

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

TEACHING SCHEME (w. e. f. 18<sup>th</sup> July, '11)

### SEMESTER-V

| SR. NO | Sub. CODE | SUBJECT                                       | TEACHING SCHEME (HOURS) |          |           | CREDITS   |
|--------|-----------|---|-------------------------|----------|-----------|-----------|
|        |           |   | THEORY                  | TUTORIAL | PRACTICAL |           |
| 1      | 356101    | Special Fire Hazards & Basic Fire Engineering | 3                       | 0        | 3         | 6         |
| 2      | 356102    | Environment Salvage & Fire Laws               | 3                       | 0        | 0         | 3         |
| 3      | 356103    | Firemanship                                   | 0                       | 0        | 6         | 6         |
| 4      | 356104    | Industrial Safety Management                  | 3                       | 0        | 3         | 6         |
| 5      | 356105    | Fire Leadership & Disaster Management         | 4                       | 0        | 0         | 4         |
| 6      | 350606    | Water Resource Management                     | 3                       | 0        | 0         | 3         |
| 7      | 350609    | Water Resource Management Practice            | 0                       | 0        | 2         | 2         |
|        |           | <b>TOTAL</b>                                  | <b>16</b>               | <b>0</b> | <b>14</b> | <b>30</b> |

#### Note:-

- (1) **Subject- 350606 - Water Resource Management Theory Paper (Diploma Civil Engg.) is a common paper for GTU Examination.**
- (2) **Subject- 350609 - Water Resource Management Practice (Diploma Civil Engg.) is a common Subject for GTU Examination.**
- (3) **Remaining all papers/ Practical are the Special, Fire Technology 's papers.**

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

### SEMESTER-V

Subject Code: 356101

Subject Name: **Special Fire Hazards & Basic Fire Engineering**

| Sr. No. | Subject Content  | Hrs |
|---------|--|-----|
| 1.      | <b>1.0 Explosives Substances:</b><br>1.1 Explosion<br>1.2 Types Of Explosion<br>1.3 Classification Of Explosives<br>1.4 Rules Of Storage Of Explosive Substances<br>1.5 Fire Fighting In Factories & Magazines<br>1.6 Transport By Water & Rail<br>1.7 Road & Air  | 08  |
| 2.      | <b>2.0 Ship Fire Fighting</b><br>2.1 Causes of ship fire<br>2.2 fire fighting procedure in ship<br>2.3 cargo ship fire<br>2.4 Locating & approaching the ship fire<br>2.5 dock safety<br>2.6 general tactics in fighting in ship fire<br>2.7 means of flooding   | 08  |
| 3.      | <b>3.0 Elements Mixture &amp; Compounds</b><br>3.1 Physical states of elements mixture & compounds<br>3.2 dust explosion explosion suppression<br>3.3 explosion Suppression<br>3.4 spontaneous combustion<br>3.5 unstable chemical<br>3.6 formation of oxides<br>3.7 organic chemical<br>3.8 hydrocarbon compounds<br>3.9 isomer & isomerism<br>3.10 ester | 09  |
| 4.      | <b>4.0 Basic Engineering</b><br>4.1 Basic instrumentation<br>4.2 measuring the instrument<br>4.3 vernier calipers micrometer screw<br>4.4 workshop practice<br>4.5 grinding machine  | 09  |

|    |   |    |
|----|---|----|
|    | 4.6 forging<br>4.7 casting<br>4.8 marking tools<br>4.9 cutting tools<br>4.10 fileing<br>4.11 study of electrical tools<br>4.12 welding and its different kinds  |    |
| 5. | <b>5.0 Terrorism Activties &amp; Fire Accidents</b><br><br>5.1 Plan Hijacking<br>5.2 Terrorist attacks<br>5.3 Fire Hazards of Petroleum Product unit<br>5.4 Gas lick age by different chemicals company<br>5.5 uneven hazards | 08 |
| 6. | <b>Total</b>  | 42 |

### Reference Books:

1. Ref handling of hazardus materials , - A.K.Rohatgi-Mumbai
2. Fire Chief's Hand Book - James F. Casey, Newyork
3. Post H.S.C.Diploma in Fire service Engineering - NIFDEM-nagpur

