

Ref No:

SRI KRISHNA INSTITUTE OF TECHNOLOGY, BANGALORE-90



COURSE PLAN

Academic Year 2019-20

| | |
|----------------------|----------------------------|
| Program: | B E – CIVIL Engineering |
| Semester : | 6TH |
| Course Code: | 17CV661 |
| Course Title: | Water Resources Management |
| Credit / L-T-P: | 4 / 4-0-0 |
| Total Contact Hours: | 40 |
| Course Plan Author: | DR. K. SATISH |

Academic Evaluation and Monitoring Cell

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Table of Contents

| | |
|--|----|
| A. COURSE INFORMATION..... | 3 |
| 1. Course Overview..... | 3 |
| 2. Course Content..... | 3 |
| 3. Course Material..... | 4 |
| 4. Course Prerequisites..... | 5 |
| 5. Content for Placement, Profession, HE and GATE..... | 5 |
| B. OBE PARAMETERS..... | 5 |
| 1. Course Outcomes..... | 5 |
| 2. Course Applications..... | 6 |
| 3. Articulation Matrix..... | 6 |
| 4. Curricular Gap and Content..... | 7 |
| C. COURSE ASSESSMENT..... | 7 |
| 1. Course Coverage..... | 7 |
| 2. Continuous Internal Assessment (CIA)..... | 7 |
| D1. TEACHING PLAN - 1..... | 8 |
| Module - 1..... | 8 |
| Module - 2..... | 9 |
| E1. CIA EXAM - 1..... | 10 |
| a. Model Question Paper - 1..... | 10 |
| b. Assignment -1..... | 10 |
| D2. TEACHING PLAN - 2..... | 14 |
| Module - 3..... | 14 |
| Module - 4..... | 15 |
| E2. CIA EXAM - 2..... | 16 |
| a. Model Question Paper - 2..... | 16 |
| b. Assignment - 2..... | 16 |
| D3. TEACHING PLAN - 3..... | 19 |
| Module - 5..... | 19 |
| E3. CIA EXAM - 3..... | 20 |
| a. Model Question Paper - 3..... | 20 |
| b. Assignment - 3..... | 21 |
| F. EXAM PREPARATION..... | 24 |
| 1. University Model Question Paper..... | 24 |
| 2. SEE Important Questions..... | 25 |
| Course Outcome Computation..... | 27 |
| Academic Year..... | 27 |
| Odd / Even semester..... | 27 |

Note : Remove "Table of Content" before including in CP Book
 Each Course Plan shall be printed and made into a book with cover page
 Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

A. COURSE INFORMATION

1. Course Overview

| | | | |
|---------|-------------------|----------|-----|
| Degree: | CIVIL ENGINEERING | Program: | B.E |
|---------|-------------------|----------|-----|

| | | | |
|----------------------|----------------------------|----------------|-------------|
| Semester: | 6 | Academic Year: | 2020 |
| Course Title: | Water Resources Management | Course Code: | 17CV661 |
| Credit / L-T-P: | 4/4-0-0 | SEE Duration: | 180 Minutes |
| Total Contact Hours: | 40 Hours | SEE Marks: | 60 Marks |
| CIA Marks: | 40 Marks | Assignment | 1 / Module |
| Course Plan Author: | DR. K. SATISH | Sign .. | Dt: |
| Checked By: | | Sign .. | Dt: |
| CO Targets | CIA Target : 80 % | SEE Target: | 85% |

Note: Define CIA and SEE % targets based on previous performance.

2. Course Content

Content / Syllabus of the course as prescribed by University or designed by institute. Identify 2 concepts per module as in G.

| Module | Content | Teaching Hours | Identified Module Concepts | Blooms Learning Levels |
|--------|---|----------------|---|------------------------|
| 1 | Hydrologic Cycle, Global water resources and Indian Water resources, Surface Water Resources, Water Balance, Available Renewable Water Resources, Water Scarcity, The Water Balance as a Result of Human Interference, Groundwater Resources, Types of Aquifers, Groundwater as a Storage Medium | 08 | Water Resources | L3 |
| 2 | Necessity, System components, planning scales, Approaches, planning and management aspects, Analysis, Models for impact prediction and evaluation, Adaptive Integrated Policies, Post Planning and management Issues. | 08 | Planning and Management of Water resources. | L3 |
| 3 | Definition of IWRM, Principles, Implementation of IWRM, Legislative and Organizational Framework, Types and Forms of Private Sector Involvement. | 08 | IWRM Policies | L4 |
| 4 | Legal Framework of Water – Substance of National Water Laws – Other key issues – Changing incentives through Regulation - National Water Policy – National-Level Commissions – Irrigation Management Transfer Policies and Activities – Legal Registration of WUAs – Legal Changes in Water Allocation, – Role of Local Institutions – Community Based Organizations – Water Policy Reforms: India. | 08 | Regulations of Water Policy | L3 |
| 5 | Water Harvesting Techniques – Micro-catchments - Design of Small Water Harvesting Structures – Farm Ponds – Percolation Tanks – Yield from a Catchment, Rain water Harvesting-various techniques related to Rural and Urban area. | 08 | Water Harvesting and Conservation | L3 |
| - | Total | 40 | - | - |

3. Course Material

Books & other material as recommended by university (A, B) and additional resources used by course teacher (C).

1. Understanding: Concept simulation / video ; one per concept ; to understand the concepts ; 15 – 30 minutes
2. Design: Simulation and design tools used – software tools used ; Free / open source
3. Research: Recent developments on the concepts – publications in journals; conferences, etc.

| Modules | Details | Chapters in book | Availability |
|----------|--|------------------|------------------|
| A | Text books (Title, Authors, Edition, Publisher, Year.) | - | - |
| | K. Subramanya, "Engineering Hydrology". | 3, 4 | In Lib / In Dept |
| | Jayarami Reddy, "A Text Book of Hydrology". | 2, 4 | In Lib/ In dept |
| B | Reference books (Title, Authors, Edition, Publisher, Year.) | - | - |
| | Lal, Ruttan. " Integrated Watershed Management in the Global | | In Lib |

| | | | |
|----------|--|---|---------------|
| | Ecosystem". | | |
| | Heathcote, I. W. Integrated Watershed Management: Principles and Practice. | | Not Available |
| | | | In lib |
| C | Concept Videos or Simulation for Understanding | - | - |
| C1 | | | |
| C2 | | | |
| C3 | | | |
| C4 | | | |
| C5 | | | |
| C6 | | | |
| C7 | | | |
| C8 | | | |
| C9 | | | |
| C10 | | | |
| D | Software Tools for Design | - | - |
| | | | |
| | | | |
| | | | |
| E | Recent Developments for Research | - | - |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| F | Others (Web, Video, Simulation, Notes etc.) | - | - |
| 1 | | | |
| ? | | | |

4. Course Prerequisites

Refer to GL01. If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

Students must have learnt the following Courses / Topics with described Content . . .

| Mod ules | Course Code | Course Name | Topic / Description | Sem | Remarks | Blooms Level |
|-------------|----------------|-------------|---------------------|-----|---------|-----------------|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| - | | | | | | |

5. Content for Placement, Profession, HE and GATE

The content is not included in this course, but required to meet industry & profession requirements and help students for Placement, GATE, Higher Education, Entrepreneurship, etc. Identifying Area / Content requires experts consultation in the area.

