	Cobs: 2 Cos: 2	
12	5/10	2	1	Effective Rainfall –Base flow – Base flow separation – Direct Runoff Hydrograph – Problem Solving	Cobs: 2 Cos: 2	
13	7/10	2	1	Unit Hydrograph , Definition , Limitations and Applications of Unit Hydrograph	Cobs: 2 Cos: 2	
14	7/10	2	1	Derivation of Unit Hydrograph from Direct Runoff and Viceversa – Problem Solving	Cobs: 2 Cos: 2	

15	8/10	2	1	S-Curve Hydrograph , Synthetic Unit Hydrograph – Problem Solving	Cobs: 2 Cos: 2	
16	19/10	3	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY GROUND WATER**	Cobs: 3 Cos: 3	
17	21/10	3	1	Groundwater occurrence , Types of Aquifers	Cobs: 3 Cos: 3	
18	21/10	3	1	Aquifer parameters : Porosity , Specific yield, Permeability, Transmissivity and Storage Coefficient –Problem solving	Cobs: 3 Cos: 3	
19	22/10	3	1	Darcy's Law, Radial Flow to wells in confined and unconfined aquifers	Cobs: 3 Cos: 3	
20	26/10	3	1	Types of wells - Well Construction – Well Development	Cobs: 3 Cos: 3	
21	29/10	4	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY IRRIGATION**	CobNos:4 CoNos:4	
22	30/10	4	1	Necessity and importance of irrigation , Advantages and ill effects of irrigation	CobNos:4 CoNos:4	
23	2/11	4	1	Types of irrigation , methods of application of irrigation water	CobNos:4 CoNos:4	
24	3/11	4	1	Indian Agricultural soils , Methods of improving soil fertility, Crop rotation , Preparation of land for irrigation	CobNos:4 CoNos:4	
25	5/11	4	1	Standards of Quality for irrigation water	CobNos:4 CoNos:4	
26	5/11	4	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY SOIL – WATER-PLANT RELATIONSHIP & IRRIGATION EFFICIENCIES**	Cobs:4 CoNos:4	
27	9/11	4	1	Soil –water – Plant relationship , Vertical distribution of soil moisture	Cobs:4 Cos: 4	
28	11/11	4	1	Soil Moisture Constants , Soil Moisture Tension , Consumptive Use , Problems-solving	Cobs:4 Cos: 4	
29	12/11	4	1	Duty and Delta , Factors affecting duty – Design discharge for a water course	Cobs:4 CoNos:4	
30	12/11	4	1	Depth and frequency of irrigation , Irrigation efficiencies , Water logging	Cobs: 4 Cos: 4	
31	23/11	5	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DESIGN OF CANALS**	Cobs: 5 Cos: 5	
32	23/11	5	1	Classification of canals , Design of irrigation canals by Kennedy's Theory	Cobs: 5 Cos: 5	
33	25/11	5	1	Design of Irrigation canals by Lacey's theory	Cobs: 5 Cos: 5	
34	26/11	5	1	Balancing depth of cutting	Cobs: 5 Cos: 5	

35	30/11	5	1	IS standards for a canal design – Canal lining	Cobs: 5 Cos: 5	
36	30/11	5	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DESIGN DISCHARGE OVER A CATCHMENT**	Cobs: 5 Cos: 5	
37	2/12	5	1	Design discharge over a catchment	Cobs: 5 Cos: 5	
38	2/12	5	1	Computation of design discharge – Rational formula	Cobs: 5 Cos: 5	
39	3/12	5	1	SCS Curve Number Method	Cobs: 5 Cos: 5	
40	3/12	5	1	Flood frequency analysis – Introductory part only	Cobs: 5 Cos: 5	
41	7/12	5	1	Stream Gauging - Measurement and estimation of stream flow	Cobs: 5 Cos: 5	

Signature of H.O.D   Signature of faculty

Date :   Date:

Note: 1. Ensure that all topics specified in the course are mentioned.
    2. Additional topicscovered, if any, may also be specified in bold
    3. Mention the corresponding course objective and out come numbers against each topic.

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic **Y**ear   : 2021-22

Semester   : I

Name of the Program: B.Tech Civil Engineering Year: III Section: B

Course/Subject: Hydrology and Water Resources Engineering   Course Code:
GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

S.No	Date	Unit No	Session Duration	Topics	Objectives & Outcome Nos.	References
1	19/8	1	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY ENGINEERING HYDROLOGY**	CobNos:1 CoNos:1	**Hydrology Text books by Dr.Jayarami Reddy& Dr.K.Subrahmanya & Irrigation Engg by Punmia et.al**
2	20/8	1	1	Definitions & Applications of Engineering Hydrology,Hydrological Cycle,Types and Forms of Precipitation	CobNos:1 CoNos:1	
3	26/8	1	1	Rainfall Measurement,Types of Raingauges,Computation of Average Rainfall over a Basin & Problem Solving	CobNos:1 CoNos:1	
4	27/8	1	1	Processing of Rainfall data – Adjustment of Record – Rainfall Double Mass Curve & Problem Solving	CobNos:1 CoNos:1	
5	28/8	1	1	Runoff - Factors affecting Runoff – Runoff over a catchment – Empirical and Rational Formulae	CobNos:1 CoNos:1	
6	9/9	1	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY EVAPORATION,EVAPOTRANSPIRATION AND INFILTRATION**	Cobs:1 CoNos:1	
7	13/9	1	1	Abstraction from rainfall – Evaporation, Factors affecting Evaporation ,Measurement of Evaporation	Cobs:1 Cos: 1	
8	13/9	1	1	Evapotranspiration-Penman and Blaney & Criddle Methods	Cobs:1 Cos: 1	
9	16/9	1	1	Infiltration –Factors affecting infiltration,Measurement of Infiltration ,Infiltration indices	Cobs:1 CoNos:1	
10	17/9		1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DISTRIBUTION OF RUNOFF**	Cobs: 2 Cos: 2	
11	20/9	2	1	Distribution of Runoff – Hydrograph Analysis – Flood Hydrograph	Cobs: 2 Cos: 2	
12	20/9	2	1	Effective Rainfall –Base flow – Base flow separation – Direct Runoff Hydrograph – Problem Solving	Cobs: 2 Cos: 2	
13	23/9	2	1	Unit Hydrograph , Definition , Limitations and Applications of Unit Hydrograph	Cobs: 2 Cos: 2	
14	24/9	2	1	Derivation of Unit Hydrograph from Direct Runoff and Viceversa – Problem Solving	Cobs: 2 Cos: 2	