## Practical :

| Sr. No | Content   | Total Hrs |
|--------|---|-----------|
| 1.     | Basic Instrumentation   | 42        |
| 2.     | Measuring The Instrument  |           |
| 3.     | Vernier Calipers Micrometer Screw                               |           |
| 4.     | Workshop Practice   |           |
| 5.     | Grinding Machine  |           |
| 6.     | Forging   |           |
| 7.     | Casting   |           |
| 8.     | Marking Tools   |           |
| 9.     | Cutting Tools   |           |
| 10.    | Fileing   |           |
| 11.    | Study Of Electrical Tools                                       |           |
| 12.    | Welding And Its Different Kinds                                 |           |
| 13.    | Verification Of The Law Of Polygon Forces                       |           |
| 14.    | Reaction At The Supported Of Simple Beams                       |           |
| 15.    | Study Tutorial Based On Syllabus Containing Minimum 10 Problems |           |

### Reference Books:

1. Instrumentation Measurement & Analysis -- D.C.Nakra & K.K.Chodhary

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

### SEMESTER-V

Subject Code: 356102

Subject Name: **Environment Salvage & Fire Laws**

| Sr. No. | Subject Content  | Hrs. |
|---------|--|------|
| 1.      | <b>1.0 Environment</b><br><br>1.1 Defination Of Enveronment & Pollution<br>1.2 Types Of Pollution<br>1.3 Water & Protection Act<br>1.4 Radiation Pollution<br>1.5 Environment Plastic Hazards<br>1.6 Community Treatment For Industrial Polluted Water<br>1.7 Recycling Solid Waste Management<br>1.8 Industrial Water Treatment Plant<br>1.9 Environment Awareness & Natural Resources Conservation<br>1.10 Sustainable Energy Management | 09   |
| 2.      | <b>2.0 Salvage</b><br><br>2.1 Damage<br>2.2 Aims Of Salvage<br>2.3 Folding Salvage Sheet<br>2.4 Before During & After Salvage  | 08   |
| 3.      | <b>3.0 Introduction Of Various Laws</b><br><br>3.1 Municipal Bye Laws For Fire Prevention<br>3.2 National Building Code<br>3.3 Code Of Practice For Construction Of Temporary & Pandals<br>3.4 Acts & Rules Of Fire Safety In Factory<br>3.5 1948 & GUJARAT FACTORY RULES<br>3.6 Explosive Act & Petroleum Act<br>3.7 Act On Hazardous Environment   | 08   |
| 4.      | <b>4.0 Fire Prevention Legislation-1</b><br><br>4.1 Calcium Carbide Rule<br>4.2 Storage Transportation & Decantation Of Petroleum Act 1934<br>4.3 Petroleum Rules 1976   | 09   |

|    |   |           |
|----|---|-----------|
|    | 4.4 Smpv Rules 1981<br>4.5 Cinema Rule 1938<br>4.6 Explosive Rule 1940<br>4.7 Model Fire Prevention Code & Fire Precaution Act 1971<br>4.8 Delhi Fire Prevention Act 1986<br>4.9 Ahmadabad Fire Safety Rule Rro |           |
| 5. | <b>5.0 Fire Prevention Legislation-2</b><br><br>5.1 Enforce Wef 2006<br>5.2 Hotel<br>5.3 Factories<br>5.4 Hospitals<br>5.5 Public Place<br>5.6 Cinema & Theaters  | 08        |
|    | <b>Total</b>  | <b>42</b> |

### Reference Books:

1. Govt. Fire laws gazate book - Publish by Govt. of India
2. Station Officer and Inspector course – Home Department of India, National Fire service College.

