

# **Courses of Study**

**2019-20**

**B.Sc. Fire and Safety**

**IILP**



Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				L	T	P	C	Contact Hours
I	TXFS101				TXFS102				TXFS103				TXFS104				TXFS111				Code				16	0	8	20	24
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	4	0	0	4	4	0	0	4	4	0	0	4	4	0	0	4	0	0	8	4	0	0	0	0					
	PC				PC				PC				PC				PC												
	Fire engineering science				Fire prevention and protection				Fire Extinction Science				Fire Service Administration				Lab Practice I												
II	TXFS201				TXFS202				TXFS203				TXFS204				TXFS211								16	0	8	20	24
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C					
	4	0	0	4	4	0	0	4	4	0	0	4	4	0	0	4	0	0	8	4	0	0	0	0					
	PC				PC				PC				PC				PC												
	Safety Management				Safety Engineering				Safety Control Procedure & Legislation				Occupational health and safety				Lab Practice II												



B.Sc. Fire & Safety_IILP																														
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				L	T	P	C	Contact Hours	
III	TXFS301				TXFS302				TXFS303				TXFS304				TXFS311				Code				16	0	8	20		24
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C						
	4	0	0	4	4	0	0	4	4	0	0	4	4	0	0	4	0	0	8	4	0	0	0	0						
	PC				PC				PC				PC				PC													
	Rescue Vehicles and Equipment's				Construction Safety				Safety Responsibility				Environmental Management				Lab Practice III													
IV	TXFS401				TXFS402				TXFS403				TXFS404				TXFS411								16	0	8	20	24	
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C						
	4	0	0	4	4	0	0	4	4	0	0	4	4	0	0	4	0	0	8	4	0	0	0	0						
	PC				PC				PC				PC				PC													
	Emergency Planning & first aid				Industrial Security Management				Fire Technology I				Radiation Hazards				Lab Practice IV													

B.Sc. Fire & Safety_IILP																														
Semester	Course I				Course II				Course III				Course IV				Course V				Course VI				L	T	P	C	Contact Hours	
V	TXFS501				TXFS502				TXFS503				TXFS504				TXFS511				TXFS512				16	0	8	23		24
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C						
	4	0	0	4	4	0	0	4	4	0	0	4	4	0	0	4	0	0	8	4	0	0	0	3						
	PC				PC				PC				PC				PC				PC									
	Fire Technology II				Social Security In Industries				Safety In Power Plant				Industrial Noise And Noise Control				Project Stage I				Internship									
VI	TXFS601				TXFS602				TXFS603				TXFS611				Code								11	0	12	17	23	
	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C	L	T	P	C						
	4	0	0	4	4	0	0	4	3	0	0	3	0	0	12	6	0	0	0	0	0	0	0	0						
	PC				PC				PC				PC																	
	Controlling Pollution				Disaster Management				DEI				Project Stage II																	

### Department Elective I

#### Course

#### Code

#### Course

#### L

#### T

#### P

#### C

1

Energy Conservation

3

0

0

3

2

Chemical And Environmental Hazards

3

0

0

3

3

Industrial Pscychology, Ergonomics And Accidents

3

0

0

3

**First Year B.Sc.Fire Engineering (Part Time)**

**Year: First Year**

**Course: Fire Engineering Science**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To understand physical and chemical properties of extinguishing media
2	To learn process of combustion
3	To learn types of water supply for fire fighting purpose

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the basic concepts of fire
2	How to deal with electrical hazards and skill to tackle electrical hazards
3	How to operate portable extinguisher

Unit Number	Details	Hours	Marks
1	<b>CHEMISTRY OF FIRE:</b> Chemical Reaction, Heat Formation and Heat of Combustion, Mechanism of Combustion, Flash Point, Fire Point, Fire Triangle , Components of Fire, Fire Tetrahedron, Chain Reaction, Spread of Fire, Extinction of Fire, Back Drought, Delayed Back drought	14	10

<b>2</b>	<b>ELECTRICITY:</b> Sources of Electricity, Fuse short circuit, Common causes Of Electric fire, Fire Fighting measures in Electricity.	<b>12</b>	<b>10</b>
<b>3</b>	<b>HYDRAULICS:</b> Water Pressure And Weight, Water weight and water per cu. Ft., Friction loss of water	<b>12</b>	<b>10</b>
<b>4</b>	<b>FIRE EXTINGUISHERS</b> Soda Acid Fire And Extinguishers: Water Co2 Gas Cartridge Fire Extinguishers:- Store Pressure Fire Extinguishers:-,Foam Type Fire Extinguishers:-, Dry Chemical Powder Fire Extinguishers:-, Co2 Gas Type Fire Extinguishers – Operation Care Maintenance, Refill	<b>12</b>	<b>10</b>
<b>5</b>	<b>WATER SUPPLY:</b> Sources Of Water, Type Of Hydrant, Care And Maintenance Of Screw Down Hydrant, Types of Water Relay System & There Advantages and Disadvantages	<b>10</b>	<b>10</b>
<b>Total</b>		<b>60</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Hand Book of Fire Control & Protection –Kumar Arun. 2.Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao.  3.Agni Suraksha – D. R. Verma.