Topics included are like, a. Advanced Topics, b. Recent Developments, c. Certificate Courses, d. Course Projects, e. New Software Tools, f. GATE Topics, g. NPTEL Videos, h. Swayam videos etc.

| Mod | Topic / Description | Area | Remarks | Blooms |
|-----|---------------------|------|---------|--------|
|-----|---------------------|------|---------|--------|

| ules | | | | Level |
|------|--|--|--|-------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| - | | | | |

B. OBE PARAMETERS

1. Course Outcomes

Expected learning outcomes of the course, which will be mapped to POs. Identify a max of 2 Concepts per Module. Write 1 CO per Concept.

| Mod ules | Course Code.# | Course Outcome At the end of the course, student should be able to . . . | Teach. Hours | Concept | Instr Method | Assessme nt Method | Blooms' Level |
|-------------|------------------|---|-----------------|--------------------------|----------------------|--------------------------|------------------|
| 1 | 17CV661.1 | Students should be able to understand hydrological cycle, surface and groundwater, water scarcity, vertical distribution of groundwater, aquifers, etc. | 08 | Global Water Resources | Lecture | Slip Test | Understand L3 |
| 2 | 17CV661.2 | Student should be able to understand the importance of water, policies, planning and management. | 08 | Planning and Management | Lecture/ Tutorial | Assignme nt | Understand L3 |
| 3 | 17CV661.3 | Student should be able to Know how to implement IWRM in different regions and private sector involvement. | 08 | IWRM | Lecture | Assignme nt | Analyze L4 |
| 4 | 17CV661.4 | Student should be able to understand the national water law policies, Irrigation Management Transfer Policies and role of local institutions. | 08 | Policy Implementation | Lecture | Slip Test | Apply L3 |
| 5 | 17CV661.5 | Student should be able to understand the different methods adopted for harvesting of water and water conservation methods in different regions. | 08 | Water Policy Regulations | Lecture | Slip test | Apply L3 |
| | | | | | | | |
| | | | | | | | |
| - | - | Total | 40 | - | - | - | L2-L4 |

2. Course Applications

Write 1 or 2 applications per CO.

Students should be able to employ / apply the course learnings to . . .

| Mod ules | Application Area Compiled from Module Applications. | CO | Level |
|-------------|--|-----|-------|
| 1 | The main uses of surface and groundwater include drinking water and other public | CO1 | L3 |

| | | | |
|---|---|-----|----|
| | uses, irrigation uses, industrial uses, and for the use by the thermoelectric power plant industry | | |
| 2 | Water resource management helps in the planning, developing, distributing, and managing the optimum use of water resources. | CO2 | L4 |
| 3 | Implementation of IWRM in different regions and private sector involvement. | CO3 | L3 |
| 4 | It helps in making regulations and policies in the development of water management. | CO4 | L3 |
| 5 | Water harvesting and conservation of water include modern techniques involved in harvesting of rain water | CO5 | L3 |

3. Articulation Matrix

CO – PO Mapping with mapping level for each CO-PO pair, with course average attainment.

| - Mo dul es | - CO.# | Course Outcomes At the end of the course student should be able to ... | Program Outcomes | | | | | | | | | | | | | | | - Lev el | |
|----------------------|-----------|---|------------------|----------|------|------|------|------|------|------|------|-------|-------|-------|-------|----------|-------|----------------|---|
| | | | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1 | PS O2 | PS O3 | | |
| 1 | 17CV661.1 | Student should be able to understand the water resources. | 2.1 | - | - | - | - | - | 1.5 | - | - | - | - | - | - | 2.1 | - | - | - |
| 1 | 17CV661.2 | Student should be able to understand the importance of water and the aquifers | 2.1 | - | 1 | - | - | 2.1 | 1.5 | - | - | - | - | - | - | 2.1 | - | 1 | - |
| 2 | 17CV661.3 | Student should be able to identify and address the issues related to planning and management of water resources | 2.1 | 2.2 5 | - | - | - | 2.1 | - | - | - | - | - | - | 2.1 | 2.2 5 | - | - | - |
| 3 | 17CV661.4 | Student should be able to Know how to implement IWRM in different regions | - | 2.2 5 | - | - | - | 2.1 | - | - | - | 1 | - | - | - | 2.2 5 | - | - | - |
| 4 | 17CV661.5 | Student should be able to understand the legal issues, regulations of water policy | - | - | - | - | - | 2.1 | - | - | - | - | - | - | - | - | - | - | - |
| 5 | 17CV661.6 | Student should be able to understand the different methods adopted for harvesting of water. | 2.1 | - | - | - | - | 2.1 | - | - | - | - | - | - | 2.1 | - | - | - | - |
| 5 | 17CV661.7 | Student should be able to understand the water conservation methods in different regions . | 2.1 | - | - | - | - | - | 1.5 | - | - | - | - | - | 2.1 | - | - | - | - |
| | | | 2.1 | 2.2 5 | 1 | - | - | 2.1 | 1.5 | - | - | 1 | - | - | - | - | - | - | - |
| - | PO, PSO | 1.Engineering Knowledge; 2.Problem Analysis; 3.Design / Development of Solutions; 4.Conduct Investigations of Complex Problems; 5.Modern Tool Usage; 6.The Engineer and Society; 7.Environment and Sustainability; 8.Ethics; 9.Individual and Teamwork; 10.Communication; 11.Project Management and Finance; 12.Life-long Learning; S1.Software Engineering; S2.Data Base Management; S3.Web Design | | | | | | | | | | | | | | | | | |

4. Curricular Gap and Content

Topics & contents not covered (from A.4), but essential for the course to address POs and PSOs.

| Mod ules | Gap Topic | Actions Planned | Schedule Planned | Resources Person | PO Mapping |
|-------------|-----------|-----------------|------------------|------------------|------------|
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

C. COURSE ASSESSMENT

1. Course Coverage

Assessment of learning outcomes for Internal and end semester evaluation. Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

| Modules | Title | Teach. Hours | No. of question in Exam | | | | | | CO | Levels |
|---------|---|--------------|-------------------------|----------|----------|----------|-----------|-----------|---------|--------------|
| | | | CIA-1 | CIA-2 | CIA-3 | Asg | Extra Asg | SEE | | |
| 1 | Surface and Ground water Resources | 08 | 2 | - | - | 1 | 1 | 2 | CO1,CO2 | L2 |
| 2 | Water Resources Planning and Management | 08 | 2 | - | - | 1 | 1 | 2 | CO3 | L4 |
| 3 | Integrated Water Resources Management | 08 | - | 2 | - | 1 | 1 | 2 | CO4 | L2 |
| 4 | Water Governance and Water Policy | 08 | - | 2 | - | 1 | 1 | 2 | CO5 | L2 |
| 5 | Water Harvesting and Conservation. | 08 | - | - | 4 | 1 | 1 | 2 | CO6,CO7 | L5 |
| - | Total | 40 | 4 | 4 | 4 | 5 | 5 | 10 | | L2-L5 |

2. Continuous Internal Assessment (CIA)

Assessment of learning outcomes for Internal exams. Blooms Level in last column shall match with A.2.