15	27/9	2	1	S-Curve Hydrograph , Synthetic Unit Hydrograph – Problem Solving	Cobs: 2 Cos: 2	
16	27/9		1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY GROUND WATER**	Cobs: 3 Cos: 3	
17	30/9	3	1	Groundwater occurrence , Types of Aquifers	Cobs: 3 Cos: 3	
18	1/10	3	1	Aquifer parameters : Porosity , Specific yield, Permeability, Transmissivity and Storage Coefficient –Problem solving	Cobs: 3 Cos: 3	
19	4/10	3	1	Darcy's Law, Radial Flow to wells in confined and unconfined aquifers	Cobs: 3 Cos: 3	
20	4/10	3	1	Types of wells - Well Construction – Well Development	Cobs: 3 Cos: 3	
				FIRST MID EXAMINATION		
21	7/10	4	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY IRRIGATION**	CobNos:4 CoNos:4	
22	8/10	4	1	Necessity and importance of irrigation , Advantages and ill effects of irrigation	CobNos:4 CoNos:4	
23	18/10	4	1	Types of irrigation , methods of application of irrigation water	CobNos:4 CoNos:4	
24	18/10	4	1	Indian Agricultural soils , Methods of improving soil fertility, Crop rotation , Preparation of land for irrigation	CobNos:4 CoNos:4	
25	22/10	4	1	Standards of Quality for irrigation water	CobNos:4 CoNos:4	
26	25/10	4	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY SOIL – WATER-PLANT RELATIONSHIP & IRRIGATION EFFICIENCIES**	Cobs:4 CoNos:4	
27	25/10	4	1	Soil –water – Plant relationship , Vertical distribution of soil moisture	Cobs:4 Cos: 4	
28	28/10	4	1	Soil Moisture Constants , Soil Moisture Tension , Consumptive Use , Problems-solving	Cobs:4 Cos: 4	
29	29/10	4	1	Duty and Delta , Factors affecting duty – Design discharge for a water course	Cobs:4 CoNos:4	
30	30/10	4	1	Depth and frequency of irrigation , Irrigation efficiencies , Water logging	Cobs: 4 Cos: 4	
31	30/10	5	1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DESIGN OF CANALS**	Cobs: 5 Cos: 5	
32	3/11	5	1	Classification of canals , Design of irrigation canals by Kennedy's Theory	Cobs: 5 Cos: 5	
33	5/11	5	1	Design of Irrigation canals by Lacey's theory	Cobs: 5 Cos: 5	
34	8/11	5	1	Balancing depth of cutting	Cobs: 5 Cos: 5	

35	11/11	5	1	IS standards for a canal design – Canal lining	Cobs: 5 Cos: 5	
36	12/11		1	**INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DESIGN DISCHARGE OVER A CATCHMENT**	Cobs: 5 Cos: 5	
37	15/11	5	1	Design discharge over a catchment	Cobs: 5 Cos: 5	
38	15/11	5	1	Computation of design discharge – Rational formula	Cobs: 5 Cos: 5	
39	3/12	5	1	SCS Curve Number Method	Cobs: 5 Cos: 5	
40	3/12	5	1	Flood frequency analysis – Introductory part only	Cobs: 5 Cos: 5	
41	7/12	5	1	Stream Gauging - Measurement and estimation of stream flow	Cobs: 5 Cos: 5	

Signature of H.O.D   Signature of faculty

Date :   Date:

Signature of HOD   Signature of faculty

Date: Date:

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 19/8/2021

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 1   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Introduction, Importance and Motivation to study Engineering Hydrology

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

> 1.
>
> 2.
>
> 3.

Assignment / Questions:
1.
2.
       (CO: & COB:)

                                                          Signature   of
                                              faculty

Designation: PROFESSOR

Lesson No: 2   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Definitions, Applications of Engg. Hydrology, Hydrological Cycle,Types and Forms of Precipitation.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.
        (CO: & COB:)

                                                                     Signature   of
                                                          faculty
Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 2

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 3   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Rainfall measurements, Types of Rain gauges, Computation of Average Rainfall over a basin & Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.
    (CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 27/8

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 4   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Processing of Rainfall Data – Adjustment of Record – Rainfall Double Mass Curve & Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

<div style="border:1px solid black;">

1.

2.

3.

</div>

Assignment / Questions:
1.
2.
   (CO: & COB:)

                                                          Signature   of
                                        faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 28/8

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 5   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Runoff - Factors affecting Runoff _ Runoff over a catchment – Empirical and Rational Formulae

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.
    (CO: & COB:)

                                        Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 9/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 6   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title:
Introduction , Importance & Motivation to study Evaporation, Evapotranspiration and Infiltration
INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.
    (CO: & COB:)

                          Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 13/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 7   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Abstraction from Rainfall – Evaporation, Factors affecting evaporation, Measurement of Evaporation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 13/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 8   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Evapotranspiration – Penman and Blaney Criddle Methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

Infiltration –Factors affecting infiltration,Measurement of Infiltration ,Infiltration indices
1.
2.
3.

Assignment / Questions:

1.

2.(CO: & COB:)

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year : 2021-22 Date: 16/9

Semester : I

Name of the Program: B.Tech Year: III Section: A &B

Course/Subject: Hydrology and Water Resources Engineering Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 9 UNIT No:1 Duration of Lesson: 1 hr

Lesson Title:
Infiltration –Factors affecting infiltration ,Measurement of Infiltration ,Infiltration indices

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 17/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 10   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title:

INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY   DISTRIBUTION OF RUNOFF

<u>INSTRUCTIONAL/LESSON OBJECTIVES:</u>

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

> 1.
>
> 2.
>
> 3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

LESSON PLAN

Academic Year   :   2021-22   Date: 20/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 11   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title: Distribution of Runoff – Hydrograph Analysis – Flood Hydrograph

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:

1.

2.(CO: & COB:)

<div align="right">Signature   of</div>

<div align="center">faculty</div>

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 20/9

Semester   : I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 12   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title:
Effective Rainfall –Base flow – Base flow separation – Direct Runoff Hydrograph – Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

<div style="border:1px solid black;">

1.

2.

3.

</div>

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 23/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 13   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title: Unit Hydrograph , Definition , Limitations and Applications of Unit Hydrograph

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.	
2.	
3.	

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 24/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 14   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title: Derivation of Unit Hydrograph from Direct Runoff and Viceversa – Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 27/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 15   UNIT No:2   Duration of Lesson: 1 hr

Lesson Title:

S -Curve Hydrograph – Synthetic Unit Hydrograph – Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

                                                                        Signature   of
                                                      faculty

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 27/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 16   Unit : 3   Duration of Lesson: 1 hr

Lesson Title: **INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY GROUND WATER**

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 30/9

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR   Unit :3

Lesson No: 17   Duration of Lesson: 1 hr

Lesson Title:
Groundwater Occurrence – Types of Aquifers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 1/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 18   Unit :3   Duration of Lesson: 1 hr

Lesson Title:
Aquifer Parameters : Porosity , Specific Yield , Permeability , Transmissivity and Storage
Coefficient – Problem Solving

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 4/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 19   UNIT No:3   Duration of Lesson: 1 hr

Lesson Title: Darcy's Law : Radial Flow to wells in confined and Unconfined aquifers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 4/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 20   UNIT No:3   Duration of Lesson: 1 hr

Lesson Title: Types of wells – Well Construction – Well Development

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

                                                                Signature   of
                                        faculty

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 7/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 21   Unit :4   Duration of Lesson: 1 hr

Lesson Title:
INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY GROUND WATER

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 8/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 22   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title:

Necessity and importance of irrigation , Advantages and ill effects of irrigation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 18/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 23   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title: Types of irrigation , methods of application of irrigation   water

