

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN FIRE TECHNOLOGY

TEACHING SCHEME (w. e. f. 18th 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
		TOTAL	16	0	14	30

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.	1.0 Explosives Substances: 1.1 Explosion 1.2 Types Of Explosion 1.3 Classification Of Explosives 1.4 Rules Of Storage Of Explosive Substances 1.5 Fire Fighting In Factories & Magazines 1.6 Transport By Water & Rail 1.7 Road & Air	08
2.	2.0 Ship Fire Fighting 2.1 Causes of ship fire 2.2 fire fighting procedure in ship 2.3 cargo ship fire 2.4 Locating & approaching the ship fire 2.5 dock safety 2.6 general tactics in fighting in ship fire 2.7 means of flooding	08
3.	3.0 Elements Mixture & Compounds 3.1 Physical states of elements mixture & compounds 3.2 dust explosion explosion suppression 3.3 explosion Suppression 3.4 spontaneous combustion 3.5 unstable chemical 3.6 formation of oxides 3.7 organic chemical 3.8 hydrocarbon compounds 3.9 isomer & isomerism 3.10 ester	09
4.	4.0 Basic Engineering 4.1 Basic instrumentation 4.2 measuring the instrument 4.3 verniar calippers micrometer screw 4.4 workshop practice 4.5 grinding machine	09

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

Subject Code: 356102

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

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

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

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 :

Sr. No.	Subject Content	Hrs.
1.	1.0 Fire fighting practical Drill 1. Hose drill 2. ladder drill 3. pump drill 4. Hydrant drill 5. tender drill 6. suction drill 7. fire extinguisher drill 8. foam drill 9. dividing berthing with hose drill 10. collecting breathing drill 11. put on gears drill	60
2.	2.0 Rescue operation practical drill 1. B.A. Set Drill 2. Stricture Drill 3. Chair Knot Drill 4. Bow Line Drill 5. Fireman Lifting Drill 6. Tunnel Drill 7. Flood Rescue Drill 8. First Aid Training 9. High Rise Rescue 10. Building Climbing 11. Rescue Techniques	20
3.	3.0 Swimming Training	02
4.	4.0 Pared drill	02
5.	5.0 BPT-PT 1. Worm-Up 2. Running 3. High Jump 4. Long Jump 5. Rope Climbing 6. Bamboo Jump	Spare Time

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

Reference Books:

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

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

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.	1.0 Fire Service Administration 1.1 Executive Duties 1.2 Administrative Duties 1.3 Hose Card Register 1.4 Workshop Order 1.5 Logbook 1.6 Stock Register 1.7 Duty Book 1.8 Occurance Book	10
2.	2.0 Discipline 2.1 Aim Of Discipline 2.2 Leadership 2.3 Does & Dons 2.4 Discipline Man 2.5 Discipline Ground & Class Room 2.6 Aim Of Punishment	10
3.	3.0 Communication & Fire Service 3.1 Watch Room 3.2 Control Room 3.3 Quality Of Control Room Operater 3.4 Address Of Incident 3.5 Attendance Data 3.6 Equipments In Control Room 3.7 Watch Room & Fire Station	11
4.	4.0 Fire Orders 4.1 Causes Of Fire 4.2 Electrical Precaution 4.3 Fire Sectors 4.4 Fire Party 4.5 Highrise Building Fire Order 4.6 Fire Protection In Cinema 4.7 Fire Protection Of Petrol Tankers	11
5.	5.0 Disaster Management 5.1 Types Of Disaster 5.2 Environment	14

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

Reference Books:

1. Fire Chief's Hand Book - James F. Casey, Newyork
2. Agni surakxa 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	<p>Introduction: (Water as Vital Resource and Its Management)</p> <p>1.1 Scope of W.R.M. 1.2 Necessity of W.R.M. 1.3 Role of various agencies in W.R.M.:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">- Agriculturists</td> <td style="width: 50%;">- Meteorologists</td> </tr> <tr> <td>- Geologists</td> <td>- Industrialists</td> </tr> <tr> <td>- Scientists</td> <td>- Biologists</td> </tr> <tr> <td>- Water quality Control (Authority)</td> <td></td> </tr> <tr> <td>- Mechanical Engg.</td> <td>- Electrical engg.</td> </tr> <tr> <td>- Economists</td> <td>- Social workers</td> </tr> <tr> <td>- NGO's</td> <td>- Politicians</td> </tr> <tr> <td>- General Public</td> <td></td> </tr> </table> <p>1.4 Water Resource Projects in Gujarat (Focus on Technical Aspects) -Kalpasar -Sujalam Sufalam -Sardar Sarovar (Narmada Project)</p>	- Agriculturists	- Meteorologists	- Geologists	- Industrialists	- Scientists	- Biologists	- Water quality Control (Authority)		- Mechanical Engg.	- Electrical engg.	- Economists	- Social workers	- NGO's	- Politicians	- General Public		02
- Agriculturists	- Meteorologists																	
- Geologists	- Industrialists																	
- Scientists	- Biologists																	
- Water quality Control (Authority)																		
- Mechanical Engg.	- Electrical engg.																	
- Economists	- Social workers																	
- NGO's	- Politicians																	
- General Public																		
2	<p>Hydrology : (Water, its existence, distribution ,and Movement Throughout the Earth)</p> <p>2.1 Define Hydrology 2.2 Hydrological cycle 2.3 Forms of precipitation 2.4 Precipitation occupancy & its types. 2.5 Measurement of rain fall</p> <p>2.5.1 Rain gauges.</p> <p>a. Non Recording – Symon's type b. Recording</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">- Float type automatic rain gauges</td> <td style="width: 50%;"></td> </tr> <tr> <td>- Tipping bucket</td> <td></td> </tr> </table> <p>2.5.2 Methods of determining average rain fall</p> <p>a. Arithmetic average method b. Theissen's polygon method</p>	- Float type automatic rain gauges		- Tipping bucket		09												
- Float type automatic rain gauges																		
- Tipping bucket																		