| Modules | Evaluation | Weightage in Marks | CO | Levels |
|---------|---------------------------------|--------------------|----------------|-------------|
| 1, 2 | CIA Exam - 1 | 15 | CO1, CO2, CO3, | L2,L4,L3,L2 |
| 3, 4 | CIA Exam - 2 | 15 | CO4,CO5 | L2,L3,L3,L4 |
| 5 | CIA Exam - 3 | 15 | CO6,CO7 | L5 |
| 1, 2 | Assignment - 1 | 05 | CO1, CO2, CO3, | L2,L4,L3,L2 |
| 3, 4 | Assignment - 2 | 05 | CO4,CO5 | L2,L3,L3,L4 |
| 5 | Assignment - 3 | 05 | CO6,CO7 | L5 |
| 1, 2 | Seminar - 1 | | - | - |
| 3, 4 | Seminar - 2 | | - | - |
| 5 | Seminar - 3 | | - | - |
| 1, 2 | Quiz - 1 | | - | - |
| 3, 4 | Quiz - 2 | | - | - |
| 5 | Quiz - 3 | | - | - |
| 1 - 5 | Other Activities - Mini Project | - | - | - |
| | Final CIA Marks | 20 | - | - |

D1. TEACHING PLAN - 1

Module - 1

| Title: | Surface and Ground water Resources | Appr Time: | 8 |
|----------|---|------------|---------------------|
| a | Course Outcomes | CO | Blooms Level |
| - | At the end of the topic the student should be able to . . . | - | |
| 1 | Student should be able to understand the water resources. | CO1 | L2 |
| 2 | Student should be able to understand the importance of water and the aquifers | CO2 | L2 |
| b | Course Schedule | - | - |

| Class No | Portion covered per hour | - | - |
|-----------------|--|----------|----------|
| 1 | Hydrologic Cycle, Global water resources and Indian Water resources. | CO1 | L2 |
| 2 | Surface Water Resources. | CO1 | L2 |
| 3 | Water Balance. | CO1 | L2 |
| 4 | Available Renewable Water Resources. | CO1 | L2 |
| 5 | Water Scarcity. | CO1 | L2 |
| 6 | The Water Balance as a Result of Human Interference. | CO1 | L2 |
| 7 | Groundwater Resources, Types of Aquifers. | CO2 | L2 |
| 8 | Groundwater as a Storage Medium. | CO2 | L2 |
| | | | |
| c | Application Areas | - | - |
| - | Students should be able employ / apply the Module learnings to . . . | - | - |
| 1 | | | |
| 2 | | | |
| | | | |
| d | Review Questions | - | - |
| - | The attainment of the module learning assessed through following questions | - | - |
| 1 | With a neat sketch, explain hydrological cycle | CO1 | L2 |
| 2 | Give a summary on global water resources and indian water resources | CO1 | L2 |
| 3 | With a sketch, explain confined and unconfined aquifer | CO2 | L2 |
| 4 | What is water scarcity? Summarize the contributing factors of water scarcity | CO1 | L2 |
| 5 | Explain the ground water storage basin cross section | CO1 | L2 |
| 6 | Explain the different classification of saturation zone, based on their water bearing capacity | CO1 | L2 |
| 7 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | CO2 | L2 |
| | | | |
| e | Experiences | | |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Module – 2

| Title: | Water Resources Planning and Management | Appr Time: | 7 Hrs |
|-----------------|--|-------------------|---------------------|
| a | Course Outcomes | CO | Blooms Level |
| - | At the end of the topic the student should be able to . . . | - | |
| 1 | Student should be able to identify and address the issues related to planning and management of water resources. | | |
| | | | |
| b | Course Schedule | - | - |
| Class No | Portion covered per hour | - | - |
| 13 | Necessity, System components, | CO3 | L2 |
| 14 | planning scales, Approaches, | CO3 | L2 |
| 15 | Approaches, | CO3 | L2 |
| 16 | planning and management aspects, | CO3 | L2 |
| 17 | Analysis, | CO3 | L4 |
| 18 | Models for impact prediction and evaluation, | CO3 | L2 |
| 19 | Adaptive Integrated Policies, | CO3 | L2 |
| 18 | Post Planning and management Issues. | CO3 | L2 |
| | | | |
| | | | |

| | | | |
|----------|--|-----|----|
| c | Application Areas | - | - |
| - | Students should be able employ / apply the Module learnings to . . . | - | - |
| 1 | | | |
| 2 | | | |
| d | Review Questions | - | - |
| - | The attainment of the module learning assessed through following questions | - | - |
| 14 | Explain the necessity of water resources planning and management. | CO3 | L2 |
| 15 | Explain the spatial and temporal scales of planning and management. | CO3 | L2 |
| 16 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | CO3 | L4 |
| 17 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | CO4 | L2 |
| e | Experiences | - | - |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

E1. CIA EXAM – 1

a. Model Question Paper - 1

| | | | | | | | | |
|-----------|--------|--|-----|--------|----|--------------|------------|--------------|
| Crs Code: | 15EC71 | Sem: | VII | Marks: | 30 | Time: | 75 minutes | |
| Course: | | | | | | | | |
| - | - | Note: Answer all questions, each carry equal marks. Module : 1, 2 | | | | Marks | CO | Level |
| 1 | a | With a neat sketch, explain hydrological cycle | | | | 07 | CO1 | L2 |
| | b | Give a summary on global water resources and indian water resources | | | | 08 | CO2 | L2 |
| | | With a sketch, explain confined and unconfined aquifer | | | | | | |
| | | OR | | | | | | |
| 2 | a | What is water scarcity? Summarize the contributing factors of water scarcity | | | | 05 | CO1 | L2 |
| | b | Explain the different classification of saturation zone, based on their water bearing capacity | | | | 05 | CO2 | L2 |
| | C | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | | | | 05 | CO2 | L2 |
| 3 | a | Explain the necessity of water resources planning and management. | | | | 07 | CO3 | L2 |
| | b | Explain the spatial and temporal scales of planning and management. | | | | 08 | CO3 | L2 |
| | | OR | | | | | | |
| 4 | a | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | | | | 07 | CO3 | L3 |
| | b | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | | | | 08 | CO | L2 |

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

| | | | | | | | |
|-----------------------------------|--|------|-----|--------|---------------|-------|------------------|
| Model Assignment Questions | | | | | | | |
| Crs Code: | | Sem: | VII | Marks: | 5 | Time: | 90 – 120 minutes |
| Course: | | | | | Module : 1, 2 | | |