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

### SEMESTER-V

Subject Code: 356103

Subject Name: **Firemanship**

**Practical :**

| <b>Sr. No.</b> | <b>Subject Content</b>  | <b>Hrs.</b>       |
|----------------|---|-------------------|
| 1.             | <b>1.0 Fire fighting practical Drill</b> <ol style="list-style-type: none"> <li>1. Hose drill</li> <li>2. ladder drill</li> <li>3. pump drill</li> <li>4. Hydrant drill</li> <li>5. tender drill</li> <li>6. suction drill</li> <li>7. fire extinguisher drill</li> <li>8. foam drill</li> <li>9. dividing berthing with hose drill</li> <li>10. collecting breathing drill</li> <li>11. put on gears drill</li> </ol>  | 60                |
| 2.             | <b>2.0 Rescue operation practical drill</b> <ol style="list-style-type: none"> <li>1. B.A. Set Drill</li> <li>2. Stricture Drill</li> <li>3. Chair Knot Drill</li> <li>4. Bow Line Drill</li> <li>5. Fireman Lifting Drill</li> <li>6. Tunnel Drill</li> <li>7. Flood Rescue Drill</li> <li>8. First Aid Training</li> <li>9. High Rise Rescue</li> <li>10. Building Climbing</li> <li>11. Rescue Techniques</li> </ol> | 20                |
| 3.             | <b>3.0 Swimming Training</b>  | 02                |
| 4.             | <b>4.0 Pared drill</b>  | 02                |
| 5.             | <b>5.0 BPT-PT</b> <ol style="list-style-type: none"> <li>1. Worm-Up</li> <li>2. Running</li> <li>3. High Jump</li> <li>4. Long Jump</li> <li>5. Rope Climbing</li> <li>6. Bamboo Jump</li> </ol>  | <b>Spare Time</b> |

|    |  |                   |
|----|--|-------------------|
|    | 7. Short Jump<br>8. Skit Jump<br>9. Crawling<br>10. Front Role<br>11. Sprint<br>12. River Bridge Crossing<br>13. Repelling<br>14. Athletics<br>15. Judo<br>16. Karate<br>17. Kusti<br>18. Yoga<br>19. Pranayam<br>20. Bend<br>21. Up-Down<br>22. Double Mark Time<br>23. Deep Berthing |                   |
| 6. | <b>6.0 Sports</b><br>1. Cricket<br>2. Foot ball<br>3. Volley ball<br>4. Carom  | <b>Spare Time</b> |
|    | <b>Total</b>   | <b>84</b>         |

### Reference Books:

1. Fire Technology -- R.S.Gupta
2. Manual of Firemanship --Volume 5 , 6



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA IN FIRE TECHNOLOGY**  
**SEMESTER-V**

Subject Code: 356104

**Subject Name: Industrial Safety Management**

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|    |  |           |
|----|--|-----------|
|    | 2.17 Battery Etc.  |           |
| 3. | <b>3.0 Explosive Substances - Chemical Industries</b><br>3.1 General Classification Of Explosive Such As Gun Powder<br>3.2 Nitrate Mixture<br>3.3 Nitro Compound<br>3.4 Chlorate Mixture<br>3.5 Fulminate<br>3.6 Ammunition<br>3.7 Fire Works<br>3.8 Lox<br>3.9 Homemade Teririst Bomb & Their Transportation<br>3.10 Storage Etc                              | 08        |
| 4. | <b>4.0 Air craft Fire &amp; Rescue-1</b><br><br>4.1 Airport Management<br>4.2 Cricital Area<br>4.3 Control Time<br>4.4 Safty Glass<br>4.5 Hazardous Of Air Craft & Its Rescue<br>4.6 Types Of Air Crafts<br>4.7 Different Fuels In Air Craft<br>4.8 Hydraulic System Of Air Craft  | 08        |
| 5. | <b>5.0 Air craft Fire &amp; Rescue-2</b><br>5.1 Electric System Air Craft<br>5.2 A/C. In Air Craft<br>5.3 Compress Gas<br>5.4 Exit In Air Craft<br>5.5 Special Hazards In Air Craft<br>5.6 Storage Of Wapons In Air Craft<br>5.7 Heliped & Helicopter<br>5.8 Use Of Diffrent Kinds Of Fire Preventing Material & Appliances In<br>Air Craft & Rescue Processer | 08        |
|    | <b>Total</b>   | <b>42</b> |