Year: First Year

Course: **Fire prevention and protection**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn the basic concepts of building Structure & design
2	To understand types of fixed fighting installation system & their types
3	To learn categories of construction
4	To learn installation maintenance and use of fixed installation
5	To aware about causes of rural fire

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the basic concepts of Challenges during aircraft fighter fighting & ship fighter
2	Examine Difficulties of fighter fighting in rural area
3	Analyze and Solve the problems related to building construction

Unit Number	Details	Hours	Marks
1	<b>Building construction:</b> General Requirement of Building Design in Fire Prevention, Wall, Roofs, Basements, Floors and Openings, Electrical Installations, Adopting Building for other Purpose, Access for Fire Appliances, Control of Smoke and Hot Gases, Escape from Buildings, Stores and other Buildings	16	16
2	<b>Fixed installation:</b> Introduction to F.F.F.I., Sprinkles and drenches system, Hose reel and down corner, Fire services inlet	10	10

<b>3</b>	<b>Rural fire:</b> Difficulties of fire lighting in rural., Combustible of rural fire., Causes of rural fire., Method of fire fighting.	<b>10</b>	<b>10</b>
<b>4</b>	<b>Aircraft Fire:</b> Design and construction of Airport, Safety Measures of Airport, Causes of fire in Aircraft and there control measures, Emergency plan at Airport.	<b>10</b>	<b>10</b>
<b>5</b>	<b>Ship and Dockyard fire:</b> Ship construction and there types, Fire protection on board ship, Fire Fighting System at Dock yard, Fire Plan and Diagram	<b>08</b>	<b>04</b>
<b>Total</b>		<b>54</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Fire Safety – V. K. Jain 2.Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao  3.Agni Suraksha – D.R. Verma



Year: First Year

Course: **FIRE EXTINCTION SCIENCE**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn introduction of small gears
2	To understand appropriate use of hose and hose fitting
3	To learn types of foam compound
4	To learn making process of foam solution
5	To learn uses of various types of ladders during fighter fighting and rescue.
6	Introduction and functions of various types pumps
7	Care and maintenance of pumps and primers

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the basic concepts and proper use of small gears
2	know about working procedure of foam making equipment
3	Does and donts during use of pumps and primers

Unit Number	Details	Hours	MARKS
1	<b>Small Gears:</b> Introduction of Small Gears, Breaking gears., Cutting gears., Rescue gears., Transport gears., Miscellaneous., Turning over gears., are and Maintenance of small gears	10	05
2	<b>Hose and Hose Fitting:-</b> Delivery hose. Delivery hose coupling. Suction hose coupling. Branches and Nozzle. Monitors. Collecting Breeching. Dividing Breeching. Adapters. Wrenches. Hose Ramps.	14	12

<b>4</b>	<b>Foam and foam making Equipment:-</b> Types of Foam compound. Foam making equipment. Working procedure of equipment. Care and maintenance foam & foam M.EQR. Description part f &S making equipment. Storage of foam compound.	<b>12</b>	<b>10</b>
<b>3</b>	<b>Ladders:</b> Hook ladders. Extension ladder. Escape T.T.L./Snorkel Ladder, Care, maintenance, standard test ladder.	<b>12</b>	<b>10</b>
<b>5</b>	<b>Pump and Primers:-</b> Introduction and Function, Types of Pumps. Force ump. Lift pump. Centrifugal pump.	<b>14</b>	<b>13</b>
<b>Total</b>		<b>62</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao  2.Agni Suraksha - D. R. Verma

Year: First Year

Course: **Fire Service Administration**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn how discipline is produced
2	To understand fundamental difference between watchroom& control room duties
3	To learn ranks and appointment of fire service organisation
4	To learn duties and responsibilities of fire service personals

Course Outcomes	
On successful completion of the course students will be able to:	
1	Analyse qualities of discipline person
2	Out words signals of discipline
3	Various books referred at watch room and control room
4	Fighter ground procedure, sop.

Unit Number	Details	Hours	Marks
1	<b>DISCIPLINE:</b> How discipline is produced?. Importance of discipline, Qualities of Disciplined person, Outward signal of discipline	12	10
2	<b>WATCHROOM PROCEDURE:</b> Definition & object of watch room, Watch room duties, Control Room duties, Maintenance of record room.	12	10
3	<b>FIRE SERVICE ORGANISATION:</b> Rank and appointment of fire services, State fire services, City fire services, Fire station, maintenance of station. Various	12	10

	Documentation in Fire Service.		
<b>4</b>	<b>Practical Fireman ship:-:</b> Fireman duties at fire S.T.N. Qualities of fire man. Duties and responsibilities of fire man, On fire ground. Duties after the fire in S.T.N.	<b>12</b>	<b>10</b>
<b>5</b>	<b>SPECIAL SERVICE CALL:</b> Sewers gases Rescue, Wells and rivers, ponds., Building collapse. Road accident, Persons trapped in lifts.	<b>12</b>	<b>10</b>
<b>Total</b>		<b>60</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao  2. Agni Suraksha - D. R. Verma  3. Hand book of fire control & protection -Kumar

**Year: First Year**

**Course: Safety Management**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn the basic concepts of safety audit, safety inspection, safety survey
2	How to measure safety performance
3	To learn significance of work permit
4	To learn emergency plan

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the role of government in safety policy implementation
2	Identify the hazards and risk at various sites
3	Analyze the safety tax system

Unit Number	Details	Hours	MARKS
1	<b>Plant Safety Inspection:</b> Types of Safety Inspection, Safety Audit, Safety Survey, Plant Safety inspection,	12	09
2	<b>Safety Performance Measurement:</b> Frequency Rate and Severity Rate, Frequency Severity incidence, Safe – T – score, Safety and Government Role	16	11
3	<b>Work Permit System:</b> Introduction Significance of Safety documentation and work permit system, Limited	19	13