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

| SNo | USN | Assignment Description | Marks | CO | Level |
|-----|-------------|--|-------|-----|-------|
| 1 | 1KT14CV065 | With a neat sketch, explain hydrological cycle | 05 | CO1 | L2 |
| 2 | 1KT14CV071 | Give a summary on global water resources and indian water resources | 05 | CO1 | L2 |
| 3 | 1KT15CV016 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |
| 4 | 1KT15CV026 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO1 | L2 |
| 5 | 1KT16CV001 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 6 | 1KT16CV002 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 7 | 1KT16CV004 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 8 | 1KT16CV005 | Explain the necessity of water resources planning and management. | 05 | CO1 | L2 |
| 9 | 1KT16CV006 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 10 | 1KT16CV007 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 11 | 1KT16CV008 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 12 | 1KT16CV009 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 13 | 1KT16CV011 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 14 | 1KT16CV016 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 15 | 1KT16CV017 | Explain the necessity of water resources planning and management. | 05 | CO3 | L2 |
| 16 | 1KT16CV018 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 17 | 1KT16CV019 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 18 | 1KT16CV021 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 19 | 1KT16CV022 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO1 | L2 |
| 20 | 1KT16CV023 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |
| 21 | 1KT16CV027 | Give a summary on global water resources and indian water resources | 05 | CO1 | L2 |
| 22 | 1KT16CV029 | With a neat sketch, explain hydrological cycle | 05 | CO3 | L2 |
| 23 | 1KT16CV030 | Explain the necessity of water resources planning and management. | 05 | CO3 | L2 |
| 24 | 1KT16CV031 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 25 | 1KT16CV037 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 26 | 1KT16CV045 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 27 | 1KT16CV0412 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 28 | 1KT16CV0431 | With a neat sketch, explain hydrological cycle | 05 | CO1 | L2 |
| 29 | 1KT16CV436 | Give a summary on global water resources and indian water | 05 | CO3 | L2 |

| | | | | | |
|----|-------------|--|----|-----|----|
| | | resources | | | |
| 30 | 1KT16CV0440 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |
| 31 | 1KT16CV0447 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO2 | L2 |
| 32 | 1KT17CV400 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 33 | 1KT17CV401 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 34 | 1KT17CV406 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 35 | 1KT17CV408 | Explain the necessity of water resources planning and management. | 05 | CO3 | L2 |
| 36 | 1KT17CV410 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 37 | 1KT17CV411 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 38 | 1KT17CV414 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 39 | 1KT17CV416 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 40 | 1KT17CV405 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 41 | 1KT17CV415 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 42 | 1KT17CV409 | Explain the necessity of water resources planning and management. | 05 | CO2 | L2 |
| 43 | 1KT14CV065 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 44 | 1KT14CV071 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 45 | 1KT15CV016 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 46 | 1KT15CV026 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 47 | 1KT16CV001 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO2 | L2 |
| 48 | 1KT16CV002 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |
| 49 | 1KT16CV004 | Give a summary on global water resources and indian water resources | 05 | CO1 | L2 |
| 50 | 1KT16CV005 | With a neat sketch, explain hydrological cycle | 05 | CO1 | L2 |
| 51 | 1KT16CV006 | Explain the necessity of water resources planning and management. | 05 | CO2 | L2 |
| 52 | 1KT16CV007 | Explain the spatial and temporal scales of planning and management. | 05 | CO3 | L2 |
| 53 | 1KT16CV008 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO3 | L2 |
| 54 | 1KT16CV009 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 55 | 1KT16CV011 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO3 | L2 |
| 56 | 1KT16CV016 | With a neat sketch, explain hydrological cycle | 05 | CO1 | L2 |
| 57 | 1KT16CV017 | Give a summary on global water resources and indian water resources | 05 | CO1 | L2 |
| 58 | 1KT16CV018 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |

| | | | | | |
|----|-------------|--|----|-----|----|
| 59 | 1KT16CV019 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO1 | L2 |
| 60 | 1KT16CV021 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 61 | 1KT16CV022 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 62 | 1KT16CV023 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 63 | 1KT16CV027 | Explain the necessity of water resources planning and management. | 05 | CO3 | L2 |
| 64 | 1KT16CV029 | Explain the spatial and temporal scales of planning and management. | 05 | CO2 | L2 |
| 65 | 1KT16CV030 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO2 | L2 |
| 66 | 1KT16CV031 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO2 | L2 |
| 67 | 1KT16CV037 | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 05 | CO2 | L2 |
| 68 | 1KT16CV0412 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO2 | L2 |
| 69 | 1KT16CV0431 | Explain the spatial and temporal scales of planning and management. | 05 | CO2 | L2 |
| 70 | 1KT16CV436 | Explain the necessity of water resources planning and management. | 05 | CO2 | L2 |
| 71 | 1KT16CV0440 | Differentiate between confined aquifer and unconfined aquifer with neat sketches. | 05 | CO2 | L2 |
| 72 | 1KT16CV0447 | Explain the different classification of saturation zone, based on their water bearing capacity | 05 | CO2 | L2 |
| 73 | 1KT16CV045 | Explain the ground water storage basin cross section. | 05 | CO2 | L2 |
| 74 | 1KT17CV400 | What is water scarcity? Summarize the contributing factors of water scarcity | 05 | CO2 | L2 |
| 75 | 1KT17CV401 | With a sketch, explain confined and unconfined aquifer | 05 | CO2 | L2 |
| 76 | 1KT17CV405 | Give a summary on global water resources and indian water resources | 05 | CO2 | L2 |
| 77 | 1KT17CV406 | With a neat sketch, explain hydrological cycle | 05 | CO2 | L2 |
| 78 | 1KT17CV408 | Explain the necessity of water resources planning and management. | 05 | CO2 | L2 |
| 79 | 1KT17CV409 | Explain the spatial and temporal scales of planning and management. | 05 | CO2 | L2 |
| 80 | 1KT17CV410 | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 05 | CO2 | L2 |

D2. TEACHING PLAN - 2

Module - 3

| | | | |
|-----------------|---|-------------------|---------------------|
| Title: | Integrated Water Resources Management | Appr Time: | 12 Hrs |
| a | Course Outcomes | CO | Blooms Level |
| - | At the end of the topic the student should be able to . . . | - | Level |
| 1 | Student should be able to Know how to implement IWRM in different regions | CO4 | L2 |
| b | Course Schedule | | |
| Class No | Portion covered per hour | - | - |
| 17 | Definition of IWRM Private Sector Involvement. | CO4 | L2 |

| | | | |
|----------|--|-----|----|
| 18 | Principles of IWRM. | CO4 | L2 |
| 19 | Implementation of IWRM. | CO4 | L2 |
| 20 | Legislative and Organizational Framework. | CO4 | L2 |
| 21 | Types of IWRM. | CO4 | L2 |
| 22 | Forms of IWRM. | CO4 | L2 |
| 23 | Private Sector Involvement. | CO4 | L2 |
| 24 | Private Sector Involvement. | CO4 | L2 |
| | | | |
| c | Application Areas | - | - |
| - | Students should be able employ / apply the Module learnings to ... | - | - |
| 1 | | | |
| 2 | | | |
| | | | |
| d | Review Questions | - | - |
| - | The attainment of the module learning assessed through following questions | - | - |
| 18 | With a sketch showing components, explain the principles of IWRM. | CO4 | L2 |
| 19 | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | CO4 | L2 |
| 20 | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | CO4 | L2 |
| 21 | Summarize the sectors benefited by IWRM. | CO4 | L2 |
| 22 | Describe the necessity of water resource planning and management. | CO4 | L2 |
| 23 | Explain the planning scales and system components of WRM. | CO4 | L2 |
| 24 | Explain the various aspects of WRM | CO4 | L2 |
| 25 | Deacribe about adaptive integrated policies and post planning management issues of WRM | CO4 | L2 |
| 26 | Illustrate the WRM analysis with flow chart. | CO4 | L2 |
| 27 | Explain about models of impact prediction and management of WRM | CO4 | L2 |
| | | | |
| e | Experiences | - | - |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Module – 4

