SCHEME OF EXAMINATION

&

SYLLABUS

FOR

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

ACADEMIC SESSION 2026-27 ONWARDS

GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY
NEW DELHI

UNIVERSITY SCHOOL OF FIRE AND INDUSTRIAL SAFETY

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY SECTOR-16 C DWARKA, NEW DELHI-110078 (INDIA)

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Programme Outcomes (POs)

By the end of the programme, students will demonstrate the ability to:

PO1. Demonstrate knowledge of fire science principles, life safety concepts, disaster management frameworks, and applicable national and international fire codes.

PO2. Interpret and apply statutory provisions, building bye-laws, fire service acts, and regulatory standards in fire and life safety auditing.

PO3. Conduct fire and life safety audits for buildings, industrial facilities, and urban environments using systematic and standardized audit methodologies.

PO4. Analyze fire risks and hazards using qualitative and quantitative tools, including risk assessment techniques, GIS-based analysis, and performance-based approaches.

PO5. Evaluate the adequacy and effectiveness of fire prevention, detection, protection, and evacuation systems in compliance with prescribed codes and best practices.

PO6. Design and recommend fire and life safety solutions incorporating performance-based fire engineering, evacuation modeling, and building services integration.

PO7. Investigate fire incidents and interpret forensic evidence to determine origin, cause, and contributing factors using scientific and analytical methods.

PO8. Prepare professional audit reports, risk assessments, and compliance documentation with clear technical justification and actionable recommendations.

PO9. Demonstrate ethical responsibility, professional judgment, and effective communication skills while working independently or in multidisciplinary teams.

PO10. Integrate disaster risk reduction principles and sustainability considerations into fire and life safety planning and decision-making processes.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI
POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

SCHEME OF EXAMINATIONS

Criteria for Internal Assessment

All theory courses have internal assessment of 40 marks and 60 marks for external examination. For the courses related to labs, summer training and projects, internal assessment is 40 marks and external examination is 60 marks.

The internal assessment of the students (out of 40 marks) shall be as per the criteria given below:

- Written Test Compulsory (to be conducted as per Academic Calendar of theUniversity.
- Individual Assignments / Presentation / Viva-Voice / Group Discussion / Class Participation.

Note: Record should be maintained by faculty and made available to the University,if required.

The student will be evaluated continuously during the semester as part of internal assessment.

MAXIMUM & MINIMUM CREDITS OF THE PROGRAM

The total number of the credits offered in Semester 1 & 2 of the Post-Graduate Diploma in Fire and Industrial Safety Programme is 47 credits.

Each student shall be required to appear for examination in all courses. However, to be awarded the One Year PG Diploma, a student must secure at least 43 credits

UNIVERSITY SCHOOL OF FIRE AND INDUSTRIAL SAFETY
GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
NEW DELHI, INDIA

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY
SCHEME OF EXAMINATION
***w.e.f.* 2026-27 Batch**

FIRST SEMESTER

Course Code	Course Title	Type	L	Credit
PGDF 101	Basics of Fire and Industrial Safety	Core	2	2
PGDF 103	Fire Prevention	Core	2	2
PGDF 105	Life Safety	Core	2	2
PGDF 107	Fire Protection	Core	2	2
PGDF 109	State Fire Service Acts, Rules & Byelaws	Core	2	2
PGDF 111	Behaviour-based Safety	Core	2	2
	Electives (Any One)			
PGDF 113	Building Codes and Standards	Elective	2	2
PGDF 115	Fire Safety Risk Assessment and Audit of Built Environment	Elective	2	2
	Practical's			
PGDF 151	Field Visits / Presentation *(Compulsory)*	Ability Enhancement	-	2+2
PGDF 153	Project Work *(Compulsory)*	Ability Enhancement	-	5
	Total			23

SECOND SEMESTER

Course Code	Course Title	Type	L	Credit
PGDF 102	Fire Risk and Hazard Analysis of Built Environment	Core	2	2
PGDF 104	Hazard Identification and Risk Assessment of Industries	Core	2	2
PGDF 106	Building Management System (BMS)	Core	2	2
PGDF 108	Performance Based Fire Design	Core	2	2
PGDF 110	Legal Framework for Disaster Management	Core	2	2
PGDF 112	Fire Forensics	Core	2	2
	Electives (Any One)			
PGDF 116	Fire Safety, & Risk assessments of Industries	Elective	2	2
PGDF 118	Geoinformatics for Fire Risk Assessment	Elective	2	2
	Practical's			
PGDF 152	Field Visits / Presentation *(Compulsory)*	Ability Enhancement	-	2+2
PGDF 154	Dissertation *(Compulsory)*	Ability Enhancement	-	6
	Total			24

Total Credits Offered in Semester 1 & 2 = 47

Required Credits for award of One Year PG Diploma = 43

SEMESTER I

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Basic of Fire & Life Safety Audit

Course Code: PGDF 101 **L - 2, Credits - 2**

Course Outcomes (Cos)

CO1: Understand fundamental concepts of fire science, industrial safety principles, and common fire and accident hazards in industrial environments.

CO2: Identify fire, electrical, chemical, and mechanical hazards in industrial and workplace settings through basic safety inspection techniques.

CO3: Apply relevant fire and industrial safety laws, codes, and standards to ensure compliance and risk reduction in organizations.

CO4: Develop basic safety awareness, preventive measures, and emergency preparedness practices to minimize fire and industrial accidents.

Course Content

Unit I

Introduction to Fire and Industrial Safety: Concept and importance of fire and industrial safety; basic principles of fire science; fire triangle and fire tetrahedron; classification of fire; sources of ignition; products of combustion; and fire load.

Unit II

Industrial Fire and Accident Hazards: Electrical hazards; chemical and flammable material hazards; mechanical hazards; housekeeping and storage practices; human factors and unsafe acts; and introduction to hazard identification and risk assessment.

