**E.G.S. PILLAY ENGINEERING COLLEGE, NAGAPATTINAM.**

**DEPARTMENT OF CIVIL ENGINEERING**

**COURSE PLAN**

**COURSE CODE : CE6703 COURSE NAME : WATER RESOURCES AND IRRIGATION ENGINEERING**

**SEMESTER : VIISEM. CIVIL.ENGG. – B SECTION ACADEMIC YEAR: 2016-2017**

**COURSE DURATION: JULY – DEC 2016 CLASS ROOM : PG 301**

**FACULTY DETAILS: Mr.R.PRABHAKARAN, Asst.Prof/Civil Engg.**

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| **PURPOSE** | To impart Knowledge about water resources and irrigation engineering. |
| **PREREQUISITE** | mathematics and engineering physics |
| **INSTRUCTIONAL OBJECTIVES** | 1.To learn The student is exposed to different phases in Water Resources Management and National Water Policy  2.To know they will be imparted required knowledge on Reservoir planning, management and economic analysis including Irrigation and Irrigation management practices. |
| **INSTRUCTIONAL OUTCOME** | After completion of this course, students can able to  1. Describe basic concepts of water resources Planning and management.  2. Explain the management of reservoir system.  3. interpret the base period on duty and delta.  4. Explain the canal irrigation and design of gravity dams.  5. Explain the various irrigation methods. |

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| Course designed by | | Anna University, Chennai | | | | |
| 1 | Category | | GENERAL  (G) | BASIC SCIENCES  (B) | **ENGINEERING SCIENCES**  **AND TECHNICAL ART**  **(E)** | PROFESSIONAL  SUBJECTS  (P) |
|  |  | **X** |  |
| 2 | Broad area | | THEORY |  |  | **General** |
| X |  |  |  |
| 3 | Course co-coordinator | | | | Mr.E.VENKATESAN | |

**Direct assessment details**

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| **Name of assessment** | **Internal Marks** | **Topics** | **Duration** |
| Unit Test | 20 | Unit I | 2periods |
| Daily Test 1 | Unit II | 1 period |
| Daily Test 2 | Unit III | 1 period |
| Daily Test 3 | Unit IV | 1 period |
| Cycle Test -1 | II & III Units | 3 Hrs |
| Cycle Test -2 | IV & V Units | 3Hrs |
| Model Exam | Entire Syllabus | 3 Hrs |
| Assignments |  | Entire Syllabus |  |
| Innovative Assignment | Content Beyond Syllabus |  |
|  |  |  |  |
| Total | 20 |  |  |

**DETAILED LESSON PLA**

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| **UNIT I WATER RESOURCES**  **Water resources survey – Water resources of India and Tamilnadu – Description of water resources planning – Estimation of water requirements for irrigation and drinking- Single and multipurpose reservoir – Multi objective - Fixation of Storage capacity -Strategies for reservoir operation - Design flood-levees and flood walls.**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **09 Hrs.** | **0 Hrs.** | **0 Hr.** | | | | | | | | | | | | | |
| **Session No** | **Topics to be covered** | | **Instruction Delivery** | | | | | **Testing Method** | | **Instructional objective** | **Course Outcome** | |
| **Method** | | **Teaching Aids** | **Level** | |
| **1** | **Water resources survey** | | Lecture with discussion | | PPT & Videos | Understand | |  | | To know the water resources management and estimation of water requirements | Describe basic concepts of water resources Planning and management. | |
| **2** | **Water resources of India and Tamilnadu** | |
| **3** | **Description of water resources planning** | | Tests, Assignments | |
| **4** | **Estimation of water requirements for irrigation and drinking** | |
| **5** | **Single and multipurpose reservoir** | |
| **6** | **Fixation of Storage capacity**  **Strategies for reservoir operation** | |
| **7** | **Design flood-levees and flood walls.** | |
| **8** | **Water resources survey** | |
| **9** | **Water resources of India and Tamilnadu** | |
| **CUMULATIVE HOURS = LECTURE - 09 TUTORIAL – 0** | | | | | | | | | | | | |
| **UNIT II WATER RESOURCE MANAGEMEN**  **Economics of water resources planning; – National Water Policy – Consumptive and non consumptive water use - Water quality – Scope and aims of master plan - Concept of basin as a unit for development - Water budget- Conjunctive use of surface and ground water Beams.**   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **09 Hrs.** | **0 Hrs.** | **0 Hr.** | | | | | | | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | | | **Testing Method** | | **Instructional objective** | | | **Course Outcome** |
| **Method** | | **Teaching Aids** | | **Level** |
| **1** | **Economics of water resources planning** | Lecture with discussion | | PPT & Videos | | Understand | Tests,  Assignments | | To know the water resources management and water policy | | | Explain the management of reservoir system |
| **2** | **National Water Policy** |
| **3** | **Consumptive and non consumptive water use** |
| **4** | **Water quality** |
| **5** | **Scope and aims of master plan** |
| **6** | **Concept of basin as a unit for development** |
| **7** | **Water budget** |
| **8** | **Conjunctive use of surface water**  **and ground water** |
| 9 | **use of ground water** |
| **CUMULATIVE HOURS = LECTURE - 18, TUTORIAL - 0** | | | | | | | | | | | | |