| | | | |
|-----------------|--|-------------------|---------------------|
| Title: | Water Governance and Water Policy | Appr Time: | 13 Hrs |
| a | Course Outcomes | CO | Blooms Level |
| - | At the end of the topic the student should be able to ... | - | |
| 1 | Student should be able to understand the legal issues, regulations of water policy | CO5 | L2 |
| | | | |
| b | Course Schedule | | |
| Class No | Portion covered per hour | - | - |
| 32 | Legal Framework of Water. | CO5 | L2 |
| 33 | Substance of National Water Laws. | CO5 | L2 |
| 34 | Other key issues – Changing incentives through Regulation. | CO5 | L2 |
| 35 | National Water Policy – National-Level Commissions. | CO5 | L2 |
| 36 | Irrigation Management Transfer Policies and Activities. | CO5 | L2 |
| 37 | Legal Registration of WUAs, Legal Changes in Water Allocation. | CO5 | L2 |
| 38 | Role of Local Institutions, Community Based Organizations. | CO5 | L2 |
| 39 | Water Policy Reforms: India. | CO5 | L2 |

| | | | |
|----------|---|-----|----|
| c | Application Areas | - | - |
| - | Students should be able employ / apply the Module learnings to . . . | - | - |
| 1 | | | |
| 2 | | | |
| d | Review Questions | - | - |
| - | The attainment of the module learning assessed through following questions | - | - |
| 32 | Explain the existing legal framework and constitutional provisions for water in India. | CO5 | L2 |
| 33 | Explain the various deficiencies in the existing legal framework of water resources development in india. | CO5 | L2 |
| 34 | Summarize the salient features of Indian National Water Policy 2012. | CO5 | L2 |
| 35 | Summarize the scope of water user's association (WUA) and its function. | CO5 | L2 |
| 36 | Explain the necessity of national water policy. | CO5 | L2 |
| 37 | Explain the nature and scope of other issues of national water policy. | CO5 | L2 |
| 38 | Explain irrigation management transfer (IMT) policies. | CO5 | L2 |
| 39 | Write a note on national water commission (NWC) and its division? | CO5 | L2 |
| 40 | Describe the water reforms in India. | CO5 | L2 |
| 41 | What are the ten golden rules of water basin allocation? | CO5 | L2 |
| e | Experiences | - | - |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | CO8 | L3 |
| 5 | | | |

E2. CIA EXAM – 2

a. Model Question Paper - 2

| | | | | | | | |
|-----------|------|--|--------|-----|--------------|------------|--------------|
| Crs Code: | Sem: | VII | Marks: | 30 | Time: | 75 minutes | |
| Course: | | | | | | | |
| - | - | Note: Answer all questions, each carry equal marks. Module : 3, 4 | | | Marks | CO | Level |
| 1 | a | With a sketch showing components, explain the principles of IWRM. | 05 | CO4 | L2 | | |
| | b | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 05 | CO4 | L2 | | |
| | C | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 05 | CO4 | L2 | | |
| | | OR | | | | | |
| 2 | a | Summarize the sectors benefited by IWRM. | 05 | CO4 | L2 | | |
| | b | Describe the necessity of water resource palnning and management. | 05 | CO4 | L2 | | |
| | C | Explain the planning scales and system components of WRM. | 05 | CO4 | L2 | | |
| 3 | a | Explain the existing legal framework and constitutional provisions for water in India. | 05 | CO5 | L2 | | |
| | b | Explain the various deficiencies in the existing legal framework of water resources development in india. | 05 | CO5 | L2 | | |
| | C | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 | | |
| | | OR | | | | | |
| 2 | a | Explain irrigation management transfer (IMT) policies. | 05 | CO5 | L2 | | |
| | b | Write a note on national water commission (NWC) and its division? | 05 | CO5 | L2 | | |
| | C | Describe the water reforms in India. | 05 | CO5 | L2 | | |

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

| Model Assignment Questions | | | | | | | |
|---|-------------|--|-------|----------|-------|-------|------------------|
| Crs Code: | | Sem: | VII | Marks: | 5 | Time: | 90 – 120 minutes |
| Course: | | | | Module : | 3, 4 | | |
| Note: Each student to answer 2-3 assignments. Each assignment carries equal mark. | | | | | | | |
| SNo | USN | Assignment Description | Marks | CO | Level | | |
| 1 | 1KT14CV065 | With a sketch showing components, explain the principles of IWRM. | 05 | CO4 | L2 | | |
| 2 | 1KT14CV071 | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 05 | CO4 | L2 | | |
| 3 | 1KT15CV016 | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 05 | CO4 | L2 | | |
| 4 | 1KT15CV026 | Summarize the sectors benefited by IWRM. | 05 | CO4 | L2 | | |
| 5 | 1KT16CV001 | Describe the necessity of water resource planning and management. | 05 | CO4 | L2 | | |
| 6 | 1KT16CV002 | Explain the planning scales and system components of WRM. | 05 | CO4 | L2 | | |
| 7 | 1KT16CV004 | Explain the various aspects of WRM | 05 | CO4 | L2 | | |
| 8 | 1KT16CV005 | Describe about adaptive integrated policies and post planning management issues of WRM | 05 | CO4 | L2 | | |
| 9 | 1KT16CV006 | Illustrate the WRM analysis with flow chart. | 05 | CO4 | L2 | | |
| 10 | 1KT16CV007 | Explain about models of impact prediction and management of WRM | 05 | CO4 | L2 | | |
| 11 | 1KT16CV008 | Explain the existing legal framework and constitutional provisions for water in India. | 05 | CO4 | L2 | | |
| 12 | 1KT16CV009 | Explain the various deficiencies in the existing legal framework of water resources development in india. | 05 | CO4 | L2 | | |
| 13 | 1KT16CV011 | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 | | |
| 14 | 1KT16CV016 | Summarize the scope of water user's association (WUA) and its function. | 05 | CO5 | L2 | | |
| 15 | 1KT16CV017 | Explain the necessity of national water policy. | 05 | CO5 | L2 | | |
| 16 | 1KT16CV018 | Explain the nature and scope of other issues of national water policy. | 05 | CO5 | L2 | | |
| 17 | 1KT16CV019 | Explain irrigation management transfer (IMT) policies. | 05 | CO5 | L2 | | |
| 18 | 1KT16CV021 | Write a note on national water commission (NWC) and its division? | 05 | CO5 | L2 | | |
| 19 | 1KT16CV022 | Describe the water reforms in India. | 05 | CO5 | L2 | | |
| 20 | 1KT16CV023 | What are the ten golden rules of water basin allocation? | 05 | CO5 | L2 | | |
| 21 | 1KT16CV027 | Explain the existing legal framework and constitutional provisions for water in India. | 05 | CO5 | L2 | | |
| 22 | 1KT16CV029 | Explain the various deficiencies in the existing legal framework of water resources development in india. | 05 | CO5 | L2 | | |
| 23 | 1KT16CV030 | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 | | |
| 24 | 1KT16CV031 | Summarize the scope of water user's association (WUA) and its function. | 05 | CO5 | L2 | | |
| 25 | 1KT16CV037 | Explain the necessity of national water policy. | 05 | CO5 | L2 | | |
| 26 | 1KT16CV045 | Explain the nature and scope of other issues of national water policy. | 05 | CO5 | L2 | | |
| 27 | 1KT16CV0412 | Explain irrigation management transfer (IMT) policies. | 05 | CO5 | L2 | | |
| 28 | 1KT16CV0431 | Write a note on national water commission (NWC) and its division? | 05 | CO5 | L2 | | |
| 29 | 1KT16CV436 | Describe the water reforms in India. | 05 | CO5 | L2 | | |
| 30 | 1KT16CV0440 | What are the ten golden rules of water basin allocation? | 05 | CO5 | L2 | | |
| 31 | 1KT16CV0447 | With a sketch showing components, explain the principles of IWRM. | 05 | CO4 | L2 | | |

