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**Syllabus**

**of**

**B.Sc in Fire Safety and Hazard Management**

**GYAN VIHAR SCHOOL OF SCIENCES**

Edition-2015

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**B.Sc in Fire Safety and Hazard Management**

1. **Introduction:**

Fire Safety has become important and integral part of our daily life. The growing number of accidents led the Government to enact and implement various Acts and Rules keeping the safety of workers & Jobbers as First and foremost objective.

Government is strictly implementing rules leading to workers safety in establishment. Thus as per safety is recruited compulsorily.This has opened new vistas for trained manpower requirement in the field of Fire & Industrial Safety Management.

Now a days, the global demand is more as compared to available tainted manpower, large number of career opportunities in the field of safety are available in India and aboard. After attaining B.Sc in Fire Safety and Hazard Management a fresher can also expect very handsome salary.

1. **Job Opportunities:**

After completing the program career opportunities are open career opportunities are open in the government sector, private, industrial & the servicesector. In the private sector, insurance, manufacturing firms, chemical and petrochemicalfirms, public utilities and educational complexes, airports,five star hotels etc, employcandidates from this field.The course is suitable to prepare graduates for a professional career in fire safety with anemphasis in the management and operation of organizations to achieve fire safetysolutions. The candidates may start their career as Fire &Safety management, Safety Auditor etc.

1. **Objectivities of the programs:**

This degree course is concerned with the study of fire, its development and prevention and the means by which its consequences may be reduced to a minimum in human, environmental and financial terms. The objectives of the program are:

1. To provide a programme of study to prepare graduates for a professional career in fire safety with an emphasis in the management and operation of organisations to achieve fire safety solutions.
2. To develop expertise in the application of management principles as they relate to fire safety to ensure safe working practises and environments.
3. To produce graduates with the ability to command and manage fire safety operations.
4. To provide the underpinning Science and Technology knowledge related to fire safety.
5. To enable graduates to assess risk and devise protection strategies as they relate to fire safety
6. To produce resourceful, competent, clear thinking graduates with a range of skills and experience relevant to modern industry and commerce and in particular to develop a range of competences and underpinning knowledge for practicingprofessionals in the field of Fire Safety.
7. To enable the graduates to apply their knowledge, understanding and skills to realistic situations and particularly in the context of the GCC region.
8. To develop skills in communication, independent study, team working, problem solving, management and critical thinking which will equip graduates for the world of work and lifelong learning.
9. **Eligibility:**
10. 10+2 pass in any stream with minimum 50% marks or equivalent grade.
11. Thecandidatewho have obtained a Three year Diploma in Fire &Industrial Safety Engineering are eligible to get Direct admission in IIyear of B.Sc., under lateral entry scheme.

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014
Year: I Semester: I**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **University Core** |   |   |   |   |   |   |   |
| 1. |  EN 101 | English Language 1 | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| 2. | ES 101 | Environmental Studies  | 2 | 2 | 0 | 0 | 3 | 40 | 60 |
| 3 | CP 101 | Elementary Computer | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
| 4 | PCA 101 | Proficiency in Co-curricular Activities  | 2 | 0 | 0 | 0 | 0 | 100 | 0 |
|  |  | **Programme Core** |  |  |  |  |  |  |  |
| 5 | FS 101 | Fundamentals of Fire Science | 4 | 4 | - | - | 3 | 40 | 60 |
| 6 | FS 103 | Fire Control Technology | 4 | 4 | - | - | 3 | 40 | 60 |
| 7 | FS 105 | Principals of Industrial Safety and Accident Prevention | 3 | 3 | - | - | 3 | 40 | 60 |
|  |  | **B. Practicals / Sessionals** |   |   |   |   |   |   |   |
| 8 | EN 151 | English Language 1 Lab | 1 | 0 | 0 | 2 | 3 | 60 | 40 |
| 9 | FS 151 | Fire Service Equipments & Appliances | 2 | - | - | 4 | 3 | 60 | 40 |
| 10 | CP 161 | Elementary Computer Lab | 1 |  |  | 2 | 2 |  |  |
|  |  |  |   |   |   |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |
|  |  | **Total** | **25** | **19** | **-** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **27** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014
Year: I Semester: II**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **University core** |   |   |   |   |   |   |   |
|  | EN 102 | English language 2 | 3 | 3 | 0 | 0 | 3 | 40 | 60 |
|  2 | PCA 102 | Proficiency in Co-curricular Activities  | 2 | 0 | 0 | 0 | 0 | 100 | 0 |
|  |  | **Programme Core**  |  |  |  |  |  |  |  |
|  | FS 104 | Industrial Safety | 4 | 4 | - | - | 3 | 40 | 60 |
|  | FS 106 | Fire Science-I | 2 | 2 | - | - | 3 | 40 | 60 |
|  | FS 108 | Emergency Planning & First AID | 2 | 2 | - | - | 3 | 40 | 60 |
|  | FS 102 | Risk Management and Hazard Control System | 4 | 4 | - | - | 3 | 40 | 60 |
|  |  | **B. Practicals / Sessionals** |   |   |   |   |   |   |   |
|  | EN 152 | English Language 2 Lab | 1 | 0 | 0 | 2 | 3 | 60 | 40 |
|  |  FS 152 | Rescue Techniques | 2 | - | - | 4 | 3 | 60 | 40 |
|  |  | **Total** | **20** | **15** | **-** | **06** |  |  |  |
|   |   | **Total Teaching Load** |  | **21** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014**

 **Year: II Semester: III**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 201 | Fire Science-II | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 2. | FS 203 | Security Management of Industrial Plants | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 3. | FS 205 | Organisation, Administration and Management Responsibility | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 4. | FS 207 | Chemical & Environmental Hazards | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 251 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
|  |  | **C. Discipline and Co-Curricular Activities** |   |   |   |   |   |   |   |
|  6. | PCA 103 | Proficiency in Co-curricular Activities  | 2 |  - | -  | -  |  - | 100 | -  |
|  |  | **Total** | **22** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014**

 **Year: II Semester: IV**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 202 | Industrial Psychology, Ergonomics and Accidents | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 2. | FS 204 | Industrial Noise and Noise Control | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 3. | FS 206 | Industrial Safety Analysis | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 4. | FS 208 | Safety in Power Plants | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 252 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
|  |  | **C. Discipline and Co-Curricular Activities** |   |   |   |   |   |   |   |
|  6. | PCA 104 | Proficiency in Co-curricular Activities  | 2 |  - | -  | -  |  - | 100 | -  |
|  |  | **Total** | **22** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014**

 **Year: III Semester: V**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 301 | Radiation Hazards | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 2. | FS 303 | Safety Training for employees and HRD | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 3. | FS 305 | Social Security in Industries | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 4. | FS 307 | Occupational Health | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 351 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
|  |  | **C. Discipline and Co-Curricular Activities** |   |   |   |   |   |   |   |
|  6. | PCA 105 | Proficiency in Co-curricular Activities  | 2 |  - | -  | -  |  - | 100 | -  |
|  |  | **Total** | **22** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B. Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014**

 **Year: III Semester: VI**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 302 | ControllingEnvironmentalPollution | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 2. | FS 304 | DisasterManagement | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 3. | FS 306 | EnergyConservation& sustainableDevelopment | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 352 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
| 6. | FS 354 | Field Work | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
|  |  | **Total** | **20** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**B.Sc in Fire Safetyand HazardManagement (Three years program)**