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| **UNIT III IRRIGATION ENGINEERING** 9 Need – Merits and Demerits – Duty, Delta and Base period – Irrigation efficiencies – Crops and Seasons - Crop water Requirement – Estimation of Consumptive use of water.     |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **09 Hrs.** | **0 Hrs.** | **0 Hr.** | | | | | | | | |
| **Session No** | **Topics to be covered** | **Instruction Delivery** | | | **Testing Method** | **Instructional objective** | **Course Outcome** |
| **Method** | **Teaching Aids** | **Level** |
| **1** | **Needs of irrigation** | Lecture with discussion | PPT & Videos | Understand | Tests,  Assignments | To know needs of irrigation and base period. | interpret the base period on duty and delta. |
| **2** | **merits and demerits of irrigation** |
| **3** | **DutyBase period** |
| **5** | **Delta Base period** |
| **6** | **Irrigation efficiencies** |
| **7** | **Crops and Seasons** |
| **8** | **Crop water Requirement** |
| **9** | **Estimation of water** |
| **CUMULATIVE HOURS = LECTURE - 26, TUTORIAL - 0** | | | | | | | |

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| **UNIT IV CANAL IRRIGATION**  Types of Impounding structures: Gravity dam – Diversion Head works - Canal drop – Cross drainage works – Canal regulations – Canal outlets – Canal lining - Kennady‟s and Lacey‟s Regime theory   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **09 Hrs.** | **0 Hrs.** | **0 Hr.** | | | | | | | | | | | | | | | |
| **Session No** | **Topics to be covered** | | **Instruction Delivery** | | | | | | | **Testing Method** | | **Instructional objective** | | **Course Outcome** |
| **Method** | **Teaching Aids** | | | **Level** | | |
| **1** | Types of Impounding structures | | Lecture with discussion | PPT & Videos | | | Understand | | | Tests,  Assignments | | To understand the storage and distribution of water for irrigation work. | | Explain the canal irrigation and design of gravity dams. |
| **2** | Gravity dam | |
| **3** | Diversion Head works | |
| **4** | Canal drop | |
| **5** | Cross drainage works | |
| **6** | canal regulations | |
| **7** | Canal outlets | |
| **8** | Canal linning | |
| **9** | Kennady‟s and Lacey‟s Regime theory | |  |  | | |  | | |  | |  | |  |
| **CUMULATIVE HOURS = LECTURE - 32, TUTORIAL - 0** | | | | | | | | | | | | | | |
| **UNIT V IRRIGATION METHODS AND MANAGEMENT**  Lift irrigation – Tank irrigation – Well irrigation – Irrigation methods: Surface and Sub-Surface and Micro Irrigation - Merits and demerits – Irrigation scheduling – Water distribution – Participatory irrigation management with a case study.   |  |  |  | | --- | --- | --- | | **LECTURE** | **TUTORIAL** | **PRACTICAL** | | **09 Hrs.** | **0 Hrs.** | **0 Hr.** | | | | | | | | | | | | | | | |
| **Session No** | | **Topics to be covered** | | | **Instruction Delivery** | | | | **Testing Method** | | **Instructional objective** | | **Course Outcome** | |
| **Method** | **Teaching Aids** | | **Level** |
| **1** | | irrigation management methods | | | Lecture with discussion, | PPT & Videos | | Understand | Tests,  Assignments | | To understand the various methods of irrigation process. | | Explain the various irrigation methods. | |
| **2** | | Lift irrigation | | |
| **3** | | Tank irrigation | | |
| **4** | | Well irrigation | | |
| **5** | | Surface and Sub-Surface and Micro Irrigation | | |
| **6** | | Merits and demerits of irrigation | | |
| **7** | | Irrigation scheduling | | |
| **8** | | Water distribution | | |  |  | |
| **9** | | Participatory irrigation management with a case study | | |
| **CUMULATIVE HOURS = LECTURE - 41, TUTORIAL - 0** | | | | | | | | | | | | | | |