Unit III

Industrial Safety Systems and Legislation: Overview of safety management systems; statutory provisions related to fire and industrial safety; Factory Act and rules; National Building Code provisions related to fire safety; and the role of the safety officer.

Unit IV

Fire Prevention and Emergency Preparedness: Fire prevention measures in industries; fire

detection and alarm systems (introductory); firefighting equipment (portable and fixed); emergency planning; evacuation procedures; fire drills; and safety training.

Reading List:

1. SP 7:2016- National Building Code of India, Volume 1 & 2 (Bureau of Indian Standards, India)
2. IS Codes on Fire and Industrial Safety (Bureau of Indian Standards, India)
3. NFPA 101 - Life Safety Code (National Fire Protection Association, USA)
4. Fire Protection Handbook, Volume I & II (National Fire Protection Association, USA)
5. International Fire Code (International Code Council, Inc.)
6. Introduction to Fire and Industrial Safety by Raghavan & Krishnamurthy (CBS Publishers, India)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	2	1	1	1	1	1
CO2	2	2	2	3	2	1	1	1	1	1
CO3	2	3	2	2	3	1	1	2	1	1
CO4	1	2	2	2	2	1	1	2	2	2
AVG	**2**	**2.25**	**1.75**	**2.25**	**2.25**	**1**	**1**	**1.5**	**1.25**	**1.25**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Prevention

Course Code: PGDF 103 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Apply fundamental principles of fire science, fire dynamics, and ignition sources to identify and assess fire risks in different occupancy and industrial settings.

CO2: Analyze building occupancies, material characteristics, and fire load to evaluate fire hazards and fire resistance requirements.

CO3: Develop fire prevention strategies and programmes, including fire drills and emergency plans, to minimize fire risks and enhance organizational preparedness.

CO4: Evaluate the effectiveness of fire prevention and protection measures through training, awareness initiatives, and compliance with applicable codes and standards.

Course Contents

Unit I

Principles of Fire Science; Classification of Fire; Spread of Fire; Sources of Ignition; Products of Combustion; Electricity and Fire Risks; and Fire Load.

Unit II

Classification of Occupancy; Hazards of Contents; Fire Resistance Rating of Various Building Materials; Classification of buildings, based on occupancy; Mixed Occupancy; Fire Zones; Temporary buildings; Surface interior finish; Vertical and Horizontal openings; Compartmentation; Locating Sub Stations and transformers; AHUs; Air conditioning, Ventilation, and Smoke Control; Fire and smoke Dampers; and Glass facades.

Unit III

Building Rehabilitation; Historic Buildings; Repairs; Renovations; Modification; Reconstruction; and Change of Occupancy.

Unit IV

Fire Drills; Emergency Plans; Fire Command Centre; Fire Prevention, and Fire Protection Programme.

Reading List:

1. SP7:2016 National Building Code of India Volume 1 & 2 (Published by Bureau of Indian Standards)
2. NFPA 101 Life Safety Code (Published by National Fire Protection Association, USA).
3. Fire Protection Handbook Volume – I & II (Published by National Fire Protection Association, USA)
4. International Fire Code (Published by International Code Council, INC.)
5. Fire Fighting The Essential Handbook by Barendra Mohan Sen (Published by UBS Publishers' Distributors Pvt. Ltd, New Delhi)
6. IS codes on 'Fire and Life Safety' published by Bureau of Indian Standards, India

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	2	1	1	1	1	1
CO2	2	2	2	3	2	1	1	1	1	1
CO3	2	2	2	3	3	2	1	2	1	2
CO4	1	2	2	2	3	2	1	3	2	2
AVG	**2**	**2**	**1.75**	**2.5**	**2.5**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Life Safety

Course Code: PGDF 105 **L - 2, Credits - 2**

Course Objectives (COs)

CO1. Explain core life safety concepts, including building construction, compartmentation, fire barriers, smoke control, and means of egress.

CO2. Apply life safety provisions of relevant codes and standards to different building types and occupancies.

CO3. Analyze evacuation strategies and life safety requirements for complex buildings such as high-rise structures, atria, and special occupancies.

CO4. Evaluate and recommend life safety measures related to building materials, interior finishes, glazing, and façade systems to enhance occupant safety.

Course Content

Unit I

Challenges to safety in built environment; types of hazards likely to cause harm (fire, burns, electric shock, falls); natural disasters; fatalities involving hazardous environments; important case studies involving major incidents and their subsequent effect on safety outlook; approach to addressing fire and safety challenges.

Unit II

The concept of industrial life safety: need, nature, and importance; focus on human resource, and concept of importance of ‘man’ as central theme in safety; concept of accident prevention, occupational health, and environmental protection; problems of industrial safety and occupational health; modern concept of fire and safety.

Unit III

History and role of building codes and safety legislation; concept of safety versus risk; enforcement of codes and standards; role of government agencies and emergency services in enforcing legislation; government framework and infrastructure involved in safety legislation enforcement; role of code enforcement, plan review and approval, record keeping, and public education.

Unit IV

Industrial Fire and Safety management concepts: hazard identification and risk assessment, risk reduction and control methods; design aspects such as segregation and separation, fire resisting construction, emergency exit arrangements, access for emergency agencies, fire protection systems, safe operational practices, maintenance and upkeep of systems, and planning for emergency response; design approaches for fire and safety; NFPA fire safety concepts tree; importance of inspection, testing, and maintenance practices for fire protection systems, types of records, code requirements, and current practices.