**LIST OF COURSE OFFERED**

**Edition 2014**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weight age (in %)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
| FS 101 | Fundamentals of Fire Science | 4 | 4 | - | - | 3 | 30 | 70 |
| FS 102 | Risk Management and Hazard Control System | 4 | 4 | - | - | 3 | 30 | 70 |
| FS 103 | Fire Control Technology | 4 | 4 | - | - | 3 | 30 | 70 |
| FS 104 | Industrial Safety | 4 | 4 | - | - | 3 | 30 | 70 |
| FS 105 | Principals of Industrial Safety and Accident Prevention | 4 | 4 | - | - | 3 | 30 | 70 |
| FS 106 | Fire Science-I | 2 | 2 | - | - | 3 | 30 | 70 |
| FS 108 | Emergency Planning & First AID | 2 | 2 | - | - | 3 | 30 | 70 |
| FS 151 | Fire Service Equipments & Appliances | 2 | - | - | 4 | 3 | 60 | 40 |
| FS 152 | Rescue Techniques | 2 | - | - | 4 | 3 | 60 | 40 |
| FS 201 | Fire Science-II | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 202 | Industrial Psychology, Ergonomics and Accidents | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 203 | Security Management of Industrial Plants | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 204 | Industrial Noise and Noise Control | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 205 | Organisation, Administration and Management Responsibility | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 206 | Industrial Safety Analysis | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 207 | Chemical & Environmental Hazards | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 251 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
| FS 252 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
| FS 301 | Radiation Hazards | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 302 | ControllingEnvironmentalPollution | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 303 | Safety Training for employees and HRD | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 304 | DisasterManagement | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 305 | Social Security in Industries | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 306 | EnergyConservation& sustainableDevelopment | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 307 | Occupational Health | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| FS 352 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
| FS 354 | Field Work | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
| EN 101 | Communicative English | 3 | 3 | 0 | 0 | 3 | 30 | 70 |
| EN 102 | Communication Techniques | 3 | 3 | 0 | 0 | 3 | 30 | 70 |
| EN 151 | English Communication Lab | 1 | 0 | 0 | 2 | 3 | 60 | 40 |
| EN 102 | Communication Techniques | 3 | 3 | 0 | 0 | 3 | 30 | 70 |
| EN 152 | Language Lab | 1 | 0 | 0 | 2 | 3 | 60 | 40 |
| ES 101 | Environmental Studies  | 2 | 2 | 0 | 0 | 3 | 30 | 70 |
| PCA101 | Discipline and Co-Curricular Activities-I | 2 |  - | -  | -  |  - | 100 | -  |
| PCA 102 | Discipline and Co-Curricular Activities-II | 2 |  - | -  | -  |  - | 100 | -  |
| PCA 103 | Discipline and Co-Curricular Activities-III | 2 |  - | -  | -  |  - | 100 | -  |
| PCA104 | Discipline and Co-Curricular Activities-IV | 2 |  - | -  | -  |  - | 100 | -  |
| PCA105 | Discipline and Co-Curricular Activities-V | 2 |  - | -  | -  |  - | 100 | -  |