	Work Permit(LWP),Safety Tag System		
<b>4</b>	<b>EMERGENCY RESPONSE PLAN:</b> On site Emergency Management Plan, Off site Emergency Management Plan	8	06
<b>5</b>	<b>RISK ANALYSIS AND RISK MANAGEMENT:</b> Risk analysis, Risk Assessment Concepts, Identification of Risks, Hazard control, Process Safety Management	16	11
<b>Total</b>		<b>45</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Industrial Safety Management – M.K. Tarafdar, K.J. Tarafdar 2.Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao

Year: First Year

Course: **Safety Engineering**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn the basic concepts of safety at work place
2	To understand industrial safety management system
3	To learn various PPE's and their use
4	To learn importance of heat ventilation & control system in hot work area

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the identification of electricity hazard
2	Need importance and methods for good housekeeping
3	Implement hazard evaluation technique

Unit Number	Details	Hours	MARKS
1	<b>Safety Analysis:</b> Hazard Evaluation Techniques, Hazop Study, Fault tree analysis, Event tree Analysis, Relative ranking techniques	10	07
2	<b>Electrical Safety:</b> Safety in use of Electricity, Dangers from Electricity, Overload and Short circuit protection, Earth fault protection, Static electricity, Points to be checked at the electrical system	18	12
3	<b>Workplace Safety:</b> Illumination, Ventilation & Heat Control, Noise Control, Vibration	9	09

<b>4</b>	<b>Personal Safety:</b> Introduction PPE ( Personal Protective Equipment ),Protective Clothing	<b>9</b>	<b>10</b>
<b>5</b>	<b>Workshop Safety:</b> Hand tools and power tools, Safety while using Grinding stone, Welding and gas cutting Safety, Lubrication Safety, Housekeeping – Need, Importance and Methods	<b>17</b>	<b>12</b>
<b>Total</b>		<b>63</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety Management – M.K. Tarafdar, K.J. Tarafdar 2. Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao



**Year: First Year**

**Course: : Safety Control Procedure & Legislation**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	How to promote employees participation in safety work
2	To understand effective implementation of various act for labours welfare
3	To learn labour laws and regulations

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand how to achieve zero accident goal at workplace.
2	Know about safety organisation structure.

Unit Number	Details	Hours	MARKS
1	<b>Overview Of Safety:</b> Fundamental of Safety, Principle for Accident Prevention, Management Responsibility in Safety, Classification of Accidents, Causes of Accident	17	12
2	<b>Industrial Safety:</b> Safety Organization, Safety Policy, Safety Committee	10	08
3	<b>Motivation To Safety:</b> Safety Programme, Safety Education & Training, Promoting Employee's Participation	16	10
4	<b>Legislative Aspects Of Safety:</b> Factory Act 1948, Indian Boiler Act 1923, Explosives Act 1884, Petroleum Act 1934, Electricity Act 2003	14	10

<b>5</b>	<b>Labor Welfare Legislations:</b> Workman Compensation act – 1923, Employees State Insurance Act - 1948, Fatal Accident Act – 1855, Maternity Benefit Act – 1961	<b>13</b>	<b>10</b>
<b>Total</b>		<b>60</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety Management – M.K. Tarafdar, K.J. Tarafdar  2. Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao  3. Labor Laws - Dr. Ganga Sahay Sharma  4. Introduction to safety- Phil Hughes, Ferett.

Year: First Year

Course: Occupational health and safety

ANNUAL PATTERN

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn how to maintain industrial quality working life and quality circles.
2	To understand implementation and operation of occupational health and safety management system
3	To learn how to prevent from occupational diseases.
4	To Understand Process, Safety, Health Issues And Environment Aspects Applicable To Engineering And Allied Industries.

Course Outcomes	
On successful completion of the course students will be able to:	
1	How to control the risks of causing diseases at various occupations.
2	Understand safety policies.
3	Aware about safety procedures at work place.

Unit Number	Details	Hours	MARKS
1	<b>Occupational Health:</b> Introduction Occupational Health & Risks, Common Occupational Diseases, Prevention of Diseases	14	10
2	<b>Occupational Health And Safety Management System:</b> Introduction, OH & S Policy, Planning, Implementation and Operation, OHSAS Standard	10	08
3	<b>Occupational Health &amp; Industrial Hygiene:</b> Introduction, Hazard Identification, Medical Surveillance, Medical Facilities, Industrial Quality of	15	12

	Working Life and Quality Circles		
<b>4</b>	<b>Important Ingredients Of Health:</b> Introduction, Importance of Food, Essential Constituents of Food, Principal Systems of Body, Importance of Exercise, Tips for Happiness	<b>12</b>	<b>10</b>
<b>5</b>	<b>Safety, Health &amp; Environmental Management System:</b> Ensuring Participation of Employees in Developing SHE Policy, Important Points for Consideration for Safety, General Instruction for Safety, Creating Awareness about process Safety	<b>13</b>	<b>10</b>
<b>Total</b>		<b>64</b>	<b>50</b>

Resources	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety Management – M.K. Tarafdar, K.J. Tarafdar 2. Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao 3. Surakshit Kamdar- Dr. K.U Mistry

## PRACTICALS

Year: First Year

Course: Lab **Practical & Viva** - I

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
-	-	8	4	-	-	-		25	-	25	50
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn Aim & importance of drill
2	To understand evacuation procedure of entrapped casualties
3	To learn proper use of tools, equipment's, appliances.
4	To learn importance of various types of knots during fighter fighting and rescue operation

Course Outcomes	
On successful completion of the course students will be able to:	
1	Perform the basic duties of firemen
2	conduct mock drill and liasoning with different services
3	Analyze and Solve the problems at incident place