### Reference Books:

1. A Govt. by laws for Industrial safety
2. Fire Technology -- R.S.Gupta

## Practical

| Sr. No | Content                                 | Total Hrs |
|--------|---|-----------|
| 1.     | Visit to Chemical Industries            | 42        |
| 2.     | Visit to Petro Chemical Industries      |           |
| 3.     | Visit to Auto Mobile Industries         |           |
| 4.     | Visit to Gas Industries                 |           |
| 5.     | Visit to Air Craft / Airport Industries |           |

### Reference Books:

1. A Govt. by laws for Industrial safety
2. Fire Technology -- R.S.Gupta

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

### SEMESTER-V

Subject Code: 356105

Subject Name: **Fire Leadership & Disaster Management**

| Sr. No. | Subject Content  | Hrs. |
|---------|--|------|
| 1.      | <b>1.0 Fire Service Administration</b><br>1.1 Executive Duties<br>1.2 Administrative Duties<br>1.3 Hose Card Register<br>1.4 Workshop Order<br>1.5 Logbook<br>1.6 Stock Register<br>1.7 Duty Book<br>1.8 Occurance Book                        | 10   |
| 2.      | <b>2.0 Discipline</b><br>2.1 Aim Of Discipline<br>2.2 Leadership<br>2.3 Does & Dons<br>2.4 Discipline Man<br>2.5 Discipline Ground & Class Room<br>2.6 Aim Of Punishment   | 10   |
| 3.      | <b>3.0 Communication &amp; Fire Service</b><br>3.1 Watch Room<br>3.2 Control Room<br>3.3 Quality Of Control Room Operater<br>3.4 Address Of Incident<br>3.5 Attendance Data<br>3.6 Equipments In Control Room<br>3.7 Watch Room & Fire Station | 11   |
| 4.      | <b>4.0 Fire Orders</b><br>4.1 Causes Of Fire<br>4.2 Electrical Precaution<br>4.3 Fire Sectors<br>4.4 Fire Party<br>4.5 Highrise Building Fire Order<br>4.6 Fire Protection In Cinema<br>4.7 Fire Protection Of Petrol Tankers                  | 11   |
| 5.      | <b>5.0 Disaster Management</b><br>5.1 Types Of Disaster<br>5.2 Environment   | 14   |

|  |  |    |
|--|--|----|
|  | 5.3 Industrial<br>5.4 Flood<br>5.5 Fire<br>5.6 Drought<br>5.7 Cyclone<br>5.8 Tornado<br>5.9 Natural & Manmade Disasters<br>5.10 Types Of Emergency<br>5.11 Crises<br>5.12 Situation<br>5.13 Task Of Disaster Management<br>5.14 The Topic Disaster May Be Given To The Student As A Case Study |    |
|  | <b>Total</b>   | 56 |

### Reference Books:

1. Fire Chief's Hand Book - James F. Casey, Newyork
2. Agni suraksha D.R.Verma
3. Fire Science and Equipment and Management Part-I &II
4. Manual of Firemanship --Volume 5 , 6

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN FIRE TECHNOLOGY

### SEMESTER-V

Subject Code: 350606

Subject Name: **Water Resource Management (Note : Common subject with Diploma Civil Engg.-GTU)**

| Sr. No | Subject Content   | Hrs. |
|--------|---|------|
| 1      | <b>Introduction: ( Water as Vital Resource and Its Management)</b><br><br>1.1 Scope of W.R.M.<br>1.2 Necessity of W.R.M.<br>1.3 Role of various agencies in W.R.M.:<br><div style="display: flex; justify-content: space-between;"> <ul style="list-style-type: none"> <li>- Agriculturists</li> <li>- Geologists</li> <li>- Scientists</li> <li>- Water quality Control (Authority)</li> <li>- Mechanical Engg.</li> <li>- Economists</li> <li>- NGO's</li> <li>- General Public</li> </ul> <ul style="list-style-type: none"> <li>- Meteorologists</li> <li>- Industrialists</li> <li>- Biologists</li> <li>- Electrical engg.</li> <li>- Social workers</li> <li>- Politicians</li> </ul> </div> 1.4 Water Resource Projects in Gujarat (Focus on Technical Aspects)<br>-Kalpasar<br>-Sujalam Sufalam<br>-Sardar Sarovar (Narmada Project) | 02   |
| 2      | <b>Hydrology : (Water, its existence, distribution ,and Movement Throughout the Earth )</b><br>2.1 Define Hydrology<br>2.2 Hydrological cycle<br>2.3 Forms of precipitation<br>2.4 Precipitation occupancy & its types.<br>2.5 Measurement of rain fall<br>2.5.1 Rain gauges.<br>a. Non Recording – Symon's type<br>b. Recording<br>- Float type automatic rain gauges<br>- Tipping bucket<br>2.5.2 Methods of determining average rain fall<br>a. Arithmetic average method<br>b. Theissen's polygon method  | 09   |