Reading List:

1. SP7:2016 National Building Code of India Volume 1 & 2 (Published by Bureau of Indian Standards)
2. NFPA 101 Life Safety Code (Published by National Fire Protection Association, USA).
3. Fire Protection Handbook Volume – I & II (Published by National Fire Protection Association, USA)
4. International Fire Code (Published by International Code Council, INC.)
5. Fire Fighting Operations in High-Rise and Standpipe-Equipped Buildings by David M. McGrail (Published by PennWell Corporation, USA)
6. IS codes on 'Fire and Life Safety' published by Bureau of Indian Standards, India

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	2	1	1	1	1	1
CO2	2	3	2	2	3	1	1	2	1	1
CO3	2	2	3	3	2	2	1	2	1	2
CO4	2	2	2	2	3	2	1	2	2	2
AVG	**2.25**	**2.25**	**2**	**2.25**	**2.5**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Protection

Course Code: PGDF 107 **L – 2, Credits – 2**

Course Outcomes (COs)

CO1: Apply principles of fire protection engineering to identify fire risks and determine appropriate fire protection requirements for different occupancies.

CO2: Analyze fire detection, alarm, suppression, and smoke management systems to assess their suitability and performance in diverse building environments.

CO3: Evaluate fire protection codes, standards, and regulatory requirements to ensure compliance and effective protection of life and property.

CO4: Develop integrated fire protection plans by selecting and coordinating active and passive fire protection systems tailored to organizational and regulatory needs.

Course Content

Unit I

Objectives; Fundamental Requirements; Minimum Requirements Based on Building Occupancy Classification.

Unit II

Fire Detection and Alarm Systems; Voice Evacuation and Public Address System; Electrical Installations; Emergency Power Supply; Lightning Protection; Escape Lighting and Exit Signage; Portable firefighting extinguishers and the relevant BIS specifications.

Unit III

Firefighting System; Wet Riser; Downcomer; Dry Riser; Static Water Storage Tanks; Fire Pumps and Appurtenances; Sprinkler System, clean agents; Automatic High Velocity and Medium Velocity Water Spray Systems; Fixed Foam Installations; Gas Based Suppression Systems; Automatic Water Mist Systems; Special Provision for High Rise Buildings.

Unit IV

Heating, Ventilation, Air Conditioning, and Refrigeration Systems; Mechanical Smoke Exhaust systems; Pressurization of staircase and protection of escape routes; arrangements for Smoke Exhaust and Pressurization of Areas Below Ground; Smoke management in Atrium and High Rise Buildings.

Reading List:

1. SP7:2016 National Building Code of India Volume 1 & 2 (Published by Bureau of Indian Standards)
2. NFPA 101 Life Safety Code (Published by National Fire Protection Association, USA).
3. Fire Protection Handbook Volume – I & II (Published by National Fire Protection Association, USA)
4. International Fire Code (Published by International Code Council, INC.)
5. IS codes on 'Fire and Life Safety' published by Bureau of Indian Standards, India
6. NFPA 13 Automatic Sprinkler Systems Handbook (Published by National Fire Protection Association, USA)
7. NFPA70 'National Fire Alarm and Signaling Code (Published by National Fire Protection Association, USA)
8. NFPA92 'Standard for Smoke Control System (Published by National Fire Protection Association, USA)
9. CPWD General Specifications for Electrical Works Part V-(Wet Riser & Sprinkler System) (Published by Central Public Works Department, Govt. of India)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relation between course outcomes and the program outcomes where "3" indicates high degree of relationship, "2" indicates moderate degree of relationship and "1" indicates low degree of relationship of CO with PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	2	1	1	1	1	1
CO2	2	2	2	2	3	2	1	2	1	1
CO3	2	2	3	3	3	2	1	2	1	2
CO4	2	2	2	3	2	2	1	2	2	2
AVG	**2.25**	**2**	**2**	**2.5**	**2.5**	**1.75**	**1**	**1.75**	**1.25**	**1.5**

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

State Fire Safety Act, Rule and Byelaws

Course Code: PGDF 109 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Apply provisions of State Fire Service Acts, rules, and bye-laws to interpret fire safety requirements in various organizational and occupancy contexts.

CO2: Analyze the legal framework governing fire services, including the roles and responsibilities of fire authorities and safety officers.

CO3: Evaluate compliance of buildings and facilities with applicable fire service laws and local bye-laws to identify gaps and risks.

CO4: Develop effective fire safety communication, training, and compliance strategies aligned with statutory fire service regulations.

Course Content

Unit I
Importance of Fire Service Act; Model Fire Force Bill and Rules; Indian Constitution Provisions on the subject "Fire".

Unit II
Fire and Life Safety Act and Rules of Delhi, Maharashtra, Gujarat, Karnataka, Odisha, and West Bengal.

Unit III
Local Bye Laws of Delhi, Maharashtra, Gujarat, Karnataka, Odisha, and West Bengal

Reading List:

1. Model Fire Service Bill & Rules of 1958 and as amended from time to time, Published by DG FS CD & HG, MHA, GOI
2. Fire and Life Safety Acts, Rules, Local Building Bye Laws published by Government of Delhi, Maharashtra, Gujarat, Karnataka, Odisha and West Bengal.
3. Provision of Indian Constitution on Subject Fire, Indian Constitution

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes
The Table depicts the degree of relationship between course outcomes and the programme

outcomes, where “3” indicates a high degree of relationship, “2” indicates a moderate degree of relationship, and “1” indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	1	1	1	1	1	1	1
CO2	2	3	2	2	2	1	1	2	1	1
CO3	2	2	2	2	2	1	1	2	1	1
CO4	2	3	3	2	3	1	1	3	2	2
AVG	**2.25**	**2.5**	**2**	**1.75**	**2**	**1**	**1**	**2**	**1.25**	**1.25**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Behaviour-based Safety

Course Code: PGDF 111 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Understand the concept, principles, and origins of behaviour-based safety (BBS) as a proactive approach to preventing workplace accidents and injuries.

CO2: Identify behavioural and organisational factors that influence safety performance and contribute to unsafe acts and conditions.

CO3: Apply behaviour-based safety techniques and tools such as observation, feedback, and positive reinforcement to enhance safety behaviour in industrial settings.