Unit Number	Details	Hours	MARKS
1	<b>Drill &amp; Field Practical:</b> Fire Squad drill, Parade & P.T. Hose Pipe Drill, Hydrant Drill, Pump Drill, Pump Operation Drill, Pump with Foam Drill, Fire Tender Mounting Drill, Ladder Drill (Climbing and crew with hose pipe line position), Fire Extinguisher Operation Drill, Fire Casualty rescue operation Drill, Use of Salve	16	50

	equipment drill, Artificial Respiration Drill, Various position rescues with B.A. set, Remove of Causality from Smoke room and confined place., Uses of Various types of knots. Live Fire Demonstration, Mock Drill, Assembly Point		
<b>Total</b>		<b>16</b>	<b>50</b>



**Course: Lab Practical & Viva - II**

**Course Code:**

**Max. Time, End Semester Exam (Theory) - 3Hrs.**

## Objectives

## Course Outcomes

On successful completion of the course students will be able to:

1	To understand how to tackle live fire and rescue calls
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Unit Number	Details	Hours	MARKS
1	<b>Lab Practical:</b> Work Environment :Gas Monitoring, Dust Estimation (C)Noise level Measurement, Wearing and operational procedure of Breathing Apparatus (B.A. Set).,Handling of Hazardous Chemicals, Study the machine guarding system, Study of various ventilation systems,Study of illumination systems.	08	25
2	<b>Drill &amp; Field Practical:</b> Ladder Drill, Streature Drill, First – Aid, Live Fire demonstration (Solid, LPG, Metal)	08	25
<b>Total</b>		<b>16</b>	<b>50</b>

Resources	
Recommended Books	
Reference Books	



## Second Year

Second Year B.Sc.Fire Engineering (Part Time)

Year: Second Year

Course: Rescue Vehicles And Equipment's

ANNUAL PATTERN

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn construction fabrication and appropriate use of special appliances.
2	To understand theory of respiration
3	Sequence of donning and doffing, operational use , functional use , recharging, testing, maintenance advantages and disadvantages of SCBA

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the do's and don'ts while using SABA
2	proper handling and use of small gears
3	perform duties of Breathing Apparatus control Officer

Unit Number	Details	Hours	MARKS
1	Introduction of Subject Construction and layout details of various types of fire fighting and rescue vehicles. Ambulance	14	10
2	<b>Detail Study:</b> I.S. Specifications for CFT, Emergency tender, Water tender type A,B & X, Foam tender, Multipurpose fire tender, Hose laying lorry, Break down van, Fire boats, Trailer pump, Portable pump, CO2 Tender, DCP Tender etc.	21	15

<b>3</b>	<b>B. A. Set</b> Types of B.A. sets, Atmospheric and self contained, Theory of respiration, Essential feature of B. A. sets, Various parts of B. A. set and their function, Sequence of wearing, operational use, functional use, recharging, testing maintenance, advantages and disadvantages of different sets, Distress signal unit, Working duration and principle of calculating working duration, Donning, Pre-Entry Test, Working in Hot and Humid Atmosphere, Study of Associated Equipments, Duties of officer in charge and BA set Operatives	<b>18</b>	<b>12</b>
<b>4</b>	<b>Small Gears:</b> Introduction to small gears, lighting equipments and other tools used in fire service, its use, care and maintenance, Special gears – Study of hydraulic rescue equipments, cutting gears and other rescue apparatus, Lifting equipments – Mechanical, hydraulic, pneumatic jacks, pulley and blocks, air bags, Electric power tools and oxy-propane cutting set, Protective clothing's, Blower and exhauster Study of Indian specification of Fireman axe and fire hook.	<b>17</b>	<b>13</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	

Year: Second Year

Course: **Construction Safety**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn identification of hazard in construction sector and their preventive measures
2	To understand details study about construction activity
3	To learn various PPE'S required at construction site

Course Outcomes	
On successful completion of the course students will be able to:	
1	To identify symptoms and signs at construction site
2	To tackle with risk associated during construction project work

Unit Number	Details	Hours	MARKS
1	<b>Safe Work Place:</b> Safe means of access, Fall Protection, Safety while working on Roofs, PFASS (Personal Fall Arrest Safety System)  <b>Scaffolding:</b> Parts of Scaffold, Ladder Access, Working on Scaffold, Basic requirements of Scaffolding, Erection of Scaffolding, Scaffolding Safety, Scaffold Inspection	14	10
2	<b>Personal Protective Equipment (PPE):</b> Need and importance of PPE, Employer's responsibilities, Employees responsibilities, Types of PPE, Head Protection, Eye and Face Protection, Ear Protection, Hand Protection, Leg Protection, Skin Protection, Respiratory protection	16	10

<b>3</b>	<b>Safe Use of Hand Tools and Portable Power Tools:</b> Hand Tools, Ten Commandments for personnel using hand tools, Portable Electric Power Tools, Pneumatic Tools, Lone Working  <b>Safe Operation of Vehicles, Equipment and Machinery:</b> Workplace Transport, Hazards, Pedestrian routes, Vehicular routes, Reversing operations (Safety guidelines), Instructions for drivers, Hand held Power circular Saws, Chain Saws, Abrasive Wheels	<b>18</b>	<b>14</b>
<b>4</b>	<b>Safe Material Handling Operations:</b> Safe Handling of materials, Major injuries, Lifting appliances, Safe operations of Cranes, Pilings, Rigs, Side Booms, General Safety Requirements for Lifting operations	<b>10</b>	<b>08</b>
<b>5</b>	<b>Major activities of Construction Project:</b> Definitions, Excavation Hazards & precautions, Methods of Excavation, Welding and Cutting Operations, Types of Welding, Hazards and precautions for welding, Confined Space entry precautions, Painting operations - Hazards and precautions, Sand Blasting - Hazards and precautions	<b>12</b>	<b>08</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety Management – M.K. Tarafdar, K.J. Tarafdar 2. Industrial Safety, Health and Environment Management System – R.K. Jain, Sunil S. Rao  3. Agni Suraksha - D. R. Verma