| | | | | | |
|----|------------|--|----|-----|----|
| 32 | 1KT17CV400 | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 05 | CO4 | L2 |
| 33 | 1KT17CV401 | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 05 | CO4 | L2 |
| 34 | 1KT17CV406 | Summarize the sectors benefited by IWRM. | 05 | CO4 | L2 |
| 35 | 1KT17CV408 | Describe the necessity of water resource planning and management. | 05 | CO4 | L2 |
| 36 | 1KT17CV410 | Explain the planning scales and system components of WRM. | 05 | CO4 | L2 |
| 37 | 1KT17CV411 | Explain the various aspects of WRM | 05 | CO4 | L2 |
| 38 | 1KT17CV414 | Describe about adaptive integrated policies and post planning management issues of WRM | 05 | CO4 | L2 |
| 39 | 1KT17CV416 | Illustrate the WRM analysis with flow chart. | 05 | CO4 | L2 |
| 40 | 1KT17CV405 | Explain about models of impact prediction and management of WRM | 05 | CO4 | L2 |
| 41 | 1KT17CV415 | Explain the existing legal framework and constitutional provisions for water in India. | 05 | CO5 | L2 |
| 42 | 1KT17CV409 | Explain the various deficiencies in the existing legal framework of water resources development in india. | 05 | CO5 | L2 |
| 43 | 1KT14CV065 | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 |
| 44 | 1KT14CV071 | Summarize the scope of water user's association (WUA) and its function. | 05 | CO5 | L2 |
| 45 | 1KT15CV016 | Explain the necessity of national water policy. | 05 | CO5 | L2 |
| 46 | 1KT15CV026 | Explain the nature and scope of other issues of national water policy. | 05 | CO5 | L2 |
| 47 | 1KT16CV001 | Explain irrigation management transfer (IMT) policies. | 05 | CO5 | L2 |
| 48 | 1KT16CV002 | Write a note on national water commission (NWC) and its division? | 05 | CO5 | L2 |
| 49 | 1KT16CV004 | Describe the water reforms in India. | 05 | CO5 | L2 |
| 50 | 1KT16CV005 | What are the ten golden rules of water basin allocation? | 05 | CO5 | L2 |
| 51 | 1KT16CV006 | With a sketch showing components, explain the principles of IWRM. | 05 | CO4 | L2 |
| 52 | 1KT16CV007 | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 05 | CO4 | L2 |
| 53 | 1KT16CV008 | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 05 | CO4 | L2 |
| 54 | 1KT16CV009 | Summarize the sectors benefited by IWRM. | 05 | CO4 | L2 |
| 55 | 1KT16CV011 | Describe the necessity of water resource planning and management. | 05 | CO4 | L2 |
| 56 | 1KT16CV016 | Explain the planning scales and system components of WRM. | 05 | CO4 | L2 |
| 57 | 1KT16CV017 | Explain the various aspects of WRM | 05 | CO4 | L2 |
| 58 | 1KT16CV018 | Describe about adaptive integrated policies and post planning management issues of WRM | 05 | CO4 | L2 |
| 59 | 1KT16CV019 | Illustrate the WRM analysis with flow chart. | 05 | CO4 | L2 |
| 60 | 1KT16CV021 | Explain about models of impact prediction and management of WRM | 05 | CO4 | L2 |
| 61 | 1KT16CV022 | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 05 | CO4 | L2 |
| 62 | 1KT16CV023 | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 05 | CO4 | L2 |
| 63 | 1KT16CV027 | Summarize the sectors benefited by IWRM. | 05 | CO4 | L2 |
| 64 | 1KT16CV029 | Describe the necessity of water resource planning and management. | 05 | CO4 | L2 |
| 65 | 1KT16CV030 | Explain the planning scales and system components of WRM. | 05 | CO4 | L2 |
| 66 | 1KT16CV031 | Explain the various aspects of WRM | 05 | CO4 | L2 |
| 67 | 1KT16CV037 | Describe about adaptive integrated policies and post planning | 05 | CO4 | L2 |

| | | | | | |
|----|-------------|---|----|-----|----|
| | | management issues of WRM | | | |
| 68 | 1KT16CV0412 | Illustrate the WRM analysis with flow chart. | 05 | CO4 | L2 |
| 69 | 1KT16CV0431 | Explain about models of impact prediction and management of WRM | 05 | CO4 | L2 |
| 70 | 1KT16CV436 | Explain the existing legal framework and constitutional provisions for water in India. | 05 | CO4 | L2 |
| 71 | 1KT16CV0440 | Explain the various deficiencies in the existing legal framework of water resources development in india. | 05 | CO4 | L2 |
| 72 | 1KT16CV0447 | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 |
| 73 | 1KT16CV045 | Summarize the scope of water user's association (WUA) and its function. | 05 | CO5 | L2 |
| 74 | 1KT17CV400 | Explain the necessity of national water policy. | 05 | CO5 | L2 |
| 75 | 1KT17CV401 | Explain the nature and scope of other issues of national water policy. | 05 | CO5 | L2 |
| 76 | 1KT17CV405 | Explain irrigation management transfer (IMT) policies. | 05 | CO5 | L2 |
| 77 | 1KT17CV406 | Write a note on national water commission (NWC) and its division? | 05 | CO5 | L2 |
| 78 | 1KT17CV408 | Describe the water reforms in India. | 05 | CO5 | L2 |
| 79 | 1KT17CV409 | What are the ten golden rules of water basin allocation? | 05 | CO5 | L2 |
| 80 | 1KT17CV410 | Summarize the salient features of Indian National Water Policy 2012. | 05 | CO5 | L2 |

D3. TEACHING PLAN - 3

Module - 5

| | | | |
|-----------------|---|------------|---------------------|
| Title: | Water harvesting and conservation | Appr Time: | 10 Hrs |
| a | Course Outcomes | CO | Blooms Level |
| - | At the end of the topic the student should be able to . . . | - | Level |
| 1 | Student should be able to understand the different methods adopted for harvesting of water. | | |
| 2 | Student should be able to understand the water conservation methods in different regions . | | |
| b | Course Schedule | - | - |
| Class No | Portion covered per hour | - | - |
| 45 | Water Harvesting Techniques. | CO6 | L2 |
| 46 | Micro-catchments. | CO6 | L2 |
| 47 | Design of Small Water Harvesting Structures. | CO6 | L5 |
| 48 | Farm Ponds. | CO7 | L2 |
| 49 | Percolation Tanks. | CO7 | L2 |
| 50 | Yield from a Catchment. | CO7 | L2 |
| 51 | Rain water Harvesting. | CO7 | L2 |
| 52 | various techniques related to Rural and Urban area. | CO7 | L2 |
| c | Application Areas | - | - |
| - | Students should be able employ / apply the Module learnings to . . . | - | - |
| 1 | | | |
| 2 | | | |

| | | | |
|----------|--|-----|----|
| d | Review Questions | - | - |
| - | The attainment of the module learning assessed through following questions | - | - |
| 42 | What is rain water harvesting? Explain the needs for rainwater harvesting | CO6 | L2 |
| 43 | Explain the different types of lining done to control seepage in ponds. | CO6 | L2 |
| 44 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | CO6 | L2 |
| 45 | Briefly explain the various techniques of rain water harvesting in urban area. | CO6 | L2 |
| 46 | Explain roof top harvesting in detail with appropriate figures. | CO7 | L2 |
| 47 | Explain advantages and disadvantages of roof top rainwater harvesting. | CO7 | L2 |
| 48 | What are the different rural and urban rain water harvesting methods | CO7 | L2 |
| 49 | Explain the design criteria for form ponds | CO7 | L2 |
| 50 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | CO7 | L2 |
| e | Experiences | - | - |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