CO4: Evaluate the effectiveness of behaviour-based safety programmes within a broader safety management context including measurement, communication, and continuous improvement.

Course Content

Unit I

Introduction to Behaviour based Safety: origin and evolution of BBS; fundamental theories of human behaviour and safety; how behaviour influences safety outcomes; difference between behaviour based and traditional safety approaches.

Unit II

Core Principles and Concepts of Behaviour based Safety: understanding safe and at risk behaviours; behavioural observation and measurement; role of individual attitudes, perception, motivation, and organisational culture in shaping safety behaviour.

Unit III

Design and Implementation of BBS Programmes: development of observation checklists; techniques for observing, recording, and analysing safety behaviours; feedback strategies and methods of positive reinforcement; engaging employees and leadership in BBS processes.

Unit IV

Evaluation and Improvement of Behaviour based Safety Initiatives: monitoring safety behaviour trends and performance indicators; integration of BBS within overall safety management system; case studies of BBS interventions; addressing challenges and sustaining behavioural change.

Reading List:

1. What Is Behaviour-based Safety? Vector Solutions resource (industry reference)
2. Behaviour-Based Safety: A Guide to Practitioners by Todd Conklin (Wiley)
3. Working Safe: How to Help People Actively Care for Health and Safety by John V. Reason (IIRSM/CRC Press)
4. Industrial Safety and Risk Management by L.M. Deshmukh (Tata McGraw-Hill)
5. Safety Management Systems in Industry (selected chapters on behavioural safety) in J. Ridley & J. Channing, *Safety Management Systems: Principles and Practice* (Butterworth-Heinemann)
6. Behavioural Safety: A Framework for Effective Safety Programme Implementation – Professional Safety Journal (American Society of Safety Professionals)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	1	1	1	1	1	2	1
CO2	2	1	2	2	2	1	1	1	2	2
CO3	1	1	2	2	2	1	1	2	3	2
CO4	1	1	2	2	2	1	1	3	3	2
AVG	**1.5**	**1**	**1.75**	**1.75**	**1.75**	**1**	**1**	**1.75**	**2.5**	**1.75**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Building Codes and Standards

Course Code: PGDF 113 **L - 2, Credits - 2**

Course Outcome (Cos)

CO1: Apply fundamental principles of building codes and standards to ensure safety, health, and regulatory compliance in building design and construction.

CO2: Analyze national and local building codes, fire safety regulations, and standards to identify compliance requirements and potential risks.

CO3: Evaluate real-world building scenarios to assess adherence to applicable codes, standards, and authority requirements.

CO4: Develop practical recommendations for the effective implementation of building codes and standards to enhance safety, performance, and sustainability in built environments.

Course Contents

Unit I

Introduction to Codes, Standards, Good Practice, Handbooks and Special Publications; Aspect of Applicability at Local Jurisdiction; Requirements and Regulations of the Authority Having Jurisdiction.

Unit II

National Building Code of India: Changes and revision from Inception to 2016; Aspect of IS Codes: Revision and Referencing in NBC; Interrelation of Parts and Sections of NBC.

Unit III

Local Building Code, Regulations, Act and Bye Laws; Changes and Amendments of the above by the Authority Having Jurisdiction; Gazette Notifications and Adoption of Local Code; Issue of NOC; Occupancy Certificate and Renewals; Adoption of NBC by the Authority Having Jurisdiction.

Unit IV

Cinematography Act: State wise aspect of applicable Act, Rules, and Bye Laws; Reference and alignment to NBC under Special Occupancy.

Reading List:

1. Model Fire Service Bill & Rules of 1958 and as amended from time to time, Published by DG FS CD & HG, MHA, GOI
2. Fire and Life Safety Acts, Rules, Local Building Bye Laws published by Government of Delhi, Maharashtra, Gujarat, Karnataka, Odisha and West Bengal.
3. NBC 1997, 2005 and 2016.
4. IS Codes and Standards – Various.
5. Development Control Regulation – Greater Mumbai
6. The Cinematography Act, 1952 and Rules (with further Amendments)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	1	1	1	1	1	1	1
CO2	2	3	2	2	2	1	1	2	1	1
CO3	2	2	2	2	2	1	1	2	1	1
CO4	2	3	3	2	3	1	1	3	2	2
AVG	**2.25**	**2.5**	**2**	**1.75**	**2**	**1**	**1**	**2**	**1.25**	**1.25**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Safety Risk Assessment and Audit of Built Environment

Course Code: PGDF 115 **L - 2, Credits – 2**

Course Outcomes (COs)

CO1: Understand the purpose, scope, and professional significance of fire safety risk assessment and audit processes in built environments and industrial facilities.

CO2: Identify fire hazards, fire protection systems, and life safety features using systematic inspection techniques, checklists, and audit protocols.

CO3: Apply recognised methods and frameworks for conducting fire safety risk assessments and audits using relevant standards, codes, and best practices in fire safety management.

CO4: Prepare comprehensive fire safety risk assessment and audit reports with practical recommendations for corrective actions, compliance improvements, and risk mitigation.

Course Contents

Unit I:
Introduction to fire safety risk assessment and audit; definition, objectives, and significance of risk assessment in fire safety management; professional context, roles, and scope of fire safety audits in buildings and industrial installations; duties, ethical responsibilities, and competencies of fire safety auditors.

Unit II:
Fire hazard identification; classification of occupancies; hazards associated with building contents; fire load assessment and considerations; inspection of fire protection systems including fire detection, alarm, suppression, and evacuation systems; evaluation of building construction features and means of egress; application of audit tools, formats, and structured checklists.

Unit III:
Fire safety audit methodology; audit planning and preparation; conduct of site inspections and systematic documentation; verification of compliance with National Building Code provisions, applicable fire safety standards, and statutory regulations; analysis, interpretation, and prioritisation of audit findings.