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| **FS101** | **FUNDAMENTALS OF FIRE SCIENCE** |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Fire service** |
| History of fire service, Basic Physics, Guidelines for writing the units,Force, resultant force, Laws of force, Laws of motion, Mass and weight, work, power, energy, Law of conservation of energy. |
| **Unit- II** | **Mechanics** |
| Mechanics – rest and motion, Distance and displacement, Speed and velocity, Acceleration, retardation, Acceleration due to gravity, Newton laws of motion, Machines and engines, Efficiency, Friction. |
| **Unit-III** | **Basic Chemistry and physics of fire** |
| Basic Chemistry and physics of fire, Atomic structure, Elements, compounds, Pure substance and mixture, Physical and chemical changes, Condition for the changes, Energy changes, Effects of heat on matter, Combustion, Temperature, Specific heat capacity. |
| **Unit-IV** | **Chemistry of fire** |
| Catalyst, Neutralization, Sublimation, Heat of decomposing, Chemical reaction, Exothermic reaction and endothermic reaction, Transmission of heat, Flash and fire point, Ignition temperature, Flammables and combustible chemicals, Spontaneous combustion, Triangle of combustion, Tetrahedron fire, Spread of fire. |
| **Unit-V** | **Classification of fire** |
| Classification of fire, General Causes of fire, Detection of fire, Extinguishing methods, First aid fire fightingequipments, Fire bucket, Fire beater, hose real hose, Portable extinguisher, depends on weight, depends on operating method, depends on content, depends on position of nozzle, Construction, Operation, Maintenance, refilling, Fixed fire fighting installations using water ,Hydrant or fire water system, Classification of hydrant system, Sprinkling system, Major foam pourer system, Steam drenching system, Emulsification, Special fires and fire fighting, Air craft fire, Ships fire, Fixed fire fighting installations not using water, Complete CO2 flooding system, Complete DCP spraying system, Complete Halon flooding system, Investigation of fire, Point, Time and cause of ignition, Arson and detection of fires. |
| **Reference books** | 1. Radiation protection- Inter National Labor Office.
2. Fire service Manual (4 volumes).
3. TAC and NBC rule- Kerala Fire Force.
4. Publications from Inter National standard organizations like ISO, OSHA, IOSH, NEBOSH etc.
5. Industrial Safety, Health and environment Management systems, RK Jain and Sunil S Rao.
6. HMSO- Fire fighting Drill Manual.
7. NFSC- Fire Fighting Drill Manual.
8. NFSC- Practical Fire Safety And Ground Command Tips.
9. A.S. Khan- Fire Fighters Drill Manual, Agni SevaPrakashan, Shikohabad.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 102**  | **RISK MANAGEMENT AND HAZARD CONTROL SYSTEM**  |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Hazards** |
| Hazards, Definition, Glossary of Terms, Risk Management, Hazards Control System, System safety, Job Hazard analysis, Hazop, Fault tree Analysis, Failure mode and effect Analysis. |
| **Unit- II** | **Hazardous materials** |
| Physical and chemical properties of hazardous materials, Introduction, Major industrial hazards,Types and consequences of major industrial hazard, Effects on human body, Precautions while fire fighting, Stages of combustion, Hazards of combustion, Stability and inflammability |
| **Unit-III** | **Fire extinguishment** |
| BLEVE, Fire extinguishment, Flammable Solids, Liquids and Gas, Petrochemicals and other hydrocarbons, Tank fire – storage tank, trucks, service stations, High pressure pipe lines, Pressurized and liquefied gases, Natural gas, Petroleum gases ,Refrigerants etc. |
| **Unit-IV** | **Other Hazardous materials** |
| Acetylene, Metals, Non metals, Other hazardous properties, Harmful contamination of air and water, Toxicity, Corrosiveness, Radioactive hazards, Special precaution for handling |
| **Unit-V** | **Emergency preparedness** |
| Emergency preparedness, Pesticides, Explosion, Deflagration and detonation of gas, Dust explosion, Confined and unconfined vapor cloud explosion, Safety Management and legislation,Functions of safety management, Factories Act 1948 (chapter 3,4,5),Workmen compensation Act 1923 (objectives and coverage’s). |
| **Reference books** | 1. Fire service Manual (4 volumes).
2. TAC and NBC rule- Kerala Fire Force.
3. Publications from Inter National standard organizations like ISO, OSHA, IOSH, NEBOSH etc.
4. Industrial Safety, Health and environment Management systems, RK Jain and Sunil S Rao.
5. HMSO- Fire fighting Drill Manual.
6. NFSC- Fire Fighting Drill Manual.
7. NFSC- Practical Fire Safety And Ground Command Tips.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 103**  | **FIRE CONTROL TECHNOLOGY** |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Types of hose** |
| Hose, Types of hose, Characteristic, Frictional lose, Material used, Cause and prevention of mildew, Causes and prevention of shock, Causes and prevention of rubber acid, Care and maintenance, Types of hose fittings, Couplings, Component parts of inter locking couplings, Suction coupling wrenches, Branches, nozzles and branch holders, Foam making branches, Nozzles, Collecting head and suction hose fittings, Breechings, Adapters, Maintenance of hose fittings. |
| **Unit- II** | **Introduction of Electronics and Electricity** |
| Fire alarm, Introduction of Electronics and Electricity, Semi conductor Physics, Circuit Control And Protective Devices, Transistors, Principles of fire detectors, Parts of fire alarm unit, Control panel, Type of detectors, Automatic fire detection, Classification of detector, Control and indicating equipment |
| **Unit-III** | **Trouble shooting and maintenance** |
| Trouble shooting and maintenance, Intruder alarms, Courseware to be provided by the institution, Reference books are enclosed in annexure 1**,** Rope, Lines, knots and ladders, Introduction, Manufacturing materials, Types of ropes and size, Cordag, Causes of deterioration of ropes and lines, Different type of knots, Different type of lines, Purpose of knots, Ladders, Introduction, Hook ladder, escape ladder, turn table and extension ladder, Hook ladder belts. |
| **Unit-IV** | **Foam making equipment** |
| SCBA and foam making equipment, Physiology of respiration, Effects of respiration, Essential fetchers of BA set, Description and technical details, Care and maintenance various BA sets, Advantage and disadvantage of various BA set, Foam & foam making equipments, Definition, Different type of foam concentrate, Storage, Characteristics, Foam branch and its type, Mechanical foam generatorPumps, primers, tenders and water relay, Introduction, definition, Deferent types of pump, Deferent types of primers. |
| **Unit-V** | **Working principle of various pumps primers** |
| Working principle of various pumps primers, Maintenance and trouble shooting, Testing of pumps, Advantages and disadvantages, Water relay system, Open circuit system, Closed circuit system, Different type of tenders and Fire alarm system, Operation and maintenance of various tenders, Water, foam, Co2, DCP and emergency tenders. |
| **Reference books** | 1. Radiation protection- Inter National Labor Office.
2. Fire service Manual (4 volumes).
3. Publications from Inter National standard organizations like ISO, OSHA, IOSH, NEBOSH etc.
4. Industrial Safety, Health and environment Management systems, RK Jain and Sunil S Rao.
5. HMSO- Fire fighting Drill Manual.
6. NFSC- Fire Fighting Drill Manual.
7. A.S. Khan- Fire Fighters Drill Manual, Agni SevaPrakashan, Shikohabad.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 104**  | **INDUSTRIAL SAFETY**  |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Types of hazards** |
| Physical hazards, Chemical hazards, Mechanical hazards, Biological hazards, Ergonomic hazards, Noise hazards, Chemical safety, Toxicity, IDLH (Immediate Danger to Life and Health), Chemicals - Storage, Handling and Transportation, Preventive measures for chemical spillage, Transport Emergency Card. (TREM Card). |
| **Unit- II** | **Safety in use of electricity** |
| What is electricity, Safety in use of electricity, Dangers from electricity, Importance of safety equipments in design and use of switches, switch, fuses, circuit breakers and isolating lines, Over load and short circuit protection, Earth fault protection, Earthing of electrically driven equipments, ELCB, Precautions, Static electricity, Electrical shock treatment, Points to be checked at the electrical system. |
| **Unit-III** | **Hand tools and Power tools** |
| Hand tools and Power tools, safety while using Grinding stone, Welding and gas cutting safety, Dangerous points, Lubrication Safety. |
| **Unit-IV** | **Hazard Study** |
| Hazard Study, Job safety analysis, Fault tree analysis, Event tree analysis, Failure modes and effects analysis, Relative ranking techniques, Monitoring of Safety Performance, Statistics of accidents, Frequency rate and severity rate, Frequency severity incidence, Safe – T – score. |
| **Unit-V** | **Petroleum Refineries** |
| Petroleum Refineries, Refinery Process, Classification of Petroleum Products, Storage TanksHouse Keeping: Definition, Need for housekeeping, Importance in view of safety, MethodsSafety Inspections: Safety Audit, Safety Survey, Plant safety inspection, Safety tour, Safety samplings |
| **Reference books** | 1. Radiation protection- Inter National Labor Office.
2. TAC and NBC rule- Kerala Fire Force.
3. Publications from Inter National standard organizations like ISO, OSHA, IOSH, NEBOSH etc.
4. Industrial Safety, Health and environment Management systems, RK Jain and Sunil S Rao.
5. NFSC- Fire Fighting Drill Manual.
6. NFSC- Practical Fire Safety And Ground Command Tips.
7. A.S. Khan- Fire Fighters Drill Manual, Agni SevaPrakashan, Shikohabad.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 105**  | **PRINCIPILES OF INDUSTRIAL SAFETY AND ACCIDENT PREVENTION**  |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Introduction to Safety** |
| Introduction to Safety, Goals, Need, History of Safety, Importance of Industrial Safety, Accident Causation, Definition, Case study, Theories and principles of accident Causation, The effect of accident,Unsafe Act, Unsafe condition. |
| **Unit- II** | **Consequences of accident** |
| Unpredictable performance,Consequences of accident.Accident prevention programmes, Cost analysis and Accident Prevention, Direct accident,Indirect accident,Accident Prevention Methods, Accident Investigation, Accident Reporting, Accident Investigation,Accident Investigation Report, Promotion Role. |
| **Unit-III** | **Pre- accident Strategy** |
| Pre- accident Strategy and Health Policy, Safety Department, Safety Committee and Function, Physical hazards, Chemical hazards, Mechanical hazards, Housekeeping and Importance, Advantages of good housekeeping, Post Accident strategy. |
| **Unit-IV** | **First Aid** |
| First Aid, Fire fighting, Accident Investigation.Role of government, Management, workers and trade unions, promoting safety in industry, First Aid, Introduction, Body structure and functions. |
| **Unit-V** | **Position of causality** |
| Position of causality, The unconscious casualty, Fracture and dislocation, Injuries to muscles and joints, Resuscitation, Bleeding, Management of shock, Burns, scalds and accidents caused by electricity, Rescue and transport of casualty. |
| **Reference books** | 1. Radiation protection- Inter National Labor Office.
2. Fire service Manual (4 volumes).
3. TAC and NBC rule- Kerala Fire Force.
4. Publications from Inter National standard organizations like ISO, OSHA, IOSH, NEBOSH etc.
5. Industrial Safety, Health and environment Management systems, RK Jain and Sunil S Rao.
6. HMSO- Fire fighting Drill Manual.
7. NFSC- Fire Fighting Drill Manual.
8. NFSC- Practical Fire Safety And Ground Command Tips.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 106** | **FIRE SCIENCE-I** |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Analysis and interpretation of data** |
| Analysis and interpretation of data.Extract and tabulate given data and express that data in the form of:-Graphs, Histograms and bar charts, Circular diagrams (pie charts), Obtain median, mean and norm values from given data Extend graphs to:-Project values from given data (extrapolate). Deduce values from missing data (interpolate) |
| **Unit- II** | **Principle of fire science** |
| Define the SI system of units in terms of basic and derived units,Describe and carry out simple calculations involving the equations of motion,Describe Newton’s Laws of Motion,Use vector quantities to find resultant values,Apply vector methods to force and motion problems,Calculate moments around a fulcrum including the use of levers and parallel force,Carry out calculations involving centres of gravity and buoyancy,Define stress strain, describe Hooke’s Law and carry out calculations involving these terms,Apply the calculations of work, power, density and efficiency to practical examples, Describe and calculate the friction force between two surfaces in contact. Hydraulics- Define the following terms and demonstrate the relationship between them:-Density, Specific gravity, Pressure in fluidsSolve problems involving the terms referred , Define “streamline flow”. |
| **Unit-III** | **Principle of atmospheric pressure** |
| Show how the principle of atmospheric pressure is used in pumping systems either as an aid to flow or as a means of measuring flow, Use the laws of friction to calculate energy losses in piped water supplies, In relation to pumps, define water power, brake power and efficiency. Carry out basic calculations involving these terms.Explain the relationship between velocity and discharge of water through hose of differing diameters, Discuss the purpose and design of branches and nozzles, Calculate the theoretical and the effective height of a jet. Electricity: Describe electric current as a flow of electrons,Describe how electrical energy is generated and distributed**,** Explain the characteristics of alternating and direct current**.** Describe the operation and characteristics of a step-up and step-down transformer,Explain Ohm’s Law and calculate the relationship between resistance, amperage and voltage in simple circuits (parallel and series),Use Ohm’s Law to solve problems. |
| **Unit-IV** | **Magnetic and chemical effects of electrical currents** |
| Explain the magnetic and chemical effects of electrical currents and show how these phenomena are applied in:-Electric motors and Primary and secondary electric cells, Describe the function and method of operation of fuses and circuit breakers,Define and solve problems involving resistance variation with temperature and resistivity,Apply the concept of power to electrical circuits. |
| **Unit-V** | **Heat** |
| Define and calculate:-Specific heat capacity, Latent heat of vaporization, Apply the use of calculations involving the transfer of heat,Calculate linear, superficial and volumetric expansion using the relevant coefficients, Apply the Gas Laws to calculations involving changing conditions of heat. |
| **Reference books** | 1. Remediation and Treatment Technologies, Dennis P Nolan P.E.
2. Fire Technology - R.S. Gupta.
3. Major hazard control- l Inter National Labor Office.
4. Encyclopedia of occupational health and safety - Inter National Labor Office.
5. Safety, health and working condition in the transfer of technology- Inter National Labor Office.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 108** | **EMERGENCY PLANING & FIRST AID** |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **On site Emergency Planning** |
| On site Emergency Planning: On-site Emergency Plan, Emergency Alarm System, Emergency Control Room. Key personnel, Emergency Control Program. |
| **Unit- II** | **Off site Emergency Planning** |
| Off site Emergency Planning: Off-site Emergency Plan, Mutual Aid Scheme, Emergency Evacuation, Security and Media management. |
| **Unit-III** | **Hazard Communication** |
| 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. |
| **Unit-IV** | **Action at Emergency** |
| Introduction: Action at Emergency, The practice of First Aid, Principles of First Aid,Training i9n First Aid, General rules of First Aid.Shocks, Electrical Shock. Artificial Respiration, Cardio Pulmonary Resuscitation, Chocking, Fainting, Poisoning, Open Wounds. |
| **Unit-V** | **Disorder** |
| Control of bleeding, Burns and Scalds, Heart Attack, Resuscitation.Disorder of respiratory system.Disorder of Circulation.Wound & Bleeding, Disorders of consciousness, Bone, Joint & Muscle injury,Burns & Scalds. Effect of heat & cold, Foreign bodies, Poisoning.Dressing & Bandages, Handling & transport of injured, Emergency First Aid. |
| **Reference books** | 1. Hand book of fire and Explosion Protection Engineering Principles for Oil, Gas, Chemical and Related, Facilities- Dennis. P. Nolan, PE.
2. Industrial Management - Jain &Bawa.
3. Thermodynamics - Aroma &Domkundwar.
4. Hand book of Hazardous Air pollutions - Dennis P Nolan P.E.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **ES101** | **ENVIRONMENTAL STUDIES** |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Man & Environment** |
| Man & Environment: Definition of Environment & its various components. Ecosystem concepts. Dependence of Man on nature for its various needs. Human population growth & its impacts on environment. Environment & human health. Environmental concerns including climate change, Global warming, Acid Rain, Ozone layer Depletion etc. Environmental ethics. Traditional ways of utilizing various components of environment. Sustainable developments. |
| **Unit- II** | **Natural Resources** |
| Natural Resources: Forest resources, Mining, Dams & their effects on forests & tribal people. Water resources-over utilization of water, floods, droughts and conflicts over water resources. Mineral Resources- Use of various minerals for Human welfare & environmental effects of mining. Food resources -World food problem. Impacts of changing Agriculture practices on Environment. Energy Resources-Renewable and non renewable energy Resources & exploration of alternative energy sources. Land Resources- land degradation, soil erosion, desertification and soil contamination. |
| **Unit-III** | **Ecosystems** |
| Ecosystems: Structure & function, energy flow, food chains, food webs, Ecological pyramids. Basics of forest grasslands, desert & aquatic ecosystem (Ponds, Streams, Lakes, Rivers, Oceans & Estuaries) |
| **Unit-IV** | **Biological Diversity** |
| Biological Diversity: Genetic, species & ecosystem diversity, Values of Biodiversity, Global, National & Local Biodiversity. Hot-spots of Biodiversity, threat to biodiversity. Endangered & endemic species of India. Conservation of biodiversity in situ & ex-situ  |
| **Unit-V** | **Environment pollution** |
| Environment pollution: Causes, effects & control of- Air pollution, Water pollution, Soil pollution, Noise Pollution, Thermal pollution & Nuclear Hazards. Solid wastes & their Management. Disaster Management-Flood, Drought, Earthquake, Landslides etc. |
| **Reference books** | 1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner.2. BharuchaErach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, Ahmedabad –3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs.4. Clark RS, Marine Pollution, Clanderson Press, Oxofrd (TB).5. Cunningham WP, Cooper TH, Gorhani E & Hepworth MT, 2001. Environmental Encyclopaedia, JaicoPublishing House, Mumbai |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 152** | **RESCUE TECHNIQUES**  |
| **Prerequisite**  | All students are expected to have a general knowledge of insects, pest, and management principles. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the Entomology, To gain knowledge about reproduction in insects, To have understanding about nature of damage, Able to analyse timber management. |
| **Salient features**  | The student will be able to conceptualize about entomology and management, Able to analyse management practice regarding pest management. |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **To Study Breathing Apparatus Set** |
| To Study Breathing Apparatus Set. Study, working, identification of different parts of BA, Donning Procedure, Pre-EntryTest, BACO, Tally, Searching operation procedure with Guide Line and PersonnelLine, Entrapped Procedure, Use of Y manifold. |
| **Unit- II** | **Study Of Small Gears Used In Fire Service** |
| Study Of Small Gears Used In Fire Service. Grouping of Small Gears with examples – Fireman Axe, Ceiling Hook, Drag Hook,Fire Beater, Door Breaker, Steel shod lever, Pad Lock Remover, Persuader, Spreader, Cutter, Bending Bar, Quick Release Knife, Shears, Bolt cutter, Search light, Focusing light. Study of hydraulically operated small gears and their use in Rescue Operation Care and Maintenance of small gears |
| **Unit-III** | **Bandages And Their Respective Uses** |
| Bandages And Their Respective Uses Rolling Bandages: Width of roller bandage, application – Simple spiral, Reversespiral, Figure of Eight, Triangular bandages – for the scalp, for the forehead, Eye, cheek or any part which is found in shape, Front or back of the chest, for the shoulder, for the elbow, for the hand, fore the hip and groin, for the knee, for the foot,stump, types of slings and its application, Arm sling, Collar and cuff sling, Triangular Sling, improvised Sling. |
| **Unit-IV** | **Resuscitation Procedures** |
| Resuscitation Procedures Methods of artificial Respiration like – Holger Nielson Method. Schaefer’s Method, Sylvester’s Method, Mouth to Mouth, Eve’s rocking stretcher Method, Emerson Method. |
| **Unit-V** | **To Perform Drill For Transportation Of Casualties** |
| To Perform Drill For Transportation Of Casualties, 4-man Stretcher Drill – Objectives, Equipment, Drill procedure by individual No.1 to. No.4 Rescuer, Loading Casualties to the Ambulance |
| **Reference books** | 1. Industrial Safety Management- N.K. Tara Fdar, K.J Tara Fdar.
2. Fire Service First Responder - Daniel Limmer, Michael Grill, IFSTA Senior Editor-Michael A Wieder.
3. Safety A personal Focus - David L Bever.
4. Fire Equipment- David L. Bever.
5. Industrial Safety - National Safety Council of India.
 |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **EN 101**  | **ENGLISHLANGUAGE 1** |
| **Prerequisite**  | Nil |
| **Learning objective**  | The learning objective of course are: 1.To develop a professional orientation |
| **Salient features**  | 1. Conduct themselves with professionalism in organizations, 2. To face interview with confidence. 3. To improve the soft skills
 |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **GRAMMAR** |
| Sentences, Prepositions, Subject-verb agreement, Correct Usage- Tenses, Active & Passive, Modals, Direct and indirect Speech, Idioms, Determiners |
| **Unit- II** | **Vocabulary Building** |
| Introduction, Synonyms, Antonyms, Homophones, Homonyms, Words Often Confused, One Word Substitution, Affixes, Select Vocabulary of about 300-500 new words |
| **Unit-III** | **Verbal Communication** |
| Definition, Working with customers, developing professional telephone skills & improving informal communication  |
| **Unit-IV** | **Professional Writing** |
| Writing Official/ Business/ Formal letters; Writing Application and CV; Writing for Official MeetingsReport Writing- Size of the Report, Kinds of Reports, How to write Reports, Format for reportingTechnical Proposals: Parts, Types, Writing of Proposal, Significance.  |
| **Unit-V** | **COMPOSITION** |
| Paragraph Writing- Parts of a paragraph, Writing a good paragraph, Characteristics of a good paragraph; Developing Outlines, Note- making, Review Writing |
| **Reference books** | 1. Communicative Grammar and Composition by Rajesh K. Lidiya,2008 Oxford Uni. Press, New Delhi