E3. CIA EXAM – 3

a. Model Question Paper - 3

| | | | | | | | | |
|-----------|--------|--|-----|--------|----|--------------|------------|--------------|
| Crs Code: | 15EC71 | Sem: | VII | Marks: | 30 | Time: | 75 minutes | |
| Course: | | | | | | | | |
| - | - | Note: Answer all questions, each carry equal marks. Module : 5 | | | | Marks | CO | Level |
| 1 | a | What is rain water harvesting? Explain the needs for rainwater harvesting | | | | 07 | CO6 | L2 |
| | b | Explain the different types of lining done to control seepage in ponds. | | | | 08 | CO6 | L2 |
| OR | | | | | | | | |
| 1 | a | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | | | | 07 | CO7 | L2 |
| | b | Briefly explain the various techniques of rain water harvesting in urban area. | | | | 08 | CO7 | L2 |
| OR | | | | | | | | |
| 2 | a | Explain roof top harvesting in detail with appropriate figures. | | | | 07 | CO6 | L2 |
| | b | Explain advantages and disadvantages of roof top rainwater harvesting. | | | | 08 | CO6 | L2 |
| OR | | | | | | | | |
| 2 | a | What are the different rural and urban rain water harvesting methods | | | | 05 | CO7 | L2 |
| | b | Explain the design criteria for form ponds | | | | 05 | CO7 | L2 |
| | c | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | | | | 05 | CO7 | L2 |

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions

| | | | | | | | |
|-----------|--|------|-----|--------|---|----------|------------------|
| Crs Code: | | Sem: | VII | Marks: | 5 | Time: | 90 – 120 minutes |
| Course: | | | | | | Module : | 3, 4 |

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

| SNo | USN | Assignment Description | Marks | CO | Level |
|-----|-------------|--|-------|-----|-------|
| 1 | 1KT14CV065 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 2 | 1KT14CV071 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 3 | 1KT15CV016 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO7 | L2 |
| 4 | 1KT15CV026 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 5 | 1KT16CV001 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 6 | 1KT16CV002 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 7 | 1KT16CV004 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 8 | 1KT16CV005 | Explain the design criteria for form ponds | 05 | CO7 | L2 |
| 9 | 1KT16CV006 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 10 | 1KT16CV007 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 11 | 1KT16CV008 | Explain the design criteria for form ponds | 05 | CO7 | L2 |
| 12 | 1KT16CV009 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 13 | 1KT16CV011 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 14 | 1KT16CV016 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 15 | 1KT16CV017 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 16 | 1KT16CV018 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO6 | L2 |
| 17 | 1KT16CV019 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 18 | 1KT16CV021 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 19 | 1KT16CV022 | Explain the design criteria for form ponds | 05 | CO7 | L2 |
| 20 | 1KT16CV023 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 21 | 1KT16CV027 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 22 | 1KT16CV029 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 23 | 1KT16CV030 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 24 | 1KT16CV031 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO7 | L2 |
| 25 | 1KT16CV037 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 26 | 1KT16CV045 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 27 | 1KT16CV0412 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 28 | 1KT16CV0431 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 29 | 1KT16CV436 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO6 | L2 |

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|----|-------------|--|----|-----|----|
| 30 | 1KT16CV0440 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 31 | 1KT16CV0447 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 32 | 1KT17CV400 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 33 | 1KT17CV401 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 34 | 1KT17CV406 | Explain the design criteria for form ponds | 05 | CO7 | L2 |
| 35 | 1KT17CV408 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 36 | 1KT17CV410 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 37 | 1KT17CV411 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 38 | 1KT17CV414 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 39 | 1KT17CV416 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 40 | 1KT17CV405 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 41 | 1KT17CV415 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO7 | L2 |
| 42 | 1KT17CV409 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 43 | 1KT14CV065 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 44 | 1KT14CV071 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 45 | 1KT15CV016 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 46 | 1KT15CV026 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO6 | L2 |
| 47 | 1KT16CV001 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 48 | 1KT16CV002 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 49 | 1KT16CV004 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 50 | 1KT16CV005 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 51 | 1KT16CV006 | Explain the design criteria for form ponds | 05 | CO6 | L2 |
| 52 | 1KT16CV007 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 53 | 1KT16CV008 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 54 | 1KT16CV009 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 55 | 1KT16CV011 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO7 | L2 |
| 56 | 1KT16CV016 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO7 | L2 |
| 57 | 1KT16CV017 | What are the different rural and urban rain water harvesting methods | 05 | CO7 | L2 |
| 58 | 1KT16CV018 | Explain the design criteria for form ponds | 05 | CO7 | L2 |
| 59 | 1KT16CV019 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO7 | L2 |
| 60 | 1KT16CV021 | Summarize the micro catchment method of water harvesting | 05 | CO6 | L2 |

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|----|-------------|--|----|-----|----|
| | | also add a note on merits and demerits of micro catchment method. | | | |
| 61 | 1KT16CV022 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 62 | 1KT16CV023 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 63 | 1KT16CV027 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO6 | L2 |
| 64 | 1KT16CV029 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO6 | L2 |
| 65 | 1KT16CV030 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO6 | L2 |
| 66 | 1KT16CV031 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 67 | 1KT16CV037 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 68 | 1KT16CV0412 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 69 | 1KT16CV0431 | Explain the different types of lining done to control seepage in ponds. | 05 | CO7 | L2 |
| 70 | 1KT16CV436 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO7 | L2 |
| 71 | 1KT16CV0440 | Briefly explain the various techniques of rain water harvesting in urban area. | 05 | CO7 | L2 |
| 72 | 1KT16CV0447 | Explain roof top harvesting in detail with appropriate figures. | 05 | CO7 | L2 |
| 73 | 1KT16CV045 | Explain advantages and disadvantages of roof top rainwater harvesting. | 05 | CO6 | L2 |
| 74 | 1KT17CV400 | What are the different rural and urban rain water harvesting methods | 05 | CO6 | L2 |
| 75 | 1KT17CV401 | Explain the design criteria for form ponds | 05 | CO6 | L2 |
| 76 | 1KT17CV405 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 77 | 1KT17CV406 | Summarize the micro catchment method of water harvesting also add a note on merits and demerits of micro catchment method. | 05 | CO6 | L2 |
| 78 | 1KT17CV408 | What is rain water harvesting? Explain the needs for rainwater harvesting | 05 | CO6 | L2 |
| 79 | 1KT17CV409 | Explain the different types of lining done to control seepage in ponds. | 05 | CO6 | L2 |
| 80 | 1KT17CV410 | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 05 | CO6 | L2 |