**Text / Reference Books**

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| **Sl. No.** | **Title of the Book** | **Author(s)** | **Publisher** |
| **TEXT BOOKS** | | | |
| T1 | “Water Resources Engineering”, | Linsley R.K. and Franzini J.B, | McGraw-Hill Inc, 2000 |
| T2 | Irrigation and water power Engineering, | Punmia B.C; | Laxmi Publications, 16th Edition, New Delhi, 2009 |
| T3 | “Irrigation Engineering and Hydraulic structures”, | Garg S. K., | Khanna Publishers, 23rd Revised Edition, New Delhi, 2009 |
| **REFERENCES** | | | |
| R1 | “Elements of Water Resources Engineering”, | Duggal, K.N. and Soni, J.P., | New Age International Publishers, 2005 |
| R2 | “Water Resources Systems Planning and Management”, | Chaturvedi M.C. | Tata McGrawHill Inc., New Delhi, 1997. |
| R3 | Irrigation Theory and Practice | Michael A.M., | 2 nd Edition, Vikas Publishing House Pvt. Ltd., Noida |
| R4 | “Irrigation Water Management”, | Dilip Kumar Majumdar, | Prentice-Hall of India, New Delhi, 2008 |
| R5 | “Irrigation Engineering”, | Asawa, G.L., | New Age International Publishers, New Delhi, 2000. |
| **REFERENCE WEBSITES** | | | |
| 1 | <http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Manuf%20Proc%20II/> | | |
| 2 | wings.buffalo.edu/...notes/class29\_nontraditional%20machining.ppt | | |

**GAP ANALYSIS:**

To satisfythe Course outcome number4 (Explain the methods of irrigation and management).

content beyond syllabi to be exposed to the student through the field visit.

**CONTENT BEYOND SYLLUBI:** field visitfor the following places:

1. METTUR DAM.

**COURSE INCHARGE**

**Programme Name: B.E. CIVIL Engineering**

**Programme Educational Objectives (PEOs):**

PEO1: Graduates will actively engage in problem solving using engineering principles to address the evolving needs of the society.

PEO2: Graduates will have successful career in civil engineering practice and research activities.

PEO3: Graduates will serve the society with professional ethics and integrity.

**ProgrammeOutcomes (POs): Graduates will be able to**

(PO1) Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

(PO2) Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

(PO3) Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

(PO4) Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

(PO5) Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

(PO6) Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

(PO7) Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

(PO8) Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

(PO9) Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

(PO10) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

(PO11) Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

(PO12) Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

**Programme Specific Outcomes (PSOs): Graduates will able to**

PSO1:Graduates will be able to apply appropriate methodology for geotechnical, structural design and analysis, material selection, planning, scheduling estimation and costing, using modern tool in construction field.

PSO2:Graduates will be able to service to the development of public health and environmental safety of the society with ethical values.

PSO3:Graduates will be able to pursue lifelong learning and professional development to face challenging and emerging needs of the society.

**Mapping Table: COs of CE6703:WATER RESOURCES AND IRRIGATION ENGINEERING Vs POs & PSOs**

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| Course Outcomes (COs) | Program Outcomes (POs) | | | | | | | | | | | |
| PO1-k3 | PO2- k4 | PO3-k5 | PO4-k5 | PO5 – k3,k5,k6 | PO6-k3 | PO7-k2 | PO8-k3 | PO9-k4 | PO10-k5,k6 | PO11-k2,k3 | PO12 |
| CO1 k2 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |
| CO2 k2 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |
| CO3 k3 | 2 | 1 |  |  |  |  |  |  |  |  |  |  |
| CO4 k3 | 3 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |
| CO5 k3 | 3 | 2 | 1 | 1 |  |  |  |  |  |  |  |  |

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| Course Outcomes (COs) | CO LEVEL |
| PSO1 | PSO2 | PSO3 |
| CO1 | K2 | 0 | 2 | 0 |
| CO2 | K2 | 0 | 2 | 0 |
| CO3 | K2 | 0 | 2 | 0 |
| CO4 | K2 | 0 | 2 | 0 |
| CO5 | K2 | 0 | 2 | 0 |

**Note:Adequate Support by the COs to Pos and PSOs: 3- High 2- Medium 1- Low**