**Year: Second Year**

**Course: Safety Responsibility**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To understand the NSCI and their working framework
2	To understand the role of safety department and their activities
3	To understand basic responsibilities of various government bodies

Course Outcomes	
On successful completion of the course students will be able to:	
1	Handling of safety responsibilities at work place
2	Know the safety policies in industry

Unit Number	Details	Hours	MARKS
1	Introduction, Objectives, Basic Safety Programming, Safety Department	10	06
2	Management Responsibility for Safety, Safeguarding Public, General Safety Rules, Responsibilities of Government, Responsibilities of Social Organizations, Responsibilities of Public Authorities	17	12
3	Safety Activities of ILO, Maintenance and Safety, Factories Act – 1948, Inspection and certifying	16	12
4	Introduction of National Safety Council, Formation, Role and Responsibility	13	09

<b>5</b>	Safety Policy of Management in Industry, Employees Responsibility ,towards Safety, Joint Responsibility for Safety	<b>14</b>	<b>11</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	Industrial Safety, Health and Environment Management Systems – RK Jain

Year: Second Year

Course: Environmental Management

ANNUAL PATTERN

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To learn the basic concepts of various energy saving practices
2	To understand procedure of internal audit of any unit based on ISO 14001
3	To learn various concern parameters to monitor
4	To learn about equipment's required in stack monitoring
5	To Identify and list major global environmental issues

Course Outcomes	
On successful completion of the course students will be able to:	
1	prepare EIA and EMS outlines for various projects
2	control the causes of pollution at working site
3	purpose and objectives of environmental management
4	enumerate the major effects of global warming on living and non-living components of the environment

Unit Number	Details	Hours	MARKS
1	<b>Introduction to Environmental Management:</b> What is Environmental Management definition, Scope of Environmental Management it industry, Purpose & Objectives	11	08
2	<b>Environmental policy &amp; laws:</b> Environmental policy definition, Environmental policy issues & planning, Water & Air acts and rules, Environmental Protection act –1986, Important Definition -Environmental Pollution, Hazardous Substance, Occupier, General	14	10

	power of Central government, Prevention Control abatement of Environmental pollutant in excess of standard, Miscellaneous Provisions of act, Coastal zone development		
<b>3</b>	<b>Environmental Management systems:</b> General of EMS, Aims of EMS, Purpose & advantages of EMS, Special features of EMS, Benefits of EMS, Environmental impact assessment (EIA), General Important issues of EIA in respect of nine principal review area, Administrative procedure for Environmental studies, HAZON & HAZOP studies	<b>17</b>	<b>12</b>
<b>4</b>	<b>Environmental Economies:</b> Importance of Environmental Economies, Scope of Environmental Economics, Rules of taxation	<b>12</b>	<b>09</b>
<b>5</b>	<b>Major challenges for development:</b> Introduction, Major global , Environmental issues, Major convention & summits Environmental protection – climate change convention, earth summits, change convention, earth summit, earth summit + 5 Kyoto Protocol, Toronto conference on changing Atmosphere, World climate conference (1979), world Environmental Day.	<b>16</b>	<b>11</b>
<b>Total</b>		<b>60</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Ecology & Environment Studies - K.C. Soni 2.Environmental Study – JitendraPandey, B. L. Choudhary 3.Industrial Safety, Health & Environmental Management System – R. K. Jain 4.Encyclopedia of Ecology and Environment – Prof. PriyaRanjanTrivedi 5.Environmental Study - Dhamecha



**Year: Second Year**

**Course: Emergency Planning & first aid**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	Learning how the On site& off site Emergency Plan works.
2	To get information about cardio-pulmonary resuscitation and its various methods.
3	To Understand the Importance of Security and Media Management During Emergency Planning.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Learn how to prepare an emergency evacuation & response plan and how to implement effectively.
2	Learn about exactly what to take care of handling hazards material.

Unit Number	Details	Hours	MARKS
1	<b>On site Emergency Planning:</b> On-site Emergency Plan, Emergency Alarm System, Emergency Control Room, Key personnel, Emergency Control Program	20	10
2	<b>Off site Emergency Planning:</b> Off-site Emergency Plan, Mutual Aid Scheme, Emergency Evacuation, Security and Media management	15	10

<b>3</b>	Hazard Communication, Safe Handling of hazardous substance, Material Safety Data Sheet (MSDS), Use of hazardous and Toxic substance, Storage and Handling, Transportation of Hazardous substance.	<b>21</b>	<b>15</b>
<b>4</b>	<b>First Aid:</b> Introduction , Principles of First Aid ,Training on First Aid, General rules of First Aid	<b>14</b>	<b>15</b>
<b>Total</b>		<b>65</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	<b>References:</b> Construction Safety Hand Book – Muraleedharan Pillai Introduction to health & Safety- Phil Hughes & Ferrett. Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Second Year**

**Course: Industrial Security Management**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To Know about need for security arrangements in the Industrial Plant.
2	To Understand the importance of discipline in industrial security management
3	To identify the various challenges in industrial security management.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Learned about different aspects of communication, media and benefits.
2	Got Training for many security devices and their proper use