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

LESSON PLAN

Academic Year   :   2021-22   Date: 18/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 24   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title:
Indian Agricultural soils , Methods of improving soil fertility, Crop rotation , Preparation of
land for irrigation

<u>INSTRUCTIONAL/LESSON OBJECTIVES:</u>

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

> 1.
>
> 2.
>
> 3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 22/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 25   UNIT No: Duration of Lesson: 1 hr

Lesson Title: Standards of Quality for irrigation water

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 25/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 26   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title: **INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY SOIL – WATER-
PLANT RELATIONSHIP & IRRIGATION EFFICIENCIES**

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 25/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 27   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title: Soil –water – Plant relationship , Vertical distribution of soil moisture

I

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1. 2. 3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 28/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 28   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title: Soil Moisture Constants , Soil Moisture Tension , Consumptive Use , Problems-solving

<u>INSTRUCTIONAL/LESSON OBJECTIVES:</u>

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 29/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 29   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title:
Duty and Delta , Factors affecting duty – Design discharge for a water course

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 30/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 30   UNIT No:4   Duration of Lesson: 1 hr

Lesson Title:

Depth and frequency of irrigation , Irrigation efficiencies , Water logging

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1. 2. 3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440**

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 30/10

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 31   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: **INTRODUCTION,IMPORTANCE & MOTIVATION TO STUDY DESIGN OF CANALS**

                                                    Signature   of
                                           faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 3/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 32   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Classification of canals , Design of irrigation canals by Kennedy's Theory

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 5/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 33   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Design of Irrigation Canals by Lacey's Theory

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1. 2. 3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 8/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 34   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Balancing Depth of Cutting

**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 11/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 35   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: IS Standards for a Canal Design – Canal Lining

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 12/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 36   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Introduction- Importance & Motivation to study Design Discharge Over a
Catchment

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 15/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 37   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Design Discharge Over a catchment

<u>INSTRUCTIONAL/LESSON OBJECTIVES:</u>

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 15/11

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 38   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Computation of Design Discharge _ Rational Formula

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature of faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 3/12

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 39   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: SCS Curve Number Method

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22   Date: 3/12

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 40   UNIT No:5   Duration of Lesson: 1 hr

Lesson Title: Flood Frequency Analysis – Introductory Part Only

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

<div style="text-align:right">Signature of faculty</div>

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic Year   :   2021-22   Date: 7/12

Semester   :   I

Name of the Program: B.Tech   Year: III   Section: A &B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr Mohd Hussain   Dept.: Civil Engineering

Designation: PROFESSOR

Lesson No: 41   UNIT No:1   Duration of Lesson: 1 hr

Lesson Title: Stream Gauging – Measurement and Estimation of Stream flow

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1.

2.

TEACHING AIDS: White Board, Marker
TEACHING POINTS   :

1.

2.

3.

Assignment / Questions:
1.
2.(CO: & COB:)

Signature   of
faculty

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

LESSON PLAN

Academic **Y**ear   :   2021-22

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

TUTORIAL SHEET - 1

Academic **Y**ear   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

This Tutorial corresponds to Unit No. / Lesson: <u>One</u>

Q1. Explain about stress block parameters.

Q2. Illustrate about. a. Balanced section b. Under reinforced section   c. Over reinforced section.

Q3. Summarize the stress strain behavior of Steel and concrete with the help of figures.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 1

Outcome Nos.: 1

Signature of HOD   Signature of faculty

Date: Date:

First Assignment in
HWRE-Scan 27 Aug

Important
Questions from first

Important
Questions from Secc

Hydrology and Water Resources EngineeringI Mid Portion Objective Questions

1. An   Isohyet is a line joining points of   [a   ]
    (a) equal rainfall depth (2) equal pressure (3) equal density (4) equal height
2. Isobar is a line which joins the points equal   [b   ]
    (a) Density (b) atmospheric pressure (c) Vapour Pressure (d) evaporation
3. The Rainfall Hyetograph is the graph drawn between   [c   ]
    (a) Effective Rainfall Vs. Time (b) Total Rainfall Vs. Time (c) Rainfall Intensity Vs. Time

(d) None of the above

4. The instrument which measures Evapotranspiration is known as   [b   ]
   (a) Atmometer (b) Lysimeter (c) Anemometer (d) None of the above

5. The upper limit of Reynold's Number for the Darcy's Law to be valid for   [a   ]
   Groundwater flow is
   (a) ONE   (b) Two (c) One Hundred (d) None of the above

6. Salinity in water   [a   ]
   (a) reduces the evaporation (b) does not affect evaporation (c) increases the evaporation (d)
   None of the above

7. A stream which contributes runoff to groundwater is known as   [a   ]
   (a) influent stream (b)effluent stream (c) perennial stream (d) ephemeral stream

8. Specific yield of an aquifer is defined as the ratio of the   [b   ]

(a) Volume of pore space to the volume of soil (b) Volume of water freely drained from a
saturated soil to the Volume of soil (c)Volume of water retained , when a saturated soil is
freely drained to the volume of soil (d) Volume of pore space to the volume of soil

9. Darcy's Law for groundwater movement states that the velocity is proportional to   [a   ]
   (a) the hydraulic gradient (b) the reciprocal of the hydraulic gradient (c) the square of
   the hydraulic gradient (d) the logarithm of the hydraulic gradient

10. According to Dalton's Law, evaporation is proportional to the   [a   ]

(a)the vapour pressure gradient (b)the difference between the saturation vapour pressure at
100degrees C. and the actual vapour pressure (c) the difference between the actual vapour
pressureand the saturation vapour pressure at Zero degree Centigrade (d) the difference
between the saturation vapour pressure at a given temperature and the saturation vapour
pressure at Zero degree Centigrade

11. Infiltration Capacity of soil is defined as   [c   ]

(a) the depth of water absorbed by the soil during the storm (b) the intensity of rainfall above which the rainfall volume equals the observed rainfall volume (c) the maximum rate at which the soil absorbs water (d) the permeability of the soil in vertical direction.

12. The rainfall hyetograph is the graph drawn between rainfall intensity and time

13. The rainfall mass curve shows the variation of cumulative rainfall with time

14. Double mass curve technique is used to check the consistency of record at a suspected raingauge station.

15.   The S-curve Hydrograph is used   [c]
    (a) To develop synthetic unit hydrograph (b) to estimate the peak flood flow (c) to convert the unit hydrograph of any given duration into a unit hydrograph of any other desired duration (d) None of the above

16. The most accurate method of finding the average depth of rainfall over an area is Isohyetal method

17. Phai ω index is defined as the rainfall intensity above which the rainfall volume equals the observed runoff volume

18. In the standard notation, the Horton's Infiltration Equation is given by $f = f_c + (fo - fc) e^{-kt}$

19. The base flow is the difference between the total runoff and the direct runoff.

20.   Which of the following formations does not contain any groundwater   [b]

    (a) Aquifer (b) Aquifuge (c) Aquitard (d) Aquiclude

21. Direct Runoff is the sum of the surface runoff and the prompt subsurface runoff

22. The inflection point on the recession side of the hydrograph indicates the end of the Overland flow .

23. The upper limit on the area of the basin for the applicability of unit hydrograph is generally taken to be 5000 km².

24.   The S-curve is the summation of the   [a   ]
    (a) Unit Hydrograph (b) Total Runoff Hydrograph   (c) Effective Rainfall Hyetograph
         (d) Base flow recession curve