Unit IV:
Documentation and reporting procedures; preparation of fire safety risk assessment and audit

reports; formulation of audit observations, risk ratings, corrective measures, and recommendations; effective communication of audit results to relevant stakeholders; follow-up actions, monitoring, and continuous improvement of fire safety systems and practices.

Reading List

1. SP 7:2016 National Building Code of India, Volume 1 & 2 (Bureau of Indian Standards, India) including fire prevention and life safety provisions.
2. Fire Protection Handbook, Volume I & II (National Fire Protection Association, USA) covering risk assessment and fire protection system evaluation.
3. NFPA 101 – Life Safety Code (National Fire Protection Association, USA) including fire safety evaluation criteria.
4. Fire Risk Assessment Tools and Techniques (Industry publications and professional audit checklists, such as those provided by fire safety audit services and consultancies).
5. Fire Fighting: The Essential Handbook by Barendra Mohan Sen (UBS Publishers, India) related to operational fire safety elements.
6. IS Codes on Fire and Life Safety in Buildings (Bureau of Indian Standards, India) relevant to audit compliance.

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relation between course outcomes and the program outcomes where “3” indicates high degree of relationship, “2” indicates moderate degree of relationship and “1” indicates low degree of relationship of CO with PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	1	1	1	1	1	1	1
CO2	2	2	3	2	2	1	1	1	1	1
CO3	2	3	3	3	3	2	1	2	1	2
CO4	1	2	3	2	3	2	1	3	2	2
AVG	**1.75**	**2.25**	**2.75**	**2**	**2.25**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Field Visits/ Presentation

Course Code: PGDF 151 **L - 0, Credits - 4**

The field visit and presentation should focus on the practical application of management concepts, theories, or techniques learned throughout the Post Graduate Diploma program. Students will visit organizations or institutions relevant to their area of study to observe real-world management practices and gather insights on specific organizational or social issues. During the presentation, students will summarize their field visit experiences, highlight key observations and connect them to theoretical frameworks. Students are expected to demonstrate critical thinking and practical understanding by articulating their findings and reflections. Upon completion, a detailed report summarizing the visit, methodology, observations, and conclusions will be submitted.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Project Work

Course Code: PGDF 153 **L - 0, Credits- 5**

The project work should focus on applying management concepts, theories, or techniques acquired throughout the program to analyze and address a specific organizational or social issue or challenge. Students will be evaluated on the clarity, depth, and originality of their work, as well as their ability to connect theory to practice and communicate their findings effectively.

SEMESTER II

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Risk and Hazard Analysis of Built Environment

Course Code: PGDF 102 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Understand the concepts of fire risk and fire hazard analysis as applied to buildings and built environments.

CO2: Identify fire hazards and risk factors associated with building design, occupancy, materials, and human behaviour.

CO3: Apply basic fire risk assessment techniques to evaluate fire safety levels in residential, commercial, institutional, and industrial buildings.

CO4: Recommend practical fire risk control and mitigation measures in accordance with applicable fire safety codes and standards**.**

Course Contents

Unit I

Introduction to fire risk and hazard analysis; basic concepts of fire risk, hazard, vulnerability, and consequences; difference between fire hazard identification and fire risk assessment; importance of fire risk analysis in the built environment.

Unit II

Fire hazards in the built environment; building materials and fire behaviour; fire load and fire growth; impact of building layout, vertical and horizontal openings, and services on fire spread; human factors and occupant behaviour during fire emergencies; Physical assessment of University buildings.

Unit III

Fire risk assessment in industries, i e polymer, oil and gas, and big manufacturing industries; fire risk assessment methods for buildings; qualitative fire risk assessment techniques; use of checklists, inspection methods, and risk matrices; evaluation of means of escape, fire detection, alarm systems, firefighting provisions, and passive fire protection measures.

Unit IV

Fire risk mitigation and safety planning; interpretation of fire risk assessment findings; prioritisation of fire safety measures; basic documentation and reporting of fire risk assessments; linkage of fire risk analysis with National Building Code provisions and local fire safety regulations.

Reading List:

1. SP 7:2016 – National Building Code of India, Volume 1 & 2 (Bureau of Indian Standards, India)
2. Fire Protection Handbook, Volume I & II (National Fire Protection Association, USA)
3. NFPA 101 – Life Safety Code (National Fire Protection Association, USA)
4. Fire Safety Management Handbook by Daniel Della-Gatta (Wiley)
5. Fire Fighting: The Essential Handbook by Barendra Mohan Sen (UBS Publishers, India)
6. IS Codes on Fire Prevention and Fire Safety in Buildings (Bureau of Indian Standards, India)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	1	1	1	1	1	1
CO2	2	2	2	3	2	1	1	1	1	1
CO3	2	2	3	3	3	2	1	2	1	2
CO4	2	3	2	2	3	2	1	3	2	2
AVG	**2.25**	**2.25**	**2**	**2.5**	**2.25**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Hazard Identification & Risk Assessment of Industries

Course Code: PGDF 104 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Understand the principles of hazard identification and risk assessment (HIRA) in industrial contexts and the role of systematic processes in preventing accidents.

CO2: Identify various types of hazards in industrial environments including physical, chemical, mechanical, electrical, ergonomic, and organizational hazards.

CO3: Apply standard approaches and tools for hazard identification and risk assessment to analyze industrial processes and workplace conditions.

CO4: Develop risk mitigation strategies and recommend control measures based on risk evaluation outcomes, linking HIRA results to effective safety management.

Course Contents

Unit I

Introduction to hazard identification and risk assessment; definition and significance of hazard and risk; importance of structured HIRA processes in industry; overview of the HIRA approach commonly used in safety practice and industrial safety management contexts; risk mitigation measures; risk levels; and ALARP (As low as reasonably practicable) terminology.