Unit Number	Details	Hours	Marks
1	<b>Alarm System</b> :VisitorEntryPass,EmployeeentryPass,Communication,Safe Keys and Locks	14	14
2	<b>Security Guard Force:</b> Check List for Plant Security,Security Staff Parade Drills ,Discipline,Record Keeping	18	12
3	Various Challenges in Security ,Weak Security Guard Force,Lack of Communication ,Weak	16	14

	Observation,Improper Knowledge of Security Devices		
<b>4</b>	<b>TRAINING OF SECURITY PERSONNEL:</b> Advance Training Drill & Practical,Knowledge about channel of Communication	<b>10</b>	<b>10</b>
<b>Total</b>		<b>58</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	<b>References:</b> Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Second Year**

**Course: Fire Technology I**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To get Detailed information about different types of hydrants, their parts, care and maintenance, how to use them.
2	To get information about various elements in the fixed fire fighting system.
3	To study of perception and behaviour of people in the event of fire.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got Information about the executive and administrative duties, responsibilities of the Incident control officer.
2	Learned about advantages and disadvantages Water Relay system.

Unit Number	Details	Hours	Marks
1	Sources of Water, Type of Hydrants Care And Maintenance of Screw Down Hydrant, Types of water relay system., Advantages and disadvantages of water Relay system.	12	09

<b>2</b>	Introduction to Fixed Fire Fighting Installation(F.F.F.I.),Hydrants, Appliances, Detectors, Sprinklers and Alarms,Sprinkles and drenches system,Hose reel and down corner,Fire services inlet	<b>16</b>	<b>11</b>
<b>3</b>	Ranks and appointment of fire services , State Fire services Administration, City Fire services Administration,Fire Station, Maintenance of Fire Station.Executive and Administrative duties of In charge, Various Documentation in Fire Service.	<b>12</b>	<b>08</b>
<b>4</b>	Perception and behaviour of people in the event of fire,The measures needed to overcome behaviour problems and ensure safe evacuation of people in the event of fire,Emergency evacuation procedures,Assisting disable people	<b>17</b>	<b>12</b>
<b>5</b>	Sources of Electricity, Fuse short circuit,Common causes of Electric Fire.,Fire Fighting measures for Electric Fire	<b>13</b>	<b>10</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	<b>References:</b> Industrial Safety, Health and Environment Management Systems – RK Jain

Year: Second Year

Course: **Industrial Safety**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To Know about challenges faced by the electroplating industry and its solutions.
2	To study the safety needs and improvements in petrochemicals refinery.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got information by actual training about the needs of various industries and their safety requirements.

Unit Number	Details	Hours	Marks
1	<b>Industries Needing Attention</b> :Automobile Industry ,Beverage Industry ,Brick & Tile Industry ,Canning & Food Industry	12	09
2	<b>Clothing Industry:</b> Dairy Products Industry , Electronics Industry Electroplating Industry , Fertiliser Industry	16	11
3	<b>Food Industry:</b> Glass Industry, Leather Goods Industry, Match Industry, Paper Industry	12	09
4	<b>Pesticide Industry:</b> Petrochemical Industry,PetroleumRefineryPharmaceuticalIndustry,Plastics Industry.	16	11

<b>5</b>	<b>Pottery Industry:</b> Rubber Industry, Silk Industry , Soap Industry Tobacco Industry , Woodworking Industry	<b>14</b>	<b>10</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	<b>References:</b> Industrial Safety- K.U. Misty



Year: Second Year

Course: Lab **Practical & Viva III**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
-	-	8	4	-	-	-		25	-	25	50
Max. Time, End Semester Exam (Theory) - 3Hrs.											
Objectives											
1		To learn use of PPE'S									
2		To understand handling of hazardous chemicals and precautions during use									

Course Outcomes			
On successful completion of the course students will be able to:			
1	Understand the basic concepts of analysis of various monitoring parameters		
2	Practical knowledge regarding safe environmental practices in industry		
Unit Number	Details	Hours	MARKS
1	<b>Lab Practical:</b> Work Environment: Gas Monitoring, Dust Estimation, Wearing and Learning about PPE, Handling of Hazardous Chemicals., Study the machine guarding system. Manual safe handling.  <b>Visit on subject related Industry/Construction Site etc.</b> <b>Field Practical</b>	08	50
<b>Total</b>		<b>08</b>	<b>50</b>



**Year: First Year**

**Course: Lab Practical & Viva - IV**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
-	-	8	4	-	-	-		25	-	25	50
Max. Time, End Semester Exam (Theory) - 3Hrs.											

### Objectives

<b>1</b>	Find out the issues that are encountered during the fire fighting operations in acid industry.
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### Course Outcomes

On successful completion of the course students will be able to:

<b>1</b>	Got information about pumps, fire engines and fixed fire fighting systems through field training.
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Unit Number	Details	Hours	Marks
<b>1</b>	Demonstration of Various acids Alkalis and Gases Organic Flammable Liquids and commonly used industrial Chemical- Fire Fighting Technique.	<b>04</b>	<b>20</b>
<b>2</b>	Demonstration and familiarization of all equipment's and tools use in Fire fighting field. Demonstration and familiarization of tender with tender drill. Pump drill, Fixed installation drill.	<b>04</b>	<b>30</b>
<b>Total</b>		<b>08</b>	<b>50</b>

### Resources

Recommended Books	
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<b>Reference Books</b>	Construction Safety Hand Book – Muraleedharan Pillai Introduction to health & Safety- Phil Hughes & Ferrett. Industrial Safety, Health and Environment Management Systems – RK Jain
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## Second Year

Third Year B.Sc. Fire Engineering (Part Time)