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|---|--|----|
|   | <p>c. Isohytel method</p> <p>2.5.3 Determine No. of rain gauges for given catchment area.<br/>(Data to be given: (i) C. A. (ii) Coefficient of variance of rainfall (Cv)<br/>(iii)E = Allowable percentage error.</p> <p>2.5.4 Define: Evaporation, Transpiration &amp; Evapo -transpiration</p> <p>2.5.4.1 Enlist factors affecting evaporation.</p>  |    |
| 3 | <p><b>Runoff : ( Rainfall Excess on the Surface of Earth )</b></p> <p>3.1 Compute runoff by various methods.</p> <p>3.2 Factors affecting runoff.</p> <p>3.2.1 (a) Coefficient method/ Rational method<br/>(b) Formula</p> <p>(i) Dicken's formula<br/>(ii) Ryve's formula<br/>(iii) Inglis formula<br/>(iv) Nawab – Jung Bahadur formula</p> <p>3.3 Calculate run off by Index. (w-index and <math>\phi</math>-index)</p> <p>3.3.1 Unit Hydrograph</p> <ul style="list-style-type: none"> <li>- Enlist assumptions of unit hydrograph.</li> <li>- Construct unit hydrograph from a given storm hydrograph data (rainfall &amp; stream - flow data)</li> <li>- Construct flood hydrograph from given unit hydrograph for two or more periods of rainfall.</li> </ul> <p>3.3.2 Compute flood discharge from unit hydrograph</p> | 07 |
| 4 | <p><b>Advance Water Application Methods : ( Micro Level Irrigation Methods)</b></p> <p>4.1 (a) Soil water plant relation-ship</p> <p>(i) Classes of soil water<br/>(ii) Compute field capacity<br/>(iii) Classes of different crops with root-zone depth.<br/>(iv) Compute the water requirement of crop with effective root zone depth.<br/>(v) Drip irrigation<br/>(vi ) Sprinkler irrigation<br/>(Enlist and briefly explain the suitability , Design layout parameters, components of above (b) &amp; (c) methods, Advantages &amp; Disadvantages of above methods.)</p> <p>4.2 Water logging and drainage.</p> <p>4.2.1 Define water logging and ill effects of water logging.</p> <p>4.2.2 Surface and sub-surface drainage.</p> <p>4.2.3 Salt efflorescence</p>   | 07 |

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|---|---|----|
| 5 | <b>Ground Water : ( Water Below the Earth Surface)</b><br><br>5.1 Importance of ground water and present scenario<br>5.2 Necessity of recharging<br>5.2.1 Artificial recharging as today's need.<br>5.2.2 Types of artificial recharge<br>a. Spreading method.<br>5.3 Pit method / khet talavadi<br>5.4 Induced recharge method<br>5.5 Recharge well method.<br>5.6 Sub surface dam.<br>5.7 Check dam series<br>5.8 Ponds<br>5.9 Unlined canals<br>Case studies for above all.<br>5.10 Suitability of artificial recharging method w.r.t. different regions in Gujarat State.<br>5.11 Methods of water-drawls of various strata   | 07 |
| 6 | <b>Sea Water Intrusion : ( Land Area Under Salinity )</b><br><br>6.1 Enlist ill effects of sea water intrusion<br>6.2 Discuss following remedial measures to control sea water intrusion.<br>6.2.1 Modification of pumping.<br>6.2.2 Artificial recharge by spreading area.<br>6.2.3 Pumping trough.<br>6.2.4 Pressure ridge.<br>6.3 Compute depth of Interface and draw the sketch   | 03 |
| 7 | <b>Watershed Management:(Rainwater + Land + Management)</b><br><br>7.1 Explain watershed concept<br>7.2 Characteristics of watershed:-<br>Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology, soil type, hydrology, hydrogeology, socio-economics.<br>7.3 Watershed management & People's participation..<br>7.3.1 Conserving Soil ,Water & Energy<br>7.3.2 Improving ability of land to hold water<br>7.3.3 Rain water harvesting, by<br>- Check dams<br>- Nala / Gully plugging<br>- Percolation tank<br>- Khet talavadi<br>- Roof harvesting<br>- Vegetation and plantation<br>7.4 Interlinking of village ponds<br>- Dressing of Natural Drains | 07 |