25 . The base flow of a stream represents   [c   ]
    (a) the groundwater runoff and the prompt subsurface runoff (b) the groundwater runoff and the subsurface runoff (c) the groundwater runoff and the delayed subsurface runoff (d) the runoff due to only snow melt

Hydrology   and Water Resources EngineeringI Mid Portion

Descriptive Questions

1. Explain the various methods of processing rainfall data with neat sketches ?

2. Draw Unit Hydrograph and explain various parts of the Hydrograph ?

3. Briefly explain steps to derive Unit Hydrograph from the rainfall records with assumptions ?

4. Derive an expression for the steady radial flow of a well in a confined aquifer ?

5. Distinguish between S-Curve Hydrograph and Synthetic Unit Hydrograph ?

6.
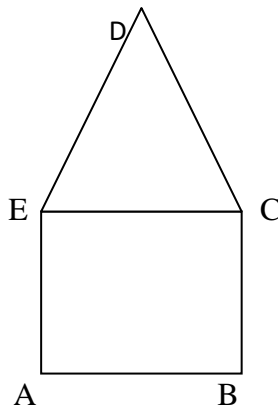
A basin has the area in the form of a Pentagon with each side of length 20 km. The five raingauges located at the corners A,B,C,D and E have recorded 60,81,73,59 and 45 mm of rainfall respectively.Compute the average depth of rainfall over the basin, using Arithmetic Mean and Theissen Polygon Methods.

7. Derive the S- curve ordinates for the 4 Hr. Unit Hydrograph given below

Time (h)	0	4	8	12	16	20	24	28
Unit Hydrograph Ordinates (m³/s)	0	10	30	25	18	10	5	0

8. In a water table aquifer of 50 m. thickness , a 20 cm diameter well is pumped at a uniform rate of 0.05 m^3/sec.If the steady state drawdown measured in the observation wells located at 10m. and 100m. distances from the well are 6.5 m. and 0.25m. respectively , determine the Hydraulic Conductivity of the aquifer.

9. A 6 Hr.storm produced rainfall intensities of 7,18,25,12.10 and 3 mm/hr. in successive one hour intervals over a basin of 800 sq. Km.The resulting runoff is observed to be 2640 hectare- metres. Determine O (Phi) index for the basin.

10. From the hourly 2 Hour Unit Hydrograph , derive the 6 Hr. Unit Hydrograph (b)

   Time (Hr)- 0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23
   (c) 2 Hr.Unit Hydrograph (m³/sec) -0-10-20-40-60-105-150-135-120-105-90-80-70-60-50-41-32-26-20-15-10-5-0-0

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

HYDROLOGY AND WATER RESOURCES ENGINEERING

Unit I Assignment   **Professor : Dr.Mohd.Hussain**   **Date : 05/10/2021**

Section :   Name of student :   Roll No:

PROBLEM ON DOUBLE MASS CURVE TECHNIUQUE TO TEST THE CONSISTENCY OF RAINFALL DATA AT A STATION

1. Exercise Problem 2.3 in the text book of " Engineering Hydrology " by Dr.K.Subramanya

GR18A3005

Test the consistency of the 22 years of data of the annual precipitation measured at station A . Rainfall data for station A as well as the average annual rainfall measured at a group of eight neighbouring stations located in a meteorologically homogeneous region are given as follows :

Year	Annual Rainfall of Station A (mm)	Average Annual Rainfall of Eight Station groups (mm)
1946	177	143
1947	144	132
1948	178	146
1949	162	147
1950	194	161
1951	168	155
1952	196	152
1953	144	117
1954	160	128
1955	196	193
1956	141	156
1957	158	164
1958	145	155
1959	132	143
1960	95	115
1961	148	135
1962	142	163
1963	140	135
1964	130	143
1965	137	130
1966	130	146
1967	163	161

COMPUTATIONS OF DOUBLE MASS CURVE

YEAR

Year	Average Annual Rainfall of Eight Station groups (mm)	Cumulative Average Annual Rainfall of Eight Station Groups (mm)	Annual Rainfall of Station A (mm)	Cumulative Annual Rainfall of Station A (mm)	Adjusted Values Of Station A	Finalized Values of A (at Post 1955 Regime)
Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)	Column (7)
1967						
1966						
1965						
1964						
1963						
1962						
1961						
1960						
1959						
1958						
1957						
1956						
1955						
1954						
1953						
1952						
1951						

1950						
1949						
1948						
1947						
1946						

A double mass curve plot is drawn between Cumulative rainfall at Station X on Y-axis and Cumulative Average Annual rainfall at Eight stations on X-axis .

There is change in regime in 1955. Values before 1955 (i.e. 1954,53,52,51,50,49,48,47 and 46) of station A need to be changed by Correction factor .

Cumulative Rainfall At Station A (Y-axis) vs Cumulative Average Rainfall at Eight Stations (X-axis), showing line A branching into B and C at 1955.
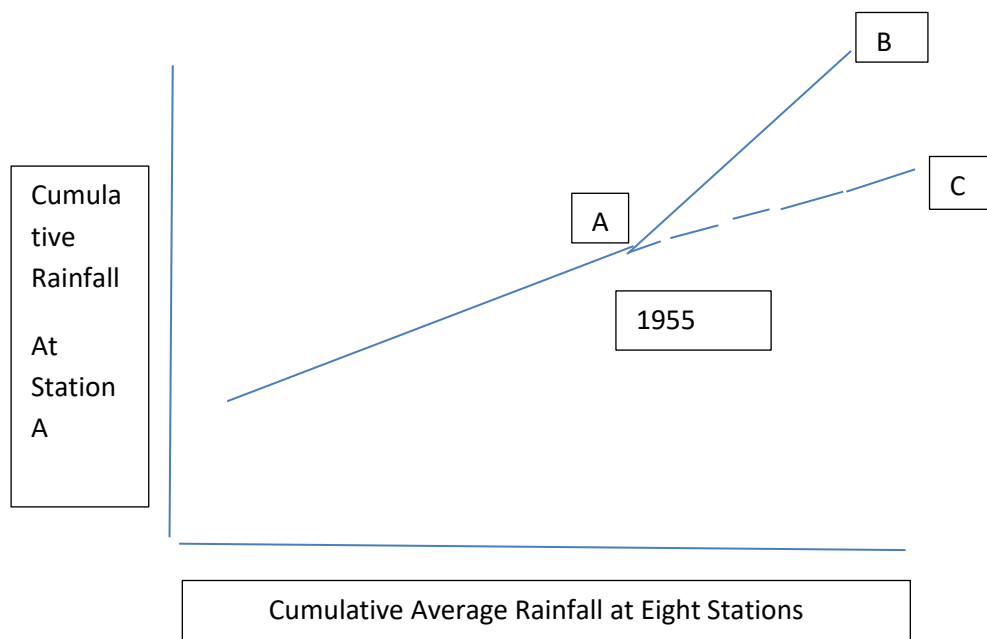
Correction Factor = Ratio of slope of Line AB and Slope of Line AC = 0.949/1.17 = 0.805

Column (6) (for values before 1955)= Values of Column (4) X Correction Factor (0.805)

Mean Annual Precipitation of Station A = Total of the column (6) / No. of Years of data =3165/22=143.9

PROCESSING OF RAINFALL

Exercise Problem from the Text Book of Dr.K.Subramanya

2.13 (Chapter 2) Following are the data of a storm as recorded in a selfrecording raingauge at a station .