Unit II

Fire hazards and risk identification of refineries, petroleum depots, and powerhouses; types and sources of hazards in industrial settings; physical hazards such as machinery and moving parts; chemical hazards including toxic and flammable substances; electrical hazards including shock and arc flash; ergonomic and human factor hazards; and environmental and organizational hazards.

Unit III

Hazard identification techniques; systematic observation and inspection methods; job hazard analysis (JHA); checklist approaches; process mapping; risk assessment tools, including qualitative risk matrices and scoring systems; assessment of likelihood and consequence; Quantitative Risk Assessment (QRA) technique and various software available; HAZOP; event

tree analysis; fault tree analysis; FMEA technique; and what if analysis methods.

Unit IV

Risk evaluation and risk control; prioritisation of risks based on severity and frequency; selection and recommendation of risk mitigation measures; linking risk assessment outcomes with safety controls, including engineering, administrative, and personal protective measures; documentation and reporting of HIRA findings; Concept of Management of Change.

Reading List:

1. HIRA (Hazard Identification and Risk Assessment) Concepts and Tools- ORS Consulting overview on hazard identification and risk assessment
2. Introduction to Health and Safety at Work by Hughes & Ferrett (Routledge)- foundational coverage of hazard and risk assessment principles.
3. Risk Assessment: Techniques and Tools by D.J. Smith (Butterworth-Heinemann)- practical methods for qualitative risk evaluation.
4. Industrial Safety and Risk Management by L.M. Deshmukh (Tata McGraw-Hill) - industry context for HIRA applications.
5. Safety Management Systems: Principles and Practice by J. Ridley & J. Channing (Butterworth-Heinemann) - integration of risk assessment with safety management.
6. IS 14489: Fire Risk Assessment and Fire Safety (Bureau of Indian Standards) - for fire-related hazard and risk contexts.

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	2	1	1	1	1	1	1
CO2	2	1	2	3	2	1	1	1	1	1
CO3	2	2	3	3	3	2	1	2	1	2
CO4	2	2	2	2	3	2	1	3	2	2
AVG	**2**	**1.5**	**2**	**2.5**	**2.25**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Building Management System (BMS)

Course Code: PGDF 106 **L - 2, Credits - 2**

Course Outcomes (Cos)

CO1: Understand the concept, architecture, and components of Building Management Systems used in commercial, institutional, and industrial buildings.

CO2: Identify the integration of fire safety, HVAC, electrical, and security systems within a centralized BMS framework.

CO3: Analyze the role of BMS in enhancing safety, energy efficiency, operational reliability, and emergency response.

CO4: Apply basic monitoring, control, and maintenance principles of BMS for effective building operations and safety management.

Course Content

Unit I

Introduction to Building Management System: Concept, objectives, and scope of BMS; evolution of building automation; BMS architecture and hierarchy; sensors, actuators, and controllers; communication protocols and interfaces.

Unit II

BMS Subsystems and Integration: HVAC control systems; electrical and lighting control; fire detection and alarm system integration; access control and CCTV systems; lifts and escalators monitoring; and water and plumbing systems.

Unit III

BMS for Fire, Life Safety, and Energy Management: Role of BMS in fire detection, smoke management, and emergency evacuation; integration with fire command centre; energy management and optimization; and sustainability and green building concepts.

Unit IV

Operation, Maintenance, and Applications of BMS: BMS operation and control room functions; alarms and event management; preventive maintenance; fault diagnostics; and case studies of BMS implementation in commercial and industrial buildings.

Reading List

1. SP 7:2016 – National Building Code of India, Volume 1 & 2 (Bureau of Indian Standards, India)
2. IS Codes related to Building Automation and Fire Safety (Bureau of Indian Standards, India)
3. ASHRAE Handbook – HVAC Applications (American Society of Heating, Refrigerating and Air-Conditioning Engineers)
4. Building Automation: Communication Systems with EIB/KNX, LON and BACnet by H. Boyer (Springer)
5. NFPA 72 – National Fire Alarm and Signaling Code (National Fire Protection Association, USA)
6. Smart Buildings: Technology and Data-Driven Design by James Sinopoli (Artech House)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	1	1	1	1	1	1	1
CO2	2	2	2	2	3	2	1	2	1	2
CO3	2	2	2	3	3	2	1	2	1	3
CO4	1	2	2	2	2	1	1	3	2	2
AVG	**1.75**	**1.75**	**1.75**	**2**	**2.25**	**1.5**	**1**	**2**	**1.25**	**2**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Performance Based Fire Design

Course Code: PGDF 108 **L - 2, Credits - 2**

Course Outcome (COs)

CO1: Understand the principles and objectives of performance-based fire design, including its advantages over traditional prescriptive approaches.

CO2: Analyze building designs and materials to assess fire performance and determine compliance with safety standards and regulations.

CO3: Apply fire modeling techniques and tools to simulate fire scenarios and evaluate the effectiveness of design solutions in mitigating fire risks.

CO4: Develop performance-based fire safety strategies and recommendations for various types of buildings, ensuring both safety and functional performance

Course Contents

Unit I: An Introduction to Prescriptive and Performance Based Design Approach
Criteria for prescriptive and performance-based design for fire and life safety systems in buildings. Specific aspects of performance-based design of fire and life safety services for large and mixed-use projects. Assessing prescriptive design and the results obtained, and comparing them with performance-based design. Special considerations in performance-based design for evacuation simulation, smoke mitigation and control, building structural fire rating, passive fire rating system on L and T rating, façade design, building separation and setbacks, elevator evacuation, public address system, and campus fire strategy.

Unit II: Fire Evacuation Modeling
Principles and Practice of Evacuation Modeling (PPEM): introduction; scope; building evacuation models; theory of occupant behavior during building fires; RSET, and models commonly used in guidelines and regulations; different theories of human behavior in fire; representation of evacuation movement; basic assumptions behind evacuation models, including space representation, modeling methods, uncertainties, verification, and validation; main strengths and limitations of evacuation models; application of evacuation models to simulate evacuation

scenarios.