Year: Third Year

Course: Radiation Hazards

ANNUAL PATTERN

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To Study the effects and side effects of nuclear energy and fission chain reaction on human health.
2	To know about devices for measuring radiation
3	To get knowledge about how to distinguished between Ionizing and Non Ionizing radiation

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got knowledge about how to deal with radioactive substances

Unit Number	Details	Hours	MARKS
1	Definition, Nuclear Energy and Fission Chain Reaction, Nuclear Cycle, Enrichment and Fabrication, Nuclear Cycle Re Processing.	22	15
2	Natural Gas, Thermal Neutrons, Ionizing and Non Ionizing radiation, Radiation Dose, Alpha, Beta and Gamma Radiation, Cosmic	24	17

	Radiation.		
<b>3</b>	Ionizing Radiation Controls, Devices for Measuring Radiation, Controlling Radiation Hazards, Controlling Exposure, Non Ionizing Radiation, Disposal of Radioactive Wastes.	<b>24</b>	<b>18</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety, Health and Environment Management Systems- RK Jain

**Year: Third Year**

**Course: Social Security In Industries**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To know about Social security in industry and their various aspects
2	To get detail information of Group Life Insurance, Workman's Compensation Act, Maternity Benefit Act, Employees Provident Fund Act,

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got detailed information about the special benefits, facilities and rights of employees.

Unit Number	Details	Hours	MARKS
1	Definition, Scope of Social Security, Social Security in India, Working of ESI, Benefits of Workers.	22	15
2	Group Life Insurance, Workman's Compensation Act, Maternity Benefit Act, Employees provident Fund Act, Right to payment for Maternity.	24	17
3	Insurance Policy, Taking Policy, Transit Insurance, Employees State Insurance, Safety Audit, After Fire Incident. After Theft, After Accident,	24	18
Total		70	50

Resources	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Industrial Safety, Health and Environment Management Systems- RK Jain

**Year: Third Year**

**Course: Safety In Power Plant**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To Study about problems that arise in the power plant and its solutions.
2	To get information about duties and responsibilities of safety workers working in a power plant.
3	To get information about general safety requirements

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got knowledge of preventive and protective measures while using Boiler, Gas Turbines

Unit Number	Details	Hours	MARKS
1	Introduction, Boilers, Gas Turbine, Control of Fluid Systems safety, General Safety Requirement, Safety Guidelines for high speed rotary equipment.	24	18
2	Safety of Diesel Station, Electrical quality associated with Human Injury, Safety precautions for electrical workers, Safety rules for Line man\Authorization, Care and storage of Live line tools.	24	17
3	Responsibilities of Employees, HT and EHT Cables, Precautions in respect of Storage Batteries, Electrical Maintenance,	22	15



	Earthing.		
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Third Year**

**Course: : Industrial Noise And Noise Control**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	A detailed study of Industrial noise and effects- side effects
2	To get knowledge about Galloping, Audible Noise, Hearing Loss

Course Outcomes	
On successful completion of the course students will be able to:	
1	conducted a detailed study of noise pollution from industrial areas, critical illnesses, and the measures taken.

Unit Number	Details	Hours	Marks
1	Introduction, Effect of Noise on the auditory System, Audible Noise, Fundamentals of Sound, Measurement of Audible Noise.	24	17
2	Attenuation of Sound Pressure Levels, Acceptable Levels of Noise, Criteria for Hearing Loss, Galloping, Control of Noise	24	18
3	Vibration, Corona Vibration, Vibration Dampers, Hearing Protectors, Record Keeping	22	15
Total		70	50

Resources	
<b>Recommended Books</b>	
<b>Reference Books</b>	1.Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: First Year**

**Course: Controlling Pollution**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To know about various measures taken by government to control the all types of pollution caused by factories.
2	To Study of structure and methodology of the Environment Management System.
3	Detail study of ISO 14000 and provision of pollution controlling

Course Outcomes	
On successful completion of the course students will be able to:	
1	Got detail knowledge of various rules , regulations and laws has made by the government for pollution control

Unit Number	Details	Hours	Marks
1	Introduction· Survival of the Environment· Conflict between North and South· Environmental Control Regulations· Impact Assessment· Prevention and Control of Pollution· Central Pollution Control Board	24	17
2	Approaches to environmental Regulation· Concept of Industrial Ecology· Environmental Management System and Standard· Compliance to Legislations· ISO 14000·	24	17

	International Environmental guiding Principles		
<b>3</b>	Normal Environment Management: Integrated approach in managing Safety and environment: Development process towards sustainability: Hazardous Waste Management	<b>22</b>	<b>16</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	Industrial Safety, Health and Environment Management Systems –RK Jain

Year: Third Year

Course: Disaster Management

ANNUAL PATTERN

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	Study the structure, procedures and responsibilities of disaster management organization.
2	knowledge of Pre-Disaster preparedness and Post disaster response & recovery policy making and implementation
3	To study the various telecommunication tools used during the disaster period.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Attempts to reduce the casualties and economic losses due to preparedness for disaster.