2. Communicative Grammar and Composition, by Rajesh K. Lidiya,2013 OUP, New Delhi3. Effective Technical Communication by M. Ashraf Rizvi 2005 ,Tata McGrew Hill New Delhi4. Technical Communication by Meenakshi Raman &Sangeeta Sharma ,2008 OUP New Delhi5. Business Communication by Meenakshi Raman & Prakash singh, OUP, New Delhi6. A Practical Course for developing Writing Skills In English by J.K. Gangal PHI Learning Pvt. Ltd. New Delhi7. Oxford Companion to English Literature U P 8. A glossary of literary terms -M H Abrams |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **EN 102**  | **English language 2** |
| **Prerequisite**  | Nil |
| **Learning objective**  | The learning objective of course are: 1.To develop a professional orientation |
| **Salient features**  | 1. Conduct themselves with professionalism in organizations, 2. To face interview with confidence. 3. To improve the soft skills
 |
| **Utility** | A degree in forestry opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, forestry technicians and forestry workers. |
| **Unit-I** | **Commercial Correspondence** |
| 1. Style and Construction
2. Significant Commercial terms and Phrases
3. Letter of Inquiry
4. Letter of Quotation
5. Letter of Order
6. Letter of Execution of Order
7. Letter of Complaint
8. Letter of Collection
9. Circular Letter