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|--|--|----|
|  | - Check dams at the pond overflow section and within the drains<br>(Feasibility, Design and advantages)<br>7.5 Role of co-operative society in watershed management. |    |
|  | <b>Total</b>   | 42 |

### **References Books:**

- |  |   |   |
|--|---|---|
| 1. Irrigation, Water Resources House,<br>& Water Power Engg.               | Dr. P.N. Modi                                     | Standard Book<br>Delhi.   |
| 2. Hydrology & Water Resources Sons, Delhi.                                | R.K. Sharma                                       | Dhanpat Rai &   |
| 3. Ground water international Ltd.,  | H.M.Ragunath                                      | New Age<br>New Delhi.   |
| 4. Ground water assessment, Hill<br>Development & management<br>New Delhi. | K.R. Karanth                                      | Tata Mc Graw<br>Pub. Co. Ltd.,                                      |
| 5. Principle & Practice of Irrigation<br>Delhi.<br>Engg.                   | S.K.Sharma  | S.Chand & Co,   |
| 6. Hydrology & Water Resources Engg.<br>Delhi.                             | S.K.Garg.   | Khanna Pub.,  |
| 7. Watershed management in India<br>Ltd.                                   | J.V.S. Moorthy                                    | Willey Eastern<br><br>New Age<br>international Ltd.,<br>New Dilhi.  |
| 8. Design of small dams.   | U.S.B.R.  |   |
| 9. Irrigation theory & practice<br>Pvt. Ltd, Delhi.                        | A.M.Mitchel                                       | Vikas Pub. House  |
| 10. Water vision 2050<br>Gandhinagar                                       | Narmada, W.R. & water supply deptt.,              |   |
| 11. Techno economic letter Vol.-107 & 108                                  |   | Gram technology<br>Institute- Gujarat<br>Secort.12,<br>Gandhinagar. |
| 12. Irrigation & water power engg.   | B.C. Punmia                                       |   |
| 13. Water Resources Engg.-<br><br>Principles & Practice                    | C. Satyanarayan<br>International Ltd.,<br>Murthy. | New Age<br><br>New Delhi  |
| 14. Relevant IS codes  |   |   |

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA IN CIVIL ENGINEERING**  
**Semester – V**

Subject Code : **350609**

Subject Name : **Water Resource Management Practice (Common  
Subject with Diploma Civil Engg. –GTU )**

| <b>Sr.<br/>No.</b> | <b>Work Details</b>   | <b>Hrs.</b> |
|--------------------|---|-------------|
| <b>1</b>           | <p><b>Numerical Examples :</b></p> <p><b>(a) Hydrology</b></p> <ul style="list-style-type: none"><li>- Average rain-fall by all three methods</li><li>- Determination of No. of rain gauge stations for given C.A.</li></ul> <p><b>(b) Runoff</b></p> <ul style="list-style-type: none"><li>- Compute run off by various methods for given catchment. (use formulae)</li><li>- Calculate runoff by Index (w-index and <math>\phi</math>-index)</li><li>- Construct unit hydrograph from a given storm hydrograph (rainfall &amp; stream flow data to be given)</li><li>- Construct flood hydrograph from a given unit hydrograph for two or more periods of rainfall</li><li>- Compute flood discharge from flood hydrograph.</li></ul> <p><b>(c) Advance Water Application Methods</b></p> <ul style="list-style-type: none"><li>- Compute Field Capacity</li><li>- Compute Water Application Efficiencies</li><li>- Compute water requirement of crop with effective root zone depth.</li></ul> <p><b>(d) Sea Water Intrusion</b></p> <ul style="list-style-type: none"><li>- Compute depth of interface &amp; DRAW the sketch.</li></ul> | <b>10</b>   |