Unit III: Fire Dynamic Simulation Fundamental Processes

Physical concepts; fuel and combustion processes and fundamentals; limits of flammability; heat transfer: conduction and convection, and radiation; ignition and flame spread: radiation from fires, ignition in general, gaseous fuels, liquid fuels, and solids, and spread of flame; fire behavior and modern buildings.

Pool fires, jet fires, and cloud fires: steady burning diffusion fires; pool fires in the open; jet fires; radiation from flames; example calculations, including radiation flux from a flare on an escape route; pool and jet fires; large scale tests; cloud fires; pool and jet fires in a compartment.

Compartment fires: the growth period; flashover; the post flashover period; and back draughts; fire performance of structures; smoke movement; fire combustion products and toxicity as a function of ventilation conditions.

Compartment fire modelling: overview of fire models; a zone model in detail, CFAST; using CFD models; hands on experience with a zone model.

Reading List:

1. Performance – based fire safety design by Morgan J Hurley and Eric R. Rosenbaum (Published by CRC Press)
2. SFPE Engineering guide to Performance – based fire protection, 2nd Edition
3. CFAST of NIST USA
4. FDS of NIST USA

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where “3” indicates a high degree of relationship, “2” indicates a moderate degree of relationship, and “1” indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	2	1	1	1	1	2	1
CO2	2	2	2	3	2	1	1	1	2	2
CO3	2	3	2	2	3	2	1	2	1	2
CO4	1	2	2	2	2	1	1	3	3	2
AVG	**1.75**	**2**	**1.75**	**2.25**	**2**	**1.25**	**1**	**1.75**	**2**	**1.75**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Legal Framework for Disaster Management

Course Code: PGDF 110 **L - 2, Credits –2**

Course Outcome (COs)

CO1: Understand the key components of the institutional framework for disaster management, including the roles and responsibilities of various government agencies and organizations.

CO2: Analyze the legal frameworks governing disaster management at national, state, and local levels, including relevant laws, policies, and regulations.

CO3: Evaluate the effectiveness of current disaster management practices and identify areas for improvement within the institutional and legal context.

CO4: Develop strategies for enhancing collaboration among stakeholders in disaster management, emphasizing the importance of legal compliance and institutional coordination.

Course Content

Unit I: Disaster Management Framework in India

Constitution of India; Prime Minister Agenda of 10 Points; NPDRR; Disaster Management Act, 2005; Environment Protection Act, 1986; Section 135 of the Company Act, 2013; India, Corporate Social Responsibility; National Disaster Management Policy, 2009; National Disaster Management Plan, 2016; Judicial case studies related to disaster management.

Unit II: International Framework for Disaster Management

International initiatives by UN: UNDRR, ARISE, Yokohama Strategy, Hyogo Framework for Disaster Risk Reduction (2005 to 2013), Sendai Framework (2013 to 2030), Sustainable Development Goals, and COP21, Paris Agreement (2015); its scope, utility, and initiatives taken for DRR; Human rights and humanitarian laws.

Unit III: Role of National and International Agencies

National Disaster Management Authority (NDMA); disaster management framework at national, state, district, and local level; constitution of DDMAs, and roles and responsibilities; Armed Forces, CAPF, and State Police; Medical Services; Civil Defence; Home Guards; NCC; NYK; NSS; volunteers; and Fire Services; role of each stakeholder; UN agencies; IFRC and National Red Cross Society; role of NIDM, and a visit to NDMA, Delhi.

Unit IV: Disaster Management Framework in Select Countries

Institutional and legal framework in certain developed and developing countries, such as USA, Japan, Singapore, South Africa, and Bangladesh.

Reading List:

1. Arnold, M. and Kreimer, A. (2000) Managing Disaster Risk in Emerging Economies", Disaster Risk Management Series No. 2, World Bank, Washington, D.C.
2. Collins, L. R. and Schneid, T. D. (2000) Disaster Management and Preparedness, Taylor and Francis.
3. Disaster Management Act (2005).
4. Goel, S. L. and K. Ram (2001) Disaster Management, Deep and Deep Publications.
5. Hyogo Framework for Action (2005-2015).
6. National Disaster Management Plan (2016).
7. National Disaster Management Policy (2009).
8. Parasuraman, S. (2004) India Disaster Report: Towards a Policy Initiatives, Oxford University Press.
9. Sendai Framework for DRR (2015-2030).
10. UNISDR – ARISE (2015).
11. Vision, United Nations (2004).

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	1	1	1	1	1	1	1	2
CO2	2	3	2	1	1	1	1	2	1	2
CO3	2	2	2	2	2	1	1	2	2	2
CO4	1	2	2	2	1	1	1	3	3	3
AVG	**1.75**	**2.25**	**1.75**	**1.5**	**1.25**	**1**	**1**	**2**	**1.75**	**2.25**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Forensics

Course Code: PGDF 112 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Apply fundamental principles of fire dynamics and combustion to identify fire origin, cause, and development patterns.

CO2: Analyze fire scenes using systematic investigation methods, evidence collection techniques, and documentation practices.

CO3: Evaluate fire incident data, burn patterns, and material behavior to support scientifically sound fire investigation conclusions.

CO4: Develop comprehensive fire investigation reports incorporating technical findings, legal considerations, and professional ethics.

Course Content

Unit I
Introduction to Fire Forensic Science; Terminologies; Fire and Arson Investigation; etc.

Unit II
Understanding physics and chemistry of fire; fire ignition and fire dynamics; types of fires; methods of heat transfer; premixed and diffusion flames; and properties of building construction materials.

Unit III
Fire Development; Factors Affecting Fire Growth; Compartment Fires; fire spread; and Human Behaviour in fire.

Unit IV
Fire Analysis and Investigation; Evidence Collection and Preservation; Fundamentals of Fire Investigation; Examining and Securing the Fire Scene; Safety at the Fire Scene.