	<p>c. Isohytel method 2.5.3 Determine No. of rain gauges for given catchment area. (Data to be given: (i) C. A. (ii) Coefficient of variance of rainfall (Cv) (iii)E = Allowable percentage error. 2.5.4 Define: Evaporation, Transpiration & Evapo -transpiration 2.5.4.1 Enlist factors affecting evaporation.</p>	
3	<p>Runoff : (Rainfall Excess on the Surface of Earth)</p> <p>3.1 Compute runoff by various methods. 3.2 Factors affecting runoff. 3.2.1 (a) Coefficient method/ Rational method (b) Formula (i) Dicken’s formula (ii) Ryve’s formula (iii) Inglis formula (iv) Nawab – Jung Bahadur formula 3.3 Calculate run off by Index. (w-index and ϕ-index) 3.3.1 Unit Hydrograph - Enlist assumptions of unit hydrograph. - Construct unit hydrograph from a given storm hydrograph data (rainfall & stream - flow data) - Construct flood hydrograph from given unit hydrograph for two or more periods of rainfall. 3.3.2 Compute flood discharge from unit hydrograph</p>	07
4	<p>Advance Water Application Methods : (Micro Level Irrigation Methods)</p> <p>4.1 (a) Soil water plant relation-ship (i) Classes of soil water (ii) Compute field capacity (iii) Classes of different crops with root-zone depth. (iv) Compute the water requirement of crop with effective root zone depth. (v) Drip irrigation (vi) Sprinkler irrigation (Enlist and briefly explain the suitability, Design layout parameters, components of above (b) & (c) methods, Advantages & Disadvantages of above methods.) 4.2 Water logging and drainage. 4.2.1 Define water logging and ill effects of water logging. 4.2.2 Surface and sub-surface drainage. 4.2.3 Salt efflorescence</p>	07

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

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

References Books:

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

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

<p>2</p>	<p>Sketch work and Data collection :</p> <p>(a) Introduction:</p> <ul style="list-style-type: none"> - Collect the data regarding available W.R. of your district/state and Compare & Conclude <p>(b) Hydrology:</p> <ul style="list-style-type: none"> - Draw Hydrologic cycle Runoff - Draw unit hydrograph - Draw flood hydrograph <p>(c) Advance Water Application Methods:</p> <ul style="list-style-type: none"> - Classes & availability of soil water - Draw the graph of application of water V/S optimum plant growth - Layout of drip irrigation - Layout of sprinkler irrigation <p>(d) Groundwater:</p> <ul style="list-style-type: none"> - Draw diagram of Structures for various methods of artificial recharge <p>(e) Seawater Intrusion:</p> <ul style="list-style-type: none"> - Draw interface diagram and its stages <p>(f) Water Shed Management:</p> <ul style="list-style-type: none"> - Draw the sketches of - Rain water harvesting structures. - Roof top water harvesting in urban area. - Cheek dam - Nala / gully plugging - Percolation tank - Recharge well bore. 	<p>Home work</p> <p>Neat and clean with detailing, in sketch book)</p>
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3	<p>Designs:</p> <p>(a) Advance Water Application methods:</p> <ul style="list-style-type: none"> - Enlist and briefly explain the Design Steps and parameters of Drip OR Sprinkler irrigation method - Enlist and briefly explain the Design Steps and parameters of surface drainage for given discharge <p>(b) Watershed Management:</p> <ul style="list-style-type: none"> - Compute Dimensions of check dam(gravity type) across a natural drain (Max. Height =3.0 m.) -Design of a Recharge Bore well. 	10
4	<p>Visits :</p> <p>(a) Introduction:</p> <ul style="list-style-type: none"> -Visit to any W.R. Project . -Visit to W.R. department for collecting existing W.R. data of a district Hydrology - Visit of meteorological department to collect data, observe, and interpret rainfall data. <p>(b) Advance Water Application Methods:</p> <ul style="list-style-type: none"> - Visit the farm field where Drip OR Sprinkler irrigation method is implemented. <p>(c) Watershed Management:</p> <ul style="list-style-type: none"> - Visit to any rainwater harvesting/recharging structure 	As per convenience of Staff and College.
5	<p>Seminar:</p> <p>Select any one topic with the guidance of teacher & present the Seminar for at least 15 to 20 minutes, before teachers & students.</p>	08
	Total	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.