Time from the beginning of Storm (minutes)	10	20	30	40	50	60	70	80	90
Cumulative Rainfall (mm)	19	41	48	68	91	124	152	160	166

(a) Plot the Hyetograph of the storm
(b) Plot the maximum intensity duration curve of the storm

Solution : Calculations for constructing the Hyetograph of the Storm

Time (minutes)	Accumulated Rainfall (mm)	Incremental Amount of Rainfall (mm)	Intensity (mm/hr)
0			
10			
20			
30			
40			
50			
60			
70			

80			
90			

Draw the Hyetograph below roughly.

2.13 (b) Plot the maximum intensity duration curve of the storm ?

For various durations , the depth of rainfall in the storm at this interval is calculated.

For each duration, the maximum rainfall value is noted. Corresponding maximum intensity is calculated.

Rainfall depth (mm) for Various durations									
Time since start (mm)	Δt=10min.	20 Min.	30 Min	40 Min.	50 Min.	60 Min.	70 Min.	80 Min.	90 Min.
10									
20									
30									
40									
50									

60									
70									
80									
90									

Calculation of Maximum Depth

Duration (min)								
Maximum Depth (min)								
Maximum Intensity (mm/hr)								

Draw the maximum Intensity Duration Curve of the storm

2.14 (Chapter 2) Prepare the maximum depth duration curve for the 90 Minute storm given below

Time (Minutes)	0	10	20	30	40	50	60	70	80	90
Cumulative Rainfall (mm)	0	8	15	25	30	46	55	60	64	67

Rainfall depths   at different durations (mm)

Time since Start (min)	10 min.	20 min.	30 min.	40 min.	50min.	60min.	70min.	80min.	90min.
10									
20									
30									
40									
50									
60									
70									
80									
90									

Roundoff Values are Maximum Rainfall Depths

GR18A3005

Maximum Depth Duration Data Duration(mm)	10	20	30	40	50	60	70	80	90
Maximum Depth (mm)									

Draw roughly the maximun depth duration Curve .

GR18A3005

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

EVALUATION STRATEGY

Academic **Y**ear   : 2021-22

Semester: I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A & B

Course/Subject: Hydrology and Water Resources Engineering   Course Code: GR18A3005

Name of the Faculty: Dr.Mohd.Hussain

Dept.: Civil Engineering

Designation: Professor

1. TARGET:

A) Percentage for pass: 90%

GR18A3005

b) Percentage of class:

Total Strength: 130

S.No.	Class / Division	No. of Students
1	First Class with distinction	75
2	First Class	46
3	Pass Class	09

2. COURSE PLAN& CONTENT DELIVERY

S.No	Plan	Brief Description
1	Practice classes	55 Theory classes for Section A, B
3	Assignments	Assignments for solving numerical problems

3. METHOD OF EVALUATION

3.1 Continuous Assessment Examinations

- Assignments: Assignments to assess the knowledge of the student on the basics and concepts in HWRE.
- Seminars: To assess the knowledge of the student in HWRE
- Quiz: To assess the knowledge of the student in various concepts and basics of HWRE
- Internal Examination: Internal Examinations to assess their overall knowledge in HWRE.

3.2. Semester/End Examination

To test their abilities in the course HWRE and to approve their abilities learnt during the same.

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

Mindmapping notes using free Mindmaple software.

Signature of HOD   Signature of faculty

GR18A3005

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

MAPPING

GR18A3005/ **Hydrology and Water Resources Engineering**	Course Outcomes				
Course Objectives	1	2	3	4	5
1	X		X		
2		X			X
3	X		X		
4				X	
5		X			X

GR18A3005/ **Hydrology and Water Resources Engineering**	Course Outcomes				
Assessments	1	2	3	4	5
1	X			X	
2			X	X	

3		X			X
4					X
5		X		X	

GR18A3005/ **Hydrology and Water Resources Engineering**	Course Objectives				
Assessments	1	2	3	4	5
1	X				
2		X			
3			X		
4				X	
5					X

GR18A3005/ **Hydrology and Water Resources Engineering**														
COs/POs	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**PSO's**	
													1	**2**
Estimate and Process rainfall data, runoff data , evapotranspiration data , evaporation data and infiltration data		H				M				L				M
Design a model in a region for direct runoff hydrograph, unit hydrograph, S-Curve Hydrograph & Synthetic Unit Hydrograph				H				M				L	M	M
Calculate the discharge of radial flow to wells in a region of confines and unconfined aquifers by determining the aquifer parameters by field tests and pumping tests					H		M			L			M	M

Design a suitable irrigation method depending on soil , water and plant conditions on the field & prepare irrigation schedules and irrigation efficiencies for farmers on the Field			H					M			L	M	M	
Design of irrigation canals and discharge by SCS Curve Number method & Analyze the regional flood frequency					H					H		M	M	

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

RUBRIC TEMPLATE

Academic **Y**ear   : 2021-22

GR18A3005

Semester : I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A / B

Course/Subject: Hydrology and Water Resources Engineering

Course Code: **Sub Code: GR18A3005**

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

Objective: To learn the principles of applications of Hydrology and Water Resources Engineering
Student Outcome: Estimate and Process rainfall data etc., design runoff model in a region, calculate discharge in well, design suitable irrigation method , design irrigation canals

			Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
S.No	Name of the Student	Performance Criteria	1	2	3	4	5	
		The level of knowledge on basic requirements for estimation of meteorological data	Low level of knowledge on estimation and processing of meteological data	Able to discuss the processing of data	Ability to explain the methods of processing of data	Full knowledge on Processing of data	Analysing and implementing the knowledge of Processing of Hydrological data	5
1	20245A0104	The level of knowledge on design of model for runoff hydrograph , Unit Hydrograph & S-Curve Hydrograph	Low level of knowledge on design of model for runoff hydrograph , Unit Hydrograph & S-Curve	Able to discuss on design of model for runoff hydrograph , Unit Hydrograph & S-Curve	Ability to explain design of model for runoff hydrograph , Unit Hydrograph & S-Curve	Full knowledge on design of model for runoff hydrograph , Unit Hydrograph & S-Curve	Analysing and application of knowledge on design of model for runoff hydrograph , Unit Hydrograph & S-Curve Hydrograph.	5

						Average Score	5
		Hydrograph	Hydrograph	Hydrograph	Hydrograph.		
		The level of knowledge to calculate discharge to a well	Low level of knowledge to calculate discharge to a well	Ability to discuss and to study the serviceability of structural elements.	Ability to explain the calcualation of discharge to a well	Full knowledge on calculation of discharge to a well	Analysing and implementing the knowledge of the calculation of discharge to a well.	5

			Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
S. N o	Name of the Stude nt	Performance Criteria	1	2	3	4	5	
1	1924 1A01 61	The level of knowledge on basic requiremen ts for estimation of meteorolog ical data	Low level of knowledge on estimation and processing of meteologic al data	Able to discuss the processing of data	Ability to explain the methods of processing of data	Full knowledge on Processing of data	Analysing and implement ing the knowledg e of Processing of Hydrologi cal data	2
		The level of knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve Hydrograp h	Low level of knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve Hydrograp h	Able to discuss on design of model for runoff hydrograp h , Unit Hydrograp h & S-Curve Hydrograp h	Ability to explain design of model for runoff hydrograp h , Unit Hydrograp h & S-Curve Hydrograp h	Full knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve Hydrograp h.	Analysing and applicatio n of knowledg e on design of model for runoff hydrograp h , Unit Hydrograp h & S-	2

GR18A3005

			Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
							Curve Hydrograph.	
		The level of knowledge to calculate discharge to a well	Low level of knowledge to calculate discharge to a well	Ability to discuss and to study the serviceability of structural elements.	Ability to explain the calcualation of discharge to a well	Full knowledge on calculation of discharge to a well	Analysing and implementing the knowledge of the calculation of discharge to a well.	2
							Average Score	2
			Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
S. N o	Name of the Stude nt	Performance Criteria	1	2	3	4	5	
		The level of knowledge on basic requiremen ts for estimation of meteorolog ical data	Low level of knowledge on estimation and processing of meteologic al data	Able to discuss the processing of data	Ability to explain the methods of processing of data	Full knowledge on Processing of data	Analysing and implementing the knowledge of Processing of Hydrologi cal data	3
1	2024 5A01 30	The level of knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve Hydrograp h	Low level of knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve	Able to discuss on design of model for runoff hydrograp h , Unit Hydrograp h & S-Curve Hydrograp h	Ability to explain design of model for runoff hydrograp h , Unit Hydrograp h & S-Curve Hydrograp h	Full knowledge on design of model for runoff hydrograph , Unit Hydrograp h & S-Curve Hydrograp h.	Analysing and applicatio n of knowledg e on design of model for runoff hydrograp h , Unit Hydrograp	4

		Hydrograph					h & S-Curve Hydrograph.	
		The level of knowledge to calculate discharge to a well	Low level of knowledge to calculate discharge to a well	Ability to discuss and to study the serviceability of structural elements.	Ability to explain the calcualation of discharge to a well	Full knowledge on calculation of discharge to a well	Analysing and implementing the knowledge of the calculation of discharge to a well.	2
							Average Score	3

Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE COMPLETION STATUS

Academic **Y**ear   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: A

Course/Subject: Hydrology and Water Resources Engineering

Course Code: **Sub Code: GR18A3005**

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	Objectives Achieved	Outcomes Achieved
Unit I	23-09-2021 Unit covered on time	1	1

GR18A3005

Unit II	8-10-2021 Unit covered on time	2	2
Unit III	26-10-2021 Unit covered on time	3	3
Unit IV	12-11-2021 Unit covered on time	4	4
Unit V	7-12-2021 Unit covered on time	5	5

Signature of HOD   Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE COMPLETION STATUS

Academic **Y**ear   : 2021-22

Semester   :   I

Name of the Program: B.Tech Civil Engineering   Year: III   Section: B

Course/Subject: Hydrology and Water Resources Engineering

Course Code: **Sub Code: GR18A3005**

Name of the Faculty: Dr.Mohd.Hussain   Dept.: Civil Engineering

Designation: Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	Objectives Achieved	Outcomes Achieved
Unit I	16-09-2021 Unit covered on time	1	1

GR18A3005

Unit II	27-09-2021 Unit covered on time	2	2
Unit III	4-10-2021 Unit covered on time	3	3
Unit IV	30-10-2021 Unit covered on time	4	4
Unit V	07-12-2021 Unit covered on time	5	5

Signature of HOD   Signature of faculty

Date: Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

Gokaraju Rangaraju Institute of Engineering and TechnologyDepartment of Civil Engineering

III B.Tech,I Sem.,I Mid Term Examination ,21 October 2021

Hydrology and Water Resources Engineering (GR18A3005)

 Name of student: **Roll No:**

Time :10 minutes   Max. Marks:5

PART A (Answer all questions)

1.   An   Isobar is a line joining points of   [
                                                                                  ]
      (a) equal rainfall depth (2) equal pressure (3) equal density (4) equal height

2. Which of the following formations does not contain any groundwater   [   ]

      (a) Aquifer (b) Aquifuge (c) Aquitard   (d) Aquiclude

3.   The Rainfall Hyetograph is the graph drawn between   [
                                                                                  ]
      (a) Effective Rainfall Vs. Time (b) Total Rainfall Vs. Time (c) Rainfall   Vs.
                                    Intensity   Time

(d) None of the above

4. The instrument which measures Evapotranspiration is known as [   ]
(a) Atmometer (b) Lysimeter (c) Anemometer (d) None of the above

5. The upper limit of Reynold's Number for the Darcy's Law to be valid for Groundwater flow is
(a) ONE   (b) Two   (c) One Hundred   (d) None of the above   [   ]

6. The S-curve is the summation of the   [   ]
(a) Unit Hydrograph (b) Total Runoff Hydrograph   (c) Effective Rainfall
Hyetograph

(d) Base flow recession curve

7. The S-curve Hydrograph is used   [   ]

(a) To develop synthetic unit hydrograph (b) to estimate the peak flood flow (c) to convertthe unit hydrograph of any given duration into a unit hydrograph of any other desired duration (d) None of the above

8. Darcy's Law for groundwater movement states that the velocity is proportional to [   ]
(a) the hydraulic gradient (b) the reciprocal of the hydraulic gradient (c) the square of the hydraulic gradient (d) the logarithm of the hydraulic gradient

9. Specific yield of an aquifer is defined as the ratio of the   [   ]
(a) Volume of pore space to the volume of soil (b) Volume of water freely drained from a saturated soil to the volume of soil (c) Volume of water retained when a saturated soil is feely drained to the Volume of soil (d) None of the above

10. Infiltration Capacity of soil is defined as   [   ]

(a) the depth of water absorbed by the soil during the storm (b) the intensity of rainfall above which the rainfall volume equals the observed rainfall volume (c) the maximum rate at which the soil absorbs water (d) the permeability of the soil in vertical direction.

