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| **Course No: - ELE-IDE 483** | **Course Title: - Lift Irrigation System Design and Management** |
| **Semester: - VIII** | **Credit:- 3=2+1** |

**Syllabus:**

**Theory**

Site selection for lift irrigation and reconnaissance survey, survey and mapping of field, cropping pattern and computing water requirement, selection of site for intake and jackwell, computing total head and power requirement, design of intake chambers, inlet pipe and pump house, selection of pump, pump layout and connection. Design and layout of rising main, distribution system and delivery chamber, working out water rates.

**Practicals:**

Selection of site for lift irrigation scheme and reconnaissance survey, Survey and mapping of field, including ‘L’ section, Estimation of water availability and computing water, requirement, Design of intake well, Design of intake pipe, Design of sump well, Design of jack well, Computation of total head and power requirement, Selection of pump, Economic of lift irrigation project, Field visit to lift irrigation project

**Teaching Schedule:**

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| **Lecture No.** | **Topics** | **Article No./**  **Page No.** | **Book** | **Weightage, (%)** |
| **Unit I** | | | | |
| 1 | Introduction to lift irrigation, necessity and role of lift irrigation schemes in irrigation development | 249-250 | 1,2 | 10 |
| 2 | Assessment of feasibility of lift irrigation project | 250-251 | 1 |
| 3, 4 | Selection of site and reconnaissance survey for lift irrigation scheme | 257-260 | 1, 2 |
| **Unit II** | | | | |
| 5, 6 | Survey and leveling procedure   1. Chain and Compass survey 2. Plain Table Survey 3. Dumpy/Automatic level | 159-161  293-298  371-379 | 3 | 30 |
| 7 | Water availability | 251, 255-256 | 1 |
| 8 | Computation of water requirement and capacity of project | 25-35 | 4 |
| **Unit III** | | | | |
| 9 | Components of lift irrigation scheme  i) Intake well-function, type, constructional details | 260-262 | 1 | 20 |
| 10 | Sump well | 268-269 | 1 |
| 11 | Jack well | 270-271 | 1 |
| 12, 13 | Intake pipe and rising main | 278-280  263-264 | 1  2 |
| **Unit IV** | | | | |
| 14 | Pumps | 487 | 5 | 30 |
| 15 | Pump house | 271-275 | 1 |
| 16 | Delivery/distribution chamber | 282-283 | 1 |
| 17 | Electrical equipments and accessories | 275-276 | 1 |
| 18 | Valves and water Hammer Control Devices | 633-635  281-282 | 1  1 |
| 19 | Design of intake well | 262-263 | 1 |
| 20 | Design of intake pipe | 264-667 | 1 |
| 21 | Design of sump well | 269-270 | 1 |
| 22 | Specification of jack well | 274-275 | 1 |
| 23 | Pump house structure | 272-273 | 1 |
| 24 | Layout of rising main | 280-281 | 1 |
| 25 | Design of rising main | 420-421 | 6 |
| 26, 27 | Computation of power requirement | 209-213  238-241 | 1 |
| **Unit V** | | | | |
| 28, 29 | Operation of lift irrigation scheme (Pump) | 277-278 | 1 | 10 |
| 30, 31 | Economics of lift irrigation project | 697-704 | 1 |
| 32 | Norms for fixing economic water rate | 283-285 | 1 |

**Practicals:**

1. Selection of site for lift irrigation scheme and reconnaissance survey,

2-3. Survey and mapping of field, including ‘L’ section

4-5. Estimation of water availability and computing water requirement

6. Design of intake well

7. Design of intake pipe

8. Design of sump well

9. Design of jack well

10. Computation of total head and power requirement

11. Selection of pump

12-13. Economic of lift irrigation project

14-16. Field visit to lift irrigation project

**Suggested readings**

**Text books**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Title** | **Author** | **Publication** |
| 1 | Irrigation Theory and Practices  (IInd edition 2008) | A.M.Michael | Vikas Publishing House Pvt. Ltd. |
| 2 | Technical aspects of agricultural project. Volume – I |  | NABARD Publication, November 1989 |
| 3 | Surveying and leveling | T.P. Kanetkar, S.V.Kulkarni | Punde Vidyapeeth, Griha Prakashan, Pune |
| 4 | Irrigation Engineering and Hydraulic Structures | S.K.Garg | Khanna Publishers, Delhi |
| 5 | Water, Well and Pumps | A.M.Michael  and S.D.Khepkar | Tata McGraw Hill Publication Co. Ltd. New Delhi |
| 6 | A Text Book of Fluid mechanics and Hydraulic machines (Eighth edition) | R.K.Bansal | Laxmi Publications (p) Ltd. New Delhi |