F. EXAM PREPARATION

1. University Model Question Paper

| | | | |
|-----------|--|--------------|-------------------|
| Course: | | Month / Year | May /2018 |
| Crs Code: | Sem: VII | Marks: 80 | Time: 180 minutes |
| Module | Note Answer all FIVE full questions. All questions carry equal marks. | Marks | CO |
| 1 | a With a neat sketch, explain hydrological cycle | 08 | CO1 L2 |
| | b Give a summary on global water resources and Indian water resources | 08 | CO1 L2 |
| | OR | | |
| 1 | a With a sketch, explain confined and unconfined aquifer | 08 | CO2 L2 |
| | b What is water scarcity? Summarize the contributing factors of water scarcity | 08 | CO1 L2 |
| | | | |
| 2 | a Explain the necessity of water resources planning and management. | 08 | CO3 L2 |
| | b Explain the spatial and temporal scales of planning and management. | 08 | CO3 L2 |

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| | | OR | | | |
| 2 | a | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 08 | CO3 | L2 |
| | b | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 08 | CO3 | L2 |
| | | | | | |
| 3 | a | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 08 | CO4 | L2 |
| | b | Summarize the sectors benefited by IWRM. | 08 | CO4 | L2 |
| | | OR | | | |
| 3 | a | With a sketch showing components, explain the principles of IWRM. | 08 | CO4 | L2 |
| | b | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 08 | CO4 | L2 |
| | | | | | |
| 4 | a | Explain the existing legal framework and constitutional provisions for water in India. | 08 | CO5 | L2 |
| | b | Explain the various deficiencies in the existing legal framework of water resources development in india. | 08 | CO5 | L2 |
| | | OR | | | |
| 4 | a | Summarize the salient features of Indian National Water Policy 2012. | 08 | CO5 | L2 |
| | b | Summarize the scope of water user's association (WUA) and its function. | 08 | CO5 | L2 |
| | | | | | |
| 5 | a | What is rain water harvesting? Explain the needs for rainwater harvesting | 08 | CO6 | L2 |
| | b | Explain the different types of lining done to control seepage in ponds. | 08 | CO6 | L2 |
| | | OR | | | |
| 5 | a | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 08 | CO7 | L2 |
| | b | Briefly explain the various techniques of rain water harvesting in urban area. | 08 | CO7 | L2 |
| | | | | | |

2. SEE Important Questions

| | | | | | | |
|------------|--------------------------|--|--------|--------------|-----------|-------------|
| Course: | Hydrology and Irrigation | | | Month / Year | May /2018 | |
| Crs Code: | Sem: | 7 | Marks: | 80 | Time: | 180 minutes |
| | Note | Answer all FIVE full questions. All questions carry equal marks. | | | - | - |
| Mod ule | Qno. | Important Question | Marks | CO | Year | |
| 1 | a | With a neat sketch, explain hydrological cycle | 07 | CO1 | 2018 | |
| | b | Give a summary on global water resources and Indian water resources | 07 | CO1 | 2018 | |
| | c | With a sketch, explain confined and unconfined aquifer | 08 | CO2 | 2018 | |
| | d | What is water scarcity? Summarize the contributing factors of water scarcity | 07 | CO1 | 2018 | |
| | | | | | | |
| 2 | a | Explain the necessity of water resources planning and management. | 07 | CO3 | 2018 | |
| | b | Explain the spatial and temporal scales of planning and management. | 07 | CO3 | 2018 | |
| | c | With a typical analytical frame work for water resources management studies, explain inception, development and selection phases | 08 | CO3 | 2018 | |
| | d | Summarize the questions addressed in adaptive integrated policy an activities of water resources planning and management. | 07 | CO3 | 2018 | |

| | | | | | |
|---|---|--|----|-----|------|
| | e | Explain the guiding principles of Dublin statement and Rio declaration of IWRM. | 08 | CO3 | 2018 |
| | f | With a figure of three pillars, economic efficiency, equity and environmental sustainability explain the implementation process of IWRM. | 07 | CO3 | 2018 |
| | g | Summarize the sectors benefited by IWRM. | 07 | CO3 | 2018 |
| | | | | | |
| 4 | a | Explain the existing legal framework and constitutional provisions for water in India. | 07 | CO4 | 2018 |
| | b | Explain the various deficiencies in the existing legal framework of water resources development in india. | 08 | CO4 | 2018 |
| | c | Summarize the salient features of Indian National Water Policy 2012. | 07 | CO4 | 2018 |
| | d | Summarize the scope of water user's association (WUA) and its function. | 08 | CO4 | 2018 |
| | | | | | |
| 5 | a | What is rain water harvesting? Explain the needs for rainwater harvesting | 07 | CO5 | 2018 |
| | b | Explain the different types of lining done to control seepage in ponds. | 07 | CO5 | 2018 |
| | c | What is percolation tank? Describe the general guidelines to be followed in proposing a percolation tank | 08 | CO5 | 2018 |
| | d | Briefly explain the various techniques of rain water harvesting in urban area. | 08 | CO5 | 2018 |

Course Outcome Computation

Academic Year:

Odd / Even semester

| INTERNAL TEST | T1 | | | | T2 | | | | T3 | | | | | | | |
|--|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|
| | CO1 | | CO2 | | CO3 | | CO4 | | CO5 | | CO6 | | CO7 | | CO8 | |
| QUESTION NO | Q1 | LV | Q2 | LV | Q3 | LV | Q1 | LV | Q2 | LV | Q3 | LV | Q1 | LV | Q2 | LV |
| MAX MARKS | | | | | | | | | | | | | | | | |
| USN-1 | | | | | | | | | | | | | | | | |
| USN-2 | | | | | | | | | | | | | | | | |
| USN-3 | | | | | | | | | | | | | | | | |
| USN-4 | | | | | | | | | | | | | | | | |
| USN-5 | | | | | | | | | | | | | | | | |
| USN-6 | | | | | | | | | | | | | | | | |
| Average CO Attainment | | | | | | | | | | | | | | | | |
| LV Threshold : 3:>60%, 2:>=50% and <=60%, 1: <=49% CO1 Computation : (2+2+2+3)/4 = 10/4=2.5 | | | | | | | | | | | | | | | | |

PO Computation

| Program Outcome Weight of CO - PO | PO1 | | PO3 | | PO3 | | PO1 | | PO12 | | PO12 | | PO6 | | PO1 | |
|-----------------------------------|-----|---|-----|----|-----|----|-----|----|------|----|------|----|-----|----|-----|----|
| | CO1 | | CO2 | | CO3 | | CO4 | | CO5 | | CO6 | | CO7 | | CO8 | |
| Test/Quiz/Lab | T1 | | | | T2 | | | | T3 | | | | | | | |
| QUESTION NO | Q1 | L | Q2 | LV | Q3 | LV | Q1 | LV | Q2 | LV | Q3 | LV | Q1 | LV | Q2 | LV |
| MAX MARKS | | | | | | | | | | | | | | | | |
| USN-1 | | | | | | | | | | | | | | | | |
| USN-2 | | | | | | | | | | | | | | | | |
| USN-3 | | | | | | | | | | | | | | | | |
| USN-4 | | | | | | | | | | | | | | | | |
| USN-5 | | | | | | | | | | | | | | | | |
| USN-6 | | | | | | | | | | | | | | | | |
| Average CO Attainment | | | | | | | | | | | | | | | | |