GR18A3005 **Gokaraju Rangaraju Institute of Engineering and Technology**

Department of Civil Engineering

III B.Tech,I Sem.,I Mid Term Examination , 21 October 2021

Hydrology and Water Resources Engineering(GR18A3005)

Time :90 minutes   Max. Marks:15

PART B (Answer any three questions)   (3x 5=15)

Obtain

(1)(a) Explain the various methods of processing rainfall data with neat sketches ? (2 Marks)(b) Theissen polygons constructed for a network of ten raingauges in a river basin yielded Theissen weights of 0.1, 0.16, 0.12, 0.11, 0.09, 0.08,0.07,0.11, 0.06 and 0.1. If the rainfalls recorded at these gauges during a cyclonic storm are 132, 114, 162, 138, 207,156, 135, 158, 168 and 150mm respectively , determine the average depth of rainfall by Thiessen mean and Arthemic mean methods

(3 Marks)

(2)(a) Briefly explain steps to derive Unit Hydrograph from the rainfall records without stating assumptions ?   (2 Marks)

(b) Derive the S- curve ordinates for the 4 Hr. Unit Hydrograph given below (3 Marks)

Time (h)	0	4	8	12	16	20	24	28
Unit Hydrograph Ordinates (m^3/s)	0	10	30	25	18	10	5	0

(3)(a)Derive an expression for the steady radial flow of a well in a unconfined aquifer (2 Marks)

(b) In a water table aquifer of 50 m. thickness , a 20 cm diameter well is pumped at a uniform rate of

0.05 m^3/sec.If the steady state drawdown measured in the observation wells located at 10m. and 100m. distances from the well are 6.5 m. and 0.25m. respectively , determine the Hydraulic Conductivity of the aquifer (3 Marks)

4. The ordinates of a 4 Hour Unit Hydrograph of a basin of area 300 km^2 measured at 1 hour intervals are 6, 36, 66,91, 106, 93, 79, 68 58, 49 , 41, 34, 27, 23, 17, 13, 9, 6,3 and 1.5 m^3/sec respectively. Obtain the ordinates of 3 Hour Unit Hydrograph for the basin using S -Curve technique (5 Marks)

GR18A3005

Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

Descriptive Paper (2021-22)

III B.Tech,I Sem.,II Mid Term Examination , 14 December 2021

Hydrology and Water Resources Engineering (Subject Code :GR18A3005)

Time :90 minutes   Date of Examination : 14-12-2021   Max. Marks:15

Answer any three Questions   **All Questions Carry Equal Marks**

1)(a)Explain briefly   i) Soil Fertility ii) Water Application Efficiency iii) Balancing Depth of cutting in canals iv) Waterlogging ?   (2 Marks)   (CO 4)

(b) Discuss various methods of application of irrigation and state briefly the advantages of each method ?(3 Marks) (CO 4)

(2)(a) Define Standards of Quality for   Irrigation Water(2 Marks)   (CO4)
  (b) The following data pertains to the healthy growth of a crop.   (3 Marks)
      (i) Field capacity of the soil =30%
      (ii) Permanent wilting percentage = 11%
      (iii) Density of soil = 1300 kg/m^3 .Density of water = 1000 kg/m^3
      (iv) Effective depth of root zone = 700 mm
       (v) Daily consumptive use of water for the given crop = 12mm
For healthy growth, moisture content must not fall below 25% of the water holding capacity between the field capacity and the permanent wilting point. Determine the watering interval in days (CO4)

(3)(a) Derive the relationship   between Duty and Delta ? What are the factors affecting Duty ?(CO4) (2 Marks)

  (b)A stable channel is to be designed for the discharge of 40 m^3/s and f=1. Calculate the dimensions of the channel using Lacey's theory . Assume any other data if necessary (3 Marks) (CO5)

(4) (a) List the methods of stream gauging to estimate the stream flow ?(CO4) (2 Marks)

(b) Explain very briefly the step by step procedure to compute Runoff from Watershed using SCSCurve Number method ? (3 Marks) (CO5)

GR18A3005

GR18A3005

Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

Objective Paper (2021-22)

III B.Tech,I Sem.,II Mid Term Examination , December 2021
Hydrology and Water Resources Engineering (Subject Code :GR18A3005)

Time :30 minutes   Date of Examination : 14-12-2021   Max. Marks:5

Answer All Questions   **All Questions Carry Equal Marks**

Name :_____   Hall Ticket No. ☐☐☐☐☐☐☐☐☐☐

II   Choose the correct alternative

1. Soil Moisture stress is the sum of   [   ]

   (a) Soil Moisture Tension and Osmotic Pressure of Soil Solution (b) Field capacity and PermanentWilting Point (c) Saturation capacity and Field Capacity (d) None of the above

2. Indian Standard IS 4745 – 1968 deals with   [   ]
   (a) Design of unlined canals (b) Design of lined canals (c) Design of bridges (d) None of the above

3. Available moisture is the difference between   [   ]
   (a) Field capacity and Permanent Wilting point (b) Saturation capacity and Field capacity (c) Fieldcapacity and Moisture Equivalent (d) None of the above

4. Relation between Duty and Delta is (where Delta in m.,D in Hectres/cumecs and B in days [

   ]
   (a) 8.46 D/B   (b) 8.64 B/D   (c) 8.64 D/B   (d) None of the above

5. The most suitable water for Irrigation
   [   ]
   (a) C1-S1 (b) C2-S2 (c) C4-S1 (d) C 1 - S 4

6.Lacey'stheory of design does not involve any trial and error procedure where as kennedy's theory involves a trial and error procedure .   [
   ]
(a) True (b) False (c) We can not say (d) None of the above

7.Indian Standard IS 7112-1973 deals with   [
   ]
 (a) Design of lined channels (b) Design of unlined channels in Alluvial soils (c) Design of unlined channelsin rocky soils (d) None of the above

8. The rating curve of a stream gauging station gives the variation of discharge in the stream with [
 ]
 (a) the area of the flow (b) the stage (c) the depth of flow (d) the velocity of flow
9. In two point method of finding the mean velocity across a vertical in a stream using a current
meter, the velocities are measured above the stream bed at   [   ]
 (a) 0.25 and 0.75 depths (b) 0.2 and 0.8 depths (c) 0.4 and 0.6 depths (d) 0.15 and 0.85
 depths
10 .Flood Frequency Analysis makes use of the observed data in the past to predict the
future flood events along with   [
                                                                                          ]
(a) probabilities or return periods (b) magnitude (c) time (d) None of the above

Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

MID-I AND MID-II MARKS   SECTION-A

S.NO	ROLL NO.	NAME	MID-I 20	MID-II 20
		MID I & II EXAM		
1	18241A0151	SOHEB PATEL	6	6
2	18241A0152	SRIAM SHIVA ADITYA	AB	AB
3	19241A0101	RUHAIL AHMAD LONE	2	4
4	19241A0102	AITHA SAI TEJA	16	20
5	19241A0103	BARISETTY SHIVA KARTHIK	8	15
6	19241A0104	BENDHI VARUN THEJA GOUD	10	20
7	19241A0105	BHUKYA VAMSHI	14	8
8	19241A0106	BOGE VENKAT ROHITH	4	6
9	19241A0107	BONTHA PRANEETHKUMAR	11	14
10	19241A0108	CHILUKA RAHUL	11	10
11	19241A0109	DANDI KIRAN	17	14
12	19241A0110	DAYYA RAGNESH	4	4
13	19241A0111	E MANISH GOUD	6	2
14	19241A0112	ERRAM SAI PRIYA	15	14
15	19241A0113	G DEEPIKA	12	14
16	19241A0114	GORANTALA SAI	20	20
17	19241A0115	GUGULOTHU SANTHOSH	18	14
18	19241A0116	GURIJALA SAI KUMAR	2	6
19	19241A0117	GURUJALA SRIDHAR	2	1
20	19241A0118	IRUVANTI HEMANTH KUMAR	16	11
21	19241A0119	JANGITI VYSHNAVI	13	20