Application for Agency |
| **Unit- II** | **Official Correspondence:** |
| Official Letter. Semi-Official Letter. Memorandum Journalistic Competitions on Commercial Topics:1. Editorial Note on a Commercial Topic
2. Letter to the Editor on Economic and Commercial Topics
3. Script Writing for the Media
4. Journalistic Report Writing, Press Release
5. Writing Advertisement Copy
6. Writing for Internet

Precise Writing |
| **Unit-III** | **Theme Writing**  |
| (Report writing/Academic and Journalistic writing) |
| **Unit-IV** | **Paragraph Writing and Essay writing** |
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| **Unit-V** | **Advanced Comprehension** |
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| **Reference books** | 1. Modern English –N. Krishnaswamy, Macmillan publication
2. Oxford Guide to Writing and Speaking – John Selly Oxford University press
3. Communicative Grammar and Composition by Rajesh K. Lidiya,2008 Oxford Uni. Press,

New Delhi4. Communicative Grammar and Composition, by Rajesh K. Lidiya,2013 OUP, New Delhi5. Effective Technical Communication by M. Ashraf Rizvi 2005 ,Tata McGrew Hill New Delhi6. Technical Communication by Meenakshi Raman &Sangeeta Sharma ,2008 OUP New Delhi7. Business Communication by Meenakshi Raman & Prakash singh, OUP, New Delhi8. A Practical Course for developing Writing Skills In English by J.K. Gangal PHI Learning Pvt. Ltd. New Delhi.  |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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|  | **Elementary Computer** |
| **Prerequisite**  | Nil |
| **Learning objective**  | This course aims to: – give a general understanding of how a computer works* Aware about operating system, various Computer Languages and number system
* Give a general understanding of Internet, information technology, e-commerce and Networks
 |
| **Salient features**  | The students will able to * Understand what is computer and how is it works.
* Understand what number system, operating system, computer language is.

Understanding the Role of Information Technology |
| **Utility** | A B. Tech degree in biotechnology opens doors to job opportunities in science, industry and environmental management, Conservation and Resource Management, Forest Rangers, tree genetics and biotechnology, biotechnology technicians and life science laboratory. |
| **Unit-I** | **Introduction** |
| Types of computers and generations .Basic architecture of computers and its building blocks .Input-Output devices, Memories, Overview, definition and function of operating system, need of operating System, |
| **Unit- II** | **Classification of Computer Languages** |
| Machine, assembly and high level languages .Brief idea of operating systemAssembler, compiler and interpreterNumber Systems :Binary, octal, decimal and hexadecimal representation of numbers.Integers and floating point numbers.Representation of characters, ASCII and EBCDIC codes.Binary Arithmetic: addition, subtraction, complements |
| **Unit-III** | **An overview of information technology** |
| An overview of information technology, difference between data and information, quality, of information, Information system.Introduction to internet: www, web browser, search engine, email, open source software’s, Search Engine optimization |
| **Unit-IV** | **Introduction to e-commerce** |
| Introduction to e-commerce and its advantage, Types of E-Commerce, B2B, B2M, M2B, M2M, Electronic payment system, E-governance, Introduction to Information Security, cryptography, digital signature and smart card technology, |
| **Unit-V** | **Introduction to LAN, WAN, MAN** |
| Transmission mediaData transmission type: Introduction to OSI reference model, Analog and digital signals,, Network topologies, client-server architecture, ISDN, Broad Band |
| **Reference books** | * 1. Computer Fundamentals: Architecture and Organization, by B Ram, New Age International Publisher
	2. Computer Fundamentals: Architecture and Organization, by B Ram, New Age International Publisher
	3. Information Technology and the Networked Economy, Second Edition ByMcKeown, Patrick G.
	4. Internet & Intranet Engineering, Tata McGraw Hill company.
	5. Information Technology by AjitPoonia.
	6. Information Technology by D.P. Sharma
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| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

**EN 151** **ENGLISH LANGUAGE 1 LAB**

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| S.No. | Contents of subject |
| 1 | Phonetics  |
| 2 | Phonetic Symbol & Transcription |
| 3 | Synonyms and Antonyms |
| 4 | Affixes |
| 5 | One word substitution |
| 6 | Paper presentation |
| 7 | Seminar presentation |
| 8 | Reading comprehension |
| 9 | Group Discussion |
| 10 | Personal Grooming & Etiquettes |

**Reference books:-**

1 Working with Emotional Intelligence-Daniel Goldman

2 Emotional Intelligence- Daniel Goldman

3 Stress Management-Vera Pfeiffer

4 Self hypnosis- Valerie Austin

5 Memory Boosters- Hamlyn

6 The 7 Habits of highly *Effective People*- Stephen R. Covey

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| **EN 152** |  **ENGLISH LANGUAGE 2LAB** |  |
| **S.No.** | **Contents of subject** |
| 1 | Communication  |
| 2 | Verbal & Non verbal Language |
| 3 | Essentials of personality development |
| 4 | Body Language |
| 5 | Team building |
| 6 | Time Management |
| 7 | Interview skills  |
| 8 | Practical lesson on personality development |
| 9 | Speaking & listening skills |
| 10 | Presentation skills |

**Reference books:-**

1. Working with Emotional Intelligence-Daniel Goldman.
2. Emotional Intelligence- Daniel Goldman.
3. Stress Management-Vera Pfeiffer.
4. Self hypnosis- Valerie Austin.
5. Memory Boosters- Hamlyn.
6. The Habits of highly Effective People- Stephen R. Covey.