|   |  |   |
|---|--|---|
| 2 | <p><b>Sketch work and Data collection :</b></p> <p><b>(a) Introduction:</b></p> <ul style="list-style-type: none"> <li>- Collect the data regarding available W.R. of your district/state and Compare &amp; Conclude</li> </ul> <p><b>(b) Hydrology:</b></p> <ul style="list-style-type: none"> <li>- Draw Hydrologic cycle</li> <li>Runoff</li> <li>- Draw unit hydrograph</li> <li>- Draw flood hydrograph</li> </ul> <p><b>(c) Advance Water Application Methods:</b></p> <ul style="list-style-type: none"> <li>- Classes &amp; availability of soil water</li> <li>- Draw the graph of application of water V/S optimum plant growth</li> <li>- Layout of drip irrigation</li> <li>- Layout of sprinkler irrigation</li> </ul> <p><b>(d) Groundwater:</b></p> <ul style="list-style-type: none"> <li>- Draw diagram of Structures for various methods of artificial recharge</li> </ul> <p><b>(e) Seawater Intrusion:</b></p> <ul style="list-style-type: none"> <li>- Draw interface diagram and its stages</li> </ul> <p><b>(f) Water Shed Management:</b></p> <ul style="list-style-type: none"> <li>- Draw the sketches of</li> <li>- Rain water harvesting structures.</li> <li>- Roof top water harvesting in urban area.</li> <li>- Check dam</li> <li>- Nala / gully plugging</li> <li>- Percolation tank</li> <li>- Recharge well bore.</li> </ul> | <p><b>Home work</b></p> <p>Neat and clean with detailing, in sketch book)</p> |
|---|--|---|

|   |  |  |
|---|--|--|
| 3 | <b>Designs:</b><br><br><b>(a) Advance Water Application methods:</b><br><br><ul style="list-style-type: none"> <li>- Enlist and briefly explain the Design Steps and parameters of Drip OR Sprinkler irrigation method</li> <li>- Enlist and briefly explain the Design Steps and parameters of surface drainage for given discharge</li> </ul> <b>(b) Watershed Management:</b><br><br><ul style="list-style-type: none"> <li>- Compute Dimensions of check dam(gravity type) across a natural drain<br/>(Max. Height =3.0 m.)</li> <li>-Design of a Recharge Bore well.</li> </ul>   | 10                                       |
| 4 | <b>Visits :</b><br><br><b>(a) Introduction:</b><br><br><ul style="list-style-type: none"> <li>-Visit to any W.R. Project .</li> <li>-Visit to W.R. department for collecting existing W.R. data of a district<br/>Hydrology</li> <li>- Visit of meteorological department to collect data, observe, and interpret rainfall data.</li> </ul> <b>(b) Advance Water Application Methods:</b><br><br><ul style="list-style-type: none"> <li>- Visit the farm field where Drip OR Sprinkler irrigation method is implemented.</li> </ul> <b>(c) Watershed Management:</b><br><br><ul style="list-style-type: none"> <li>- Visit to any rainwater harvesting/recharging structure</li> </ul> | As per convenience of Staff and College. |
| 5 | <b>Seminar:</b><br><br>Select any one topic with the guidance of teacher & present the Seminar for at least 15 to 20 minutes, before teachers & students.  | 08                                       |
|   | <b>Total</b>   | 28                                       |

**Note:**

- (1) Above visits should be arranged according to the convenience.
- (2) Visits should be associated with the **detailed report** of the visited site.

**Term Work :**

1. Term work should also include certification by subject teacher and counter signed by HOD. With all above exercises sr.no. 1 to 5.
2. Viva is to be defended (along with term work) with practical examination by external and internal examiners .Practical examination will include followings:

**Viva**

**Explanation of terminologies associated with Water Resources Management.**