22	19241A0120	JARUPLA CHERAN	13	17
23	19241A0122	JETTI SREEVANI	18	18
24	19241A0123	K SOWMYA	19	19
25	19241A0124	KADALI KRISHNASRI SAI	7	6
26	GR18A3005 19241A0125	KAMAREDDY AKSHAY	5	7
27	19241A0126	KATTA SAI KUMAR	20	19
28	19241A0127	KOLLURI.TEJASWI	16	18
29	19241A0128	KONDAPURAM SRIJA	16	17
30	19241A0129	KOTTE VIVEK	5	5
31	19241A0130	KRUTHIKA VIJAY PALANGE	16	20
32	19241A0131	MADA AKHIL REDDY	15	14
33	19241A0132	MADARAM SHRAVAN KUMAR REDDY	20	19
34	19241A0133	MADDIGATLA AJAY SAGAR	5	1
35	19241A0134	CHANDANA MALPATEL	15	16
36	19241A0135	MANDALA CHINNI	7	1
37	19241A0136	MIREGILLA VIJAYAKUMAR	11	9
38	19241A0137	MOHD OBAID KASHIF	15	15
39	19241A0138	NARAPAKA MADHAV KUMAR	10	5
40	19241A0139	NIMMALA ARSHITHA	7	18
41	19241A0141	P SIDDARTHA	AB	AB
42	19241A0142	PAGIDIPALLY AJAY KUMAR	16	17
43	19241A0143	PALLAPU NAVEEN	10	15
44	19241A0144	PALLE SANATH KUMAR	19	18
45	19241A0145	PANTANGI PRANAY	9	10
46	19241A0146	PATIL SWAPNIL	5	4
47	19241A0147	POLISETTY SAAHAS	13	19
48	19241A0148	S.SAITEJA	13	9
49	19241A0149	SAI NEERAJ M	7	5
50	19241A0150	SATYA SAI PRASANNA REDDY SOLIPETA	AB	1
51	19241A0151	SHAIK BILAL	5	3
52	19241A0152	SHAIK FIRDOUS AYESHA	18	19
53	19241A0153	SOORA VIKAS	15	7
54	19241A0154	TELLAM SRI SAI PAVANA ROSHINI	17	20
55	19241A0155	THALLAPALLY SWARANYA	16	17
56	19241A0156	THUMATI VENKATA VAYUNANDHAN	5	4
57	19241A0157	UDUMULA NIKHIL REDDY	7	6
58	19241A0158	VELISHALA GAYATHRI	19	19
59	19241A0159	VENKATA SIDDHARTHA RAJU VEGESNA	5	6
60	19241A0160	YASWANTH KURUVA	19	19

GR18A3005

MID-I AND MID-II MARKS   SECTION-B

	MID II EXAM		MID -I	MID -II
S.NO	ROLL NO.	NAME	20	20
1	19241A0161	ABDUL RAHEEM	14	10
2	19241A0162	ANEMONI MURALI MANOHAR	10	8
3	19241A0163	ASKANY HARISH SAGAR	5	2
4	19241A0164	BODLA AKSHITH	15	11
5	19241A0165	BURRA VAMSHI KRISHNA	20	20
6	19241A0166	CHERLAKOLA AKHILA	18	19
7	19241A0167	CHINTAPALLI VIKRAM	17	15
8	19241A0168	CHIRRIBOYINA DHANYA	18	19
9	19241A0169	D SREE MADHURI	9	15
10	19241A0170	GADDAM SAHITHI	10	10
11	19241A0171	GAJJALA SUKENDHAR REDDY	10	6
12	19241A0172	YASHASWI GANGAVARAM	7	9
13	19241A0173	GINDHAM ADITYA KUMAR	20	12
14	19241A0174	GUDHETI NARENDAR REDDY	17	9
15	19241A0175	GUMMADI SAI PRATEEK REDDY	AB	5
16	19241A0176	HANMAPUR DHEERAJ GOUD	9	6
17	19241A0177	JAVVAJI AISHWARYA	16	15
18	19241A0178	JULAPALLY NITHIN RAO	6	10
19	19241A0179	K NAVEEN	11	8
20	19241A0180	K RAJESHWARI	20	18
21	19241A0181	KACHAVA SURENDAR	18	17
22	19241A0182	KODATHALA INDU	18	15
23	19241A0183	KOTARU SRINIVASA VARAPRASAD	13	18
24	19241A0184	MALOTH RAHUL	7	7

25	19241A0185	MATURI SATHWIK	20	18
26	19241A0186	MD ABDUL MAAJID	2	4
27	19241A0187	MEDARI DAYANA	15	19
28	19241A0188	NARSINGA SANDEEP	11	9
29 19R18A3005	19241A0189	PALANATI ROHITH	6	6
30	19241A0190	PURALASETTY BHAVANA	19	15
31	19241A0191	RODDA MALAVIKA REDDY	17	18
32	19241A0192	SAPRAM NAGA SRILOWKYA MUKTHA	AB	16
33	19241A0193	SHAIK PARVEZ ANSARI	AB	AB
34	19241A0194	SIDDELA THARUN KUMAR	6	4
35	19241A0195	TALARI CHANDANA SREE	11	7
36	19241A0196	VALLEPU KALYAN	16	10
37	19241A0197	VRASHAB PATEL	20	16
38	19241A0198	YELLAVULA NARENDER	10	12
39	19241A0199	BADDELA SAI THARUN	13	9
40	20245A0101	Aamanchi Bowmi	20	19
41	20245A0102	Aviraboina Sai Chaithanya	18	14
42	20245A0103	Bairy B S Anirudh	11	7
43	20245A0104	Daddu Tejasree	20	20
44	20245A0105	Dopathi Raviteja	15	17
45	20245A0106	Eruventi Niharika	18	16
46	20245A0107	Gaddamidi Aanil	10	9
47	20245A0108	Gandla Rishik Raj	20	16
48	20245A0109	Gone Naveen Kumar	14	16
49	20245A0110	Kota Vishal	17	15
50	20245A0111	Kummari Mahesh	14	15
51	20245A0112	Lakavath Anil	6	17
52	20245A0113	Madavaram Rohith	19	14
53	20245A0114	Mandala Akshitha	20	19
54	20245A0115	M Manjunath	17	17
55	20245A0116	Porandla Nababhushanam	20	16
56	20245A0117	Pulishetty Bhavani	11	13
57	20245A0118	Racha Kranthi Ranadeer	16	12
58	20245A0119	S Manoj Kumar	19	19
59	20245A0120	Samudrala Manideep	20	16
60	20245A0121	Sangepaga Goutham	10	6
61	20245A0122	Sodadasi Rahul	18	20
62	20245A0123	Vanga Harshith	16	14
63	20245A0124	Choleti Vineetha	19	19
64	20245A0125	Gangula Grishma	10	20
65	20245A0126	Bollampalli Sai Poojith	9	12
66	20245A0127	Pamulapati Sumanth	13	8
67	20245A0128	T Sanghamithra	17	16
68	20245A0129	Abeda Akanksha	15	16
69	20245A0130	Doppalapudi Ramvineeth Sai	9	6
70	20245A0131	Pilly Uday Kiran	15	10

GR18A3005

HWRE Lesson plan
Section B.docx

HWRE Lesson plan
Section A.docx