**FS 151 Fire Service Equipment& Appliances lab**

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| **S.N.** | **Course Contents** |
| **I** | Perform Fire Fighting Hose Drill:Hose Drill Actions: Lifting hose, Lowering hose, Carrying hose, Laying hose,Connect hose, Disconnect hose, Under running, Remove the kink, Rolling.Identification of different types of hose fittings and their uses. |
| **II** | Perform Hydrant Drills:3 -man Hydrant Drill: Drill procedure with application of Hose and HydrantFittings: Add one length of hose, Remove one length of hose, Replace the burst Hose,Divide one line into two line using Dividing Breeching, Collect two line into one lineusing Collecting Breeching, Hydrant Gears and its operation. |
| **III** | Perform Hydrant Drills:4 -man Hydrant Drill: Drill procedure with application of Hose and HydrantFittings: Add one length of hose, Remove one length of hose, Replace the burst Hose,Divide one line into two line using Dividing Breeching, Collect two line into one lineusing Collecting Breeching, Hydrant Gears and its operation, |
| **IV** | Identification, Selection, Operation And Maintenance Of Fire Extinguishers:Identification of different types of Fire Extinguishers {Water Expelling type, Foamtype, DCP type, CO2 type} With respect to constructional feature, capacity operationand use. in fires, It's effective application in extinguishment, Recharging procedure,Care and Maintenance, Performance test, Hydraulic test Inspection procedure -Weekly,monthly, quarterly, half yearly, yearly. |
| **V** | To Identify The Use Of Fire Service LaddersTypes of ladders, their construction, uses, identification of parts, care and maintenanceof ladders. |
| **VI** | To Carry Out Four Men DrillFormation of crew, individual working procedure on get to work command, ladderpitching, climbing, rescue operation, fire fighting, ventilation procedure, laddercarrying, drill report. |
| **VII** | To Carry Out Standard Tests of LadderString test, round test, standard line test, acceptance test, deflection test. |
| **VIII** | Fire Tender Drill6 -man Water Tender Drill: Mounting procedure, Dismounting procedure,Individual working procedure like -working with ladder, Application of different typesof signals applied during pump operation, working with B.A. set, Soft suction, Hardsuction. |
| **IX** | Identify Foam Making Branch PipesProtein Foam, Aqueous Film Forming Foam ( AFFF), Foam Making Branch 5X (FB5X) , Foam Making Branch 10 X (FB 10X) , Inline inductor, Pick -up -tube. |
| **X** | To Study Breathing Apparatus SetStudy, working, identification of different parts of BA, Donning Procedure, Pre-EntryTest, BACO, Tally, Searching operation procedure with Guide Line and Personnel Line,Entrapped Procedure, Use of Y manifold. |
| **XI** | Study Of Small Gears Used In Fire ServiceGrouping of Small Gears with examples – Fireman Axe, Ceiling Hook, Drag Hook, FireBeater, Door Breaker, Steel shod lever, Pad Lock Remover, Persuader, Spreader,Cutter, Bending Bar, Quick Release Knife, Shears, Bolt cutter, Search light, Focusinglight.Study of hydraulically operated small gears and their use in Rescue Operation Care andMaintenance of small gears. |





**SYLLABUS**

**B.Sc. in Fire Safety and Hazard ManagementPROGRAMME 2ndYEAR**

**GYAN VIHAR SCHOOL OF SCIENCES**

**EDITION2015**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safetyand HazardManagement (Three years program)**

**Edition 2014**

 **Year: II Semester: III**

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| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 201 | Fire Science-II | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 2. | FS 203 | Security Management of Industrial Plants | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 3. | FS 205 | Organisation, Administration and Management Responsibility | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
| 4. | FS 207 | Chemical & Environmental Hazards | 4 | 3 | 1 | 0 | 3 | 30 | 70 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 251 | Practical | 4 | 0 | 0 | 8 | 3 | 30 | 70 |
|  |  | **C. Discipline and Co-Curricular Activities** |   |   |   |   |   |   |   |
|  6. | PC 103 | Proficiency in Co-curricular Activities | 2 | 0 | 0 | 0 | 0 | 100 | 0 |
|  |  | **Total** | **22** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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**GYAN VIHAR SCHOOL OF SCIENCES**

**Teaching and Examination Scheme for B.Sc in Fire Safety and Hazard Management (Three years program)**

**Edition 2014**

 **Year: II Semester: IV**

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| **S. No.** | **Course Code** | **Course Name** | **Credits** | **Contact Hrs/Wk.** | **Exam Hrs.** | **Weightage (in%)** |
| **L** | **T/S** | **P** | **CE** | **ESE**  |
|   |   | **A. Theory** |   |   |   |   |   |   |   |
| 1. | FS 202 | Industrial Psychology, Ergonomics and Accidents | 4 | 3 | 1 | 0 | 3 | 40 | 60 |
| 2. | FS 204 | Industrial Noise and Noise Control | 4 | 3 | 1 | 0 | 3 | 40 | 60 |
| 3. | FS 206 | Industrial Safety Analysis | 4 | 3 | 1 | 0 | 3 | 40 | 60 |
| 4. | FS 208 | Safety in Power Plants | 4 | 3 | 1 | 0 | 3 | 40 | 60 |
|  |  | **B. Practicals / Sessionals** |  |  |  |  |  |  |  |
|  5. | FS 252 | Practical | 4 | 0 | 0 | 8 | 3 | 60 | 40 |
|  |  | **C. Discipline and Co-Curricular Activities** |   |   |   |   |   |   |   |
|  6. | PC 104 | Proficiency in Co-curricular Activities | 2 | 0 | 0 | 0 | 0 | 100 | 0 |
|  |  | **Total** | **22** | **12** | **04** | **08** |  |  |  |
|  |   | **Total Teaching Load** |  | **24** |  |  |   |   |   |