Unit Number	Details	Hours	Marks
1	Introduction, Disaster Management Plan, Disaster Zoning for natural calamities, Important consideration in Disaster Management, Structure, Constitution, Needs and resources to tackle disaster	18	12
2	Pre-Disaster preparedness, Post disaster response and recovery, Control of emergencies, Organization consideration, Concept of communication	18	12
3	Pre-Disaster preparedness, Disaster Management Plan, Fire : Disaster	10	08

<b>4</b>	Introduction· Types of Natural Disaster· Flood· Earthquake· Landslide· Desertification· Cyclone	<b>14</b>	<b>08</b>
<b>5</b>	Introduction· Definition· Types of Artificial Disaster· Management of Artificial Disaster	<b>10</b>	<b>10</b>
<b>Total</b>		<b>70</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	Industrial Safety, Health and Environment Management Systems – RK Jain Environment Study – JitendraPandy, Prof. B. L. Choudhary

**Year: Third Year**

**Course: Energy Conservation (Optional paper A)**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
3	-	-	3	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	Detailed study of energy conservation contribution of the Indian Renewable Energy Development Agency.
2	the efforts and measures taken by the industry for energy conservation.
3	Study about roll of Bureau of Energy Efficiency

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the basic concepts of non – conventional energy sources
2	Knowledge on various topics and technologies for renewable energy
3	Importance of generation of alternative forms of energy.

Unit Number	Details	Hours	Marks
1	Energy Conservation Act,Bureau of Energy Efficiency,Energy Management,Energy Audit,Indian Renewable Energy Development Agency (IREDA)· Sustainable Energy Development	25	20



<b>2</b>	Introduction to sustainable development· Issue of achieving sustainable development· Optimal resource utilization· SustainableCities· Sustainable Transportation System	25	18
<b>3</b>	Energy Conservation· Sustainable mining Technology· Efficient energy Management· Bio- Methanation and Filtration· Protection of atmosphere	15	12
		<b>65</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	1. Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Third Year**

**ANNUAL PATTERN**

**Course: Chemical And Environmental Hazards (Optional paper B)**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
3	-	-	3	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To study toxic chemicals & its harmful effects on humans and environment.
2	Introduction of HAZCHEM code
3	To learn about toxic chemicals and necessary precautions while handling
4	To understand the plant operating procedures and safety measures to be taken

Course Outcomes	
On successful completion of the course students will be able to:	
1	Aware about handling of toxic chemicals at work place.
2	Analyse the safety measures at chemical plants
3	Reduction of risk and hazards to the environment due to mankind activities at plant.

Unit Number	Details	Hours	Marks
1	Introduction, Multiple Effects of Chemicals, Industrial Toxicology, Toxic Chemicals and its Harmful Effects on Humans, Factors influencing the effects of Toxic Material.	25	18

<b>2</b>	Chemical Hazards Exposure, Safety Analysis, Control Measures, Management of Workplace Exposure, Plant Operations, Dust Explosion.	<b>25</b>	<b>20</b>
<b>3</b>	Introduction to Environmental Hazards, Terms and Definition, Pollution, Environment Pollution, Energy, Man and Environment, Law of Conservation of Energy, Thermodynamics.	<b>15</b>	<b>12</b>
<b>Total</b>		<b>65</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Third Year**

**Course: Industrial Psychology, Ergonomics And**

**ANNUAL PATTERN**

**Course Code:**

**Accidents**(Optional paper C)

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
3	-	-	3	15	20	15		-	100	-	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Objectives	
1	To understand Aspect of the Industry:Economic, Social and Psychological
2	Study of the Physical Aspect of Work Environment.
3	To learn how to care of Worker's Health

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand relationship between intelligence and injury experience
2	Handle job stress and its effects
3	The Psychology of Industrial Efficiency

Unit Number	Details	Hours	Marks
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<b>1</b>	.Introduction, Industrial Psychology & its Scope, Concepts and Principles of Industrial Psychology, Application of Industrial Psychology, Industrial Accidents, Accident proneness	<b>20</b>	<b>15</b>
<b>2</b>	Relationship between perception and muscular responses and Injuries, Relationship between Intelligence and Injury Experience, Hearing, Emotional Instability, Fatigue, Illumination, Noise.	<b>20</b>	<b>15</b>
<b>3</b>	Atmospheric Condition, Job stress and its effects, Coping with Stress, Bio Mechanism and Ergonomics, Industrial Ergonomics and Measurements.	<b>22</b>	<b>12</b>
<b>4</b>	Physiology, Psychology, Working Environment.	<b>12</b>	<b>08</b>
<b>Total</b>		<b>74</b>	<b>50</b>

<b>Resources</b>	
<b>Recommended Books</b>	
<b>Reference Books</b>	Industrial Safety, Health and Environment Management Systems – RK Jain

**Year: Third Year**  
**Course: INTERNSHIP**

**ANNUAL PATTERN**  
**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
-	-		3	-	-	-		50	-	50	100
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Unit Number	Details	Hours
1	Internship of 15-30 days shall be arranged at the establishment relevant for training in Safety Management. This training will be required for students after the Semester Examination.	240
Total		240

**Year: Third Year**

**Course: Project & Case Study**

**ANNUAL PATTERN**

**Course Code:**

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
4	-	-	4	-	-	-		25	-	25	50
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Unit Number	Details	Hours	Marks
1	PROJECT IS TAKEN FROM THE SUBJECT & UNDER THE SUPERVISION OF ANY LECTURER. IT MUST FULFILL THE CREDIT & UPON COMPLETION THE DEGREE WOULD BE AWARDED	40	50
Total		40	50

Year: Third Year

Course: **PROJECT & VIVA VOCE**

**ANNUAL PATTERN**

Course Code:

Teaching Scheme (Hrs/Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	T	P	C	CIA-1	CIA-2	CIA-3		Lab	Theory	Lab	
-	-	1 2	-	-	-	-			-	50	50
Max. Time, End Semester Exam (Theory) - 3Hrs.											

Unit Number	Details	Hours
1	PROJECT IS TAKEN FROM THE SUBJECT & UNDER THE SUPERVISION OF ANY LECTURER. IT MUST FULFILL THE CREDIT & UPON COMPLETETION THE DEGREE WOULD BE AWARDED	120
Total		120