**L = Lecture T = Tutorial CE = Continuous Evaluation S = Seminar P = Practical ESE = End Semester Examination**

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| **FS 201** | **Fire Science- II**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Chemistry of fire** |
| Introduction -Chemistry of fire - Combustion - Composition of Combustion - Flame, heat, fire gases, smoke - Dimensions, Structure, Intensity and velocity of flames. Heat transfer from flames-Ignition temperature-LFL-UFL-Flash point Fire point -spontaneous combustion-Flash over. Dust explosion-classification of fires. Flammability principles. Ignition. Rate of burning. |
| **Unit- II** | **Fire hazards** |
| Fire hazards-health-flammability –reactivity (stability) Air contaminants generally found in fires-toxic effects of fire gases. Electrical fires,causes , protective system prevention of failure, fire prevention measures |
| **Unit-III** | **Fire prevention** |
| Fire prevention- handling and storing flammable and combustible liquids. Elimination of ignition sources. Grounding and bonding. Fire protection in plants and factories. Fire walls, fire doors, means of egress. |
| **Unit-IV** | **Fibre optics and its applications** |
| Fibre optics and its applications: general ideas of optical fibre- NA of fibre- step index and graded index of fibres- multimode and single mode fibres- applications of optical fibre- fibre optic communication- optical fibre sensors- general ideas of integrated optics. |
| **Unit-V** | **Fire suppression** |
| Fire suppression. Fixed automatic sprinklers. Sprinkler system-sprinkler design -water supply. Wet system-Dry system-Fixed manual application-sprinkler alarm stand pipes. Portable fire extinguishers-Types-extinguisher location Inspection - testing. |
| **Reference books** | 1. Industrial fire hazards hand book : N F P A2. Introduction to Safety Engineering : David S Gloss, Miriam, Gaylle Wardle 3. Automatic sprinkler and stand pipe system : Bryan J L4. Accident Prevention Manual for Industrial operation : L N S C, Chicago. 5. Electrical fires and failures : A AHattangadi, TMH  |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 203** | **SECURITY MANAGEMENT OF INDUSTRIAL PLANTS**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Ventilation** |
| Ventilation - purpose of ventilation-general principles ventilation requirements. Physiological and comfort level .Natural ventilation - Dilution ventilation - Mechanical ventilation - Local exhaust ventilation - Ventilation measuring instruments. Fundamentals of hood and duct designs. Standards on ventilation. |
| **Unit- II** | **Purpose of lighting** |
| Purpose of lighting. Advantages of good illumination. Lighting and the work. Sources and kinds of artificial lighting principles of good illuminations. Design of lighting installation. Maintenance. Lighting and colour. Standards on lighting and illuminations. |
| **Unit-III** | **Plant safety observations** |
| Plant safety observations - plant safety inspections - safety sampling, safety survey - Incident Recall Technique (IRT) - Job safety analysis - safety inventory systems - product safety - work permit system - total loss control - damage control - system safety . Safety audit. |
| **Unit-IV** | **Systems safety analysis** |
| Systems safety analysis - Commonality in systems analysis - systems safety positions emerge - Methodical analysis. Systems safety analysis techniques. THERP, FEMA Risk Tolerability. |
| **Unit-V** | **Simulations and Modelling** |
| Simulations and Modelling - Preliminary hazard analysis (PHA) - Hazard and operability study (HAZOP). HAZAN, Case study. |
| **Reference books** | 1.Accident prevention manual for Industrial operations - NSC Chicago2.High risk safety technology - A.E.Green3.Loss prevention in the process industries - F.P.Lees4.Accident prevention manual published by NSC Chicago.5.Material Handling equipments - N.Rudenko6. Industrial safety |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 205** | **Organizations,Administration & Management Responsibility**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Organisationmanagement** |
| Organisation : Concept of organisation, characteristics of organisation, elements of organisation, organisational structure, organisation charts, Types of organisation- formal line, military or scalar organisation, functional organisation, line & staff organisation, project organisation, matrix organisation, authority and responsibility, span of control, delegation of authority.Management: Concept of management and administration, difference and relationship between management, administration, and organisation, evolution of management theory, principles of scientific management, levels in management, introduction to project management and MIS. Industrial ownership: Types of ownership- single ownership, partnership, joint stock company, co-operative societies, public sector, private sector, scientific management- review of different schools of thoughts. |
| **Unit- II** | **Personal Management** |
| Personal Management: Recruitment and training, labour turnover, operator training, suggestion systems. Wages and Incentives: feature of wages, time and piece rate, different incentive plans, profit sharing, job evaluation and merit rating, factorsof comparison and point rating. Industrial relations: industrial disputes, collective bargaining, trade unions, workers’ participation in management, labour welfare. |
| **Unit-III** | **Marketing Management** |
| Marketing Management: Concept of marketing VS sales approach, consumer behaviour and demand concept, buying motives, influence of income level, product design, new product distribution, pricing decisions, major price policy considerations, |
| **Unit-IV** | **Finance Management** |
| Finance Management : Tasks, evolution of corporate management, long term financing, equity, preference and debenture capitals, term loans, dividends and share valuation, legal aspects of dividends, short term financing, working capital influencing factors, cash budgeting |
| **Unit-V** | **Management accounting** |
| Management accounting:Fundamentals of book keeping, journalising, ledger accounts, subdivision of journal, cash book, banking transactions, trial balance, preparation of trading, profit and loss account, and balance sheet, adjustments. |
| **Reference books** | 1. Industrial Organisation and Management : Bethel et.al, McGraw Hill
2. Principles of Industrial Management : Kootnz&Donnel
3. Financial Management : Prasanna Chandra, Tata McGraw Hill
4. Operation Management : Fabricky et al, Tata McGraw Hill
5. Hand Book of MBO : Reddin& Ryan, Tata McGraw Hill.
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| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 207** | **CHEMICAL AND ENVIRONMENTAL HAZARD**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Principles of environmental science** |
| Principles of environmental science, threshold levels, life conditions, global element cycles, oxygen balance of a river, eutroplication problem, hydrological cycle, plume dispersion , effect of air pollution, principles of ecotoxicology ecological principles and concepts, an overview of the major environmental problems. |
| **Unit- II** | **waste water problems** |
| Water and waste water problems, reduction of biological oxygen demand, mechanical treatment method, biological treatment method, nutrient removal, removal of toxic organic compounds, removal of heavy metals, water resources. Solid waste problems, treatment of sludge, domestic garbage, industrial mining and hospital waste, agricultural waste. |
| **Unit-III** | **Air pollution problems** |
| Air pollution problems, particulate pollution, carbon dioxide, carbon hydrides and carbon monoxide, sulfur dioxide, nitrogenous gases, industrial air pollution- method of evaluating pollution. |
| **Unit-IV** | **The chemical industry** |
| The chemical industry, stages in producing a new product , economies of production designing a chemical plant, continuous and batch processing, examples of modern chemical manufacture such as manufacture of sulfuric acid, ammonia, chlor-alkali industry, extraction of copper, Iron and aluminium, the oil industry fats, oils, soaps and detergent. Introduction to petrochemical industries. |
| **Unit-V** | **Selection of energy materials** |
| Selection of energy materials, carbon and low alloy steels, high alloy steels, pressure vessel design codes, cast iron, nickel and alloys, copper and alloys, aluminium and alloys, lead and alloys, glass, cement, bricks and tiles, plastics and rubbers. Corrosion and degradation of engineering materials - prevention - selection of suitable materials of construction in the chemical industry. |
| **Reference books** | 1.Chemical Technology : Drydun2.Chemical Engineers Handbook : John H Peny. |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 202**  | **INDUSTRIAL PSYCOLOGY, ERGONOMICS AND ACCIDENTS**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Introduction-Safety** |
| Introduction-Safety -Goals of safety engineering. Need for safety. Safety and productivity. Definitions: Accident, Injury, Unsafe act, Unsafe Condition, Dangerous Occurrence, Reportable accidents. History of safety movement: ILO, NSC, LPA. |
| **Unit- II** | **Role of management** |
| Role of management, supervisors, workmen, unions, government and voluntary agencies in safety. Employee awareness, Acceptance and participation. Engineering, Education and Enforcement. Various training methods. Development of various training programme. Communication- purpose, barrier to communication |
| **Unit-III** | **Planning and organising for safety** |
| Planning and organising for safety - Safety organisation, Objectives, types, functions, Safety policy. Safety Officer-role, responsibilities, authority, power, duties. Safety committees-need , types, advantages. Safety Education & Training-Importance,. |
| **Unit-IV** | **Job safety analysis** |
| Frequency rate, severity rate, incidents rate, activity rate Plant safety inspection, responsibility for inspection, types of inspection, inspection procedures, Safety sampling techniques. Job safety analysis(JSA) . Theories and principles of accident causation. Cost of accidents-Computation of Costs- Utility of Cost data. |
| **Unit-V** | **Principles of ergonomics** |
| Principles of ergonomics-Definition-application of ergonomics in a work system- physical loads-perpetual loads- mental loads. Design of displays. Panel layout. Working areas. Principles of motion economy. Effects of environment. |
| **Reference books** | 1 Industrial Accident Prevention - H.N. Heinrich2 Safety at work - John Ridley3 Techniques of Safety Management - Dan Peterson4 An Introduction to Safety Engineering and Management - N.V. Krishnan5 Occupational Safety Management & Engineering - Willi Hammer 6 OSHA Inspections - Rich Kaletsky |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 204** | **INDUSTRIAL NOISE AND NOISE CONTROL**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Vibrations and Acoustics** |
| Introduction:- Basic definitions and terminology used in vibrations and Acoustics. Mathematical concepts and degrees of freedom in vibration systems. Natural frequencies and vibration modes and relation to acoustics. Theory of sound propagation and terminology involved. Plane waves and spherical waves. Concepts of free field and diffuse field, |
| **Unit- II** | **Sensors** |
| Sensors used in vibration and measurements. Frequency and spectrum analysis. Weighting networks. Hearing mechanism. Relation between subjective and objective sounds. Auditory effects of noise and automatic testing. Speech interference level and importance. |
| **Unit-III** | **Noise generation** |
| Mechanism of noise generation and propagation in various machinery and machine components, vehicle etc. Directivity index. Noise rating and standards for various sources like industrial, construction, traffic, aircraft, community etc.. Industrial safety and OSHA regulations. Noise legislation and Management. |
| **Unit-IV** | **Noise control** |
| Noise control:- Energy transferring and dissipating devices. Source: Structure borne and flow excited. Vibration isolation and absorption. Spring and Damping materials. Dynamic absorbers. Mufflers and silencers. Path:- Close filter and loosely covered enclosures. Acoustic treatment and materials. Transmission loss and abortion coefficient of materials and structures and their estimation in industrial halls/ auditorium for minimum noise. |
| **Unit-V** | **Active noise attenuates** |
| Active noise attenuates and scope for abatement of industrial noise. Receiver:- Measure to control at the receiver end. Use of enclosures, ear muffs and other protective devices. Near field and far field. Frequency analysis and vibration and noise spectrum. Signature analysis and condition monitoring. |
| **Reference books** | 1. J. D. Irwin and E. R. Graf

“ Industrial Noise and Vbibration Control:1. B. J. Smith, R. J. Peter and stephanic Owen-

“ Scoustics and Noise Control”3. Scretes of Noise Control – Journal. |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 206** | **Industrial safety analysis**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Properties of materials** |
| Effect of temperature on the properties of materials: concrete, steel, masonry and wood. Combustibility of building materials and structures - Fire resistance of structural members - Fire resistance of buildings. |
| **Unit- II** | **Experimental determination of fire resistance** |
| Experimental determination of fire resistance - Approximate method for calculating the fire resistance of structures. Fire resistance limits of structures - coefficient of fire resistance - fire duration. |
| **Unit-III** | **Design of fire resistant walls** |
| Design of fire resistant walls - ceilings-screens-local barriers- Roof separations and partitioned fire areas - Fire stopped areas in connecting constructions. Fire protection of building structures: Wooden structures - Steel structures - Reinforced concrete structures - Plastic structures. |
| **Unit-IV** | **Building fire areas** |
| Building fire areas - calculation of fire areas - subdivision of fire areas - Industrial, Residential and Public buildings - Fire transmission between buildings - propagation of fire. Protection of openings: Openings for conveyors - opening for doors - low combustible doors - Non combustible doors - Spark proof doors - suspension of doors - Air-tight sealing of doors - Windows |
| **Unit-V** | **Reparability of fire damaged structures** |
| Reparability of fire damaged structures: Assessment of fire severity - assessment of damage-concrete, steel, masonry, timber - feasibility of repair-Repair techniques: Columns, beams, floors, etc. - a case study on building reinstatement. |
| **Reference books** | 1. Principles of fire safety standards for Building construction :M.YA Roytman2. Design of Buildings for fire safety : E.E.Smith&T.Z.Harmathy3. A complete guide to fire & building: Eric.W.Marchant4. Designing of fire safety : E.Gorden Butcher &Alan.C |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

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| **FS 208** | **SAFETY IN POWER PLANTS**  |
| **Prerequisite**  | All students are expected to have a general knowledge of biology, chemistry and physics. |
| **Learning objective**  | The learning objective of course are: To create an understanding regarding the fire science, To gain knowledge about fire prevention, To have understanding about nature of damage, Able to analyse fire hazard management. |
| **Salient features**  | The student will be able to conceptualize about chemistry of fire, Able to analyse management practice regarding fire management. |
| **Utility** | A degree in fire safety and hazard management opens doors to job opportunities in science, industry and fire management, Conservation and prevention of fire hazards Management, Fire Rangers, fire officer. |
| **Unit-I** | **Minerals** |
| Minerals, rocks, ores and non-metallic minerals. Rock types Classification of rocks, structural features of rocks, Mineral Classification, rockforming minerals - non-metallic industrial Minerals and rocks, Coal Classification, Petroleum. |
| **Unit- II** | **Mine atmosphere** |
| Mine atmosphere, heat and humidity. Natural and Mechanical Ventilation, laws of air flow in mines, mine resistance and equivalent orifice. Ventilation standards. Distribution and control of air circulation. Mine fans, types and characteristics, Construction and installation. Booster and auxiliary fans. Selection and location of fans. |
| **Unit-III** | **Machinery** |
| Machinery, Pressure vessels, and Points of operation.:- Mechanical Hazards: Enclosures and Barrier - Type guards for transmission apparatus. Specific hazardous equipment Power presses. Control of point-of-operation. Hazards: Barrier or enclosure guards. Guarding by distance. Hand removal devices. Safety trip controls. |
| **Unit-IV** | **Sensing Device** |
| Presence - Sensing Device - special feeding tools - Flywheels Automation. Elevators and lifting equipment:- Elevators - hoistways - lifting equipment - wireropes and chains - slings Calculations for HP & Load on lifting line. Boilers and pressure vessels:- Boilers, safety values Gauge glass and water column, instruments and controls Blowdown values, Furnace explosions, Hold-off systems. The Boiler room, unfired pressure vessels. |
| **Unit-V** | **Ionising and non ionising Radiation** |
| Ionising and non ionising Radiation. The genesis of atomic power development. The early recognition of Radiation hazards: Ionising radiation particulate and electromagnetic radiation, units of ionising radiation measurement. Radiation dose Biological effects and assumptions. Hazards and safety mechanisms for ionising and non ionising radiation |
| **Reference books** | 1. Principles of fire safety standards for Building construction :M.YA Roytman |
| **Mode of Examination** | Assignment/Quiz/Viva-Voce/student seminar/written examination/PPT |
| **Recommended By BOS on:** |  |
| **Approved by academic council on:** |  |

**FS 251Practical**

1. Study of elements of fire and their use
2. Study and use of different extinguishing Hand Appliances - water, foam, dry powder, ABC Powder, CO2, and Halon.
3. Study of basic fire protection equipments.
4. Study of Modular Automatic Fire Extinguishers, Trolley Mounted fire extinguishers.
5. Study of Fire Protection systems,
6. Study of Fire Alarm System,
7. Study of Manual, Electric,
8. Automatic Fire Detection System
9. Study of Study of Water sprays system.
10. Study of Mobile fire fightingEquipments Mobile Monitors, Trailor, Pumps, Fire.