Unit V

Electrical Fire Investigation; Motor Vehicle Fire Investigation; Modern Laboratory Techniques Involved in the Analysis of Fire Debris Samples; Reporting; and Reconstructions.

Unit VI

Fire Investigation methodology; Role of Fire Investigator; Arson Motives and Pathology; Fire Problems and Precautions; Determining Origin and Cause; Eliminating Accidental Causes; Documenting the Fire Scene; Surveillance.

Reading List:

1. NFPA 921 Guide for Fire and Explosion Investigation 2014, Published by National Fire Protection Association, USA.
2. Fire Investigation published by HMSO publication UK
3. Kirks Fire Investigation
4. Forensic Fire Science Reconstruction, By David J Icove, John D DeHaan, Gerald a Haynes Published by Pearson/ Prentice Hall
5. Principal of Fire Behavior by James G Quintiere, Published by Delmer

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	1	2	1	1	2	1	1	1
CO2	2	2	2	2	1	1	3	2	1	1
CO3	2	2	2	3	1	1	3	2	1	1
CO4	1	2	2	2	1	1	2	3	2	1
AVG	**2**	**2**	**1.75**	**2.25**	**1**	**1**	**2.5**	**2**	**1.25**	**1**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Fire Safety, & Risk assessments of Industries

(ELECTIVE)

Course Code: PGDF 116 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Understand the concepts, objectives, and scope of industrial safety risk assessment and audit in various industrial sectors.

CO2: Identify industrial hazards and assess risks associated with processes, equipment, materials, and human activities.

CO3: Apply systematic risk assessment and audit methodologies to evaluate industrial safety performance and statutory compliance.

CO4: Prepare industrial safety risk assessment and audit reports with practical recommendations for risk reduction and safety improvement. National and International Statutory Provisions of Industrial Fire Safety and Risk Assessment.

Course Content

Unit I:
Introduction to industrial safety risk assessment and audit; definition, objectives, and purpose of risk assessment and safety audits; scope and significance of industrial safety audits; types of safety audits including internal, external, and statutory audits; role, responsibilities, and professional competencies of industrial safety auditors.

Unit II:
Identification of industrial hazards; classification of physical, chemical, mechanical, electrical, ergonomic, and organisational hazards; process-related and operational hazards; unsafe acts and unsafe conditions; techniques and tools for systematic hazard identification in industrial environments.

Unit III:
Industrial risk assessment and audit techniques; qualitative risk assessment methods; application of risk matrices and risk scoring systems; job safety analysis, process safety reviews, and task-based risk assessments; inspection procedures and verification of compliance with applicable safety standards and legal requirements.

Unit IV:
Audit documentation and reporting practices; preparation of industrial safety risk assessment and audit reports; classification, evaluation, and prioritisation of identified risks; formulation of corrective and preventive actions; follow-up audits, monitoring mechanisms, and continuous improvement of industrial safety management systems.

Reading List:

1. Introduction to Health and Safety at Work by Hughes & Ferrett (Routledge)
2. Industrial Safety and Risk Management by L.M. Deshmukh (Tata McGraw-Hill)
3. Safety Management Systems: Principles and Practice by J. Ridley & J. Channing (Butterworth-Heinemann)
4. ISO 45001: Occupational Health and Safety Management Systems – Requirements (International Organization for Standardization)
5. Factories Act, 1948 and Relevant State Factory Rules (Government of India)
6. IS Codes related to Industrial Safety and Risk Assessment (Bureau of Indian Standards, India)

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes
The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	1	1	1	1	1	1	1
CO2	2	2	2	3	2	1	1	1	1	1
CO3	2	3	3	3	3	2	1	2	1	2
CO4	1	2	3	2	3	2	1	3	2	2
AVG	**1.75**	**2.25**	**2.5**	**2.25**	**2.25**	**1.5**	**1**	**1.75**	**1.25**	**1.5**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Geoinformatics for Fire Risk Assessment

(ELECTIVE)

Course Code: PGDF 118 **L - 2, Credits - 2**

Course Outcomes (COs)

CO1: Apply fundamental concepts of geoinformatics, remote sensing, and GIS to collect, process, and visualize spatial data related to fire risk.

CO2: Analyze geospatial data on land use, topography, climate, and infrastructure to identify fire-prone areas and assess fire risk patterns.

CO3: Apply geospatial tools and technologies to develop fire risk maps, models, and decision-support outputs for planning and mitigation.

CO4: Evaluate the effectiveness of geoinformatics-based approaches in supporting fire risk management, emergency response, and resilience planning.

Course Content

Unit I: Introduction to Remote Sensing (RS)

Basics and principles of remote sensing; electromagnetic spectrum; resolution types; EMR interaction; spectral signatures of different objects; platforms and sensors; digital image processing (DIP) techniques; visual image interpretation tools and techniques.

Unit II: Geographic Information System (GIS)

Basics, principles, and components of GIS; spatial information and spatial data types; raster and vector based GIS data processing using regular and irregular tessellations; vector based GIS data processing and topology; spatial relations; spatial analysis; map projections and coordinate systems; types of Survey of India (SOI) topographical maps; numbering systems and interpretation of SOI topographical maps.

Unit III: Global Positioning Systems (GPS)

Basic principles of GPS; functions and positioning services; basic concepts of robots; robots available in the market; how they help control fire; basic concepts of drones; drones available in the market; how they help control fire.

Unit IV: Spatial Information Technologies and Disaster Management

Concepts of spatial information and spatial data; spatial data platforms for disaster information: government, private, and community sourced; spatial digital data collection and processing during pre disaster, during disaster, and post disaster phases; spatial information accessibility and authorization issues in disaster management; real time spatial data availability; requirements for emergencies.

Unit V: Applications

Geospatial urban planning and fire risk resilience: GIS based fire response planning; remote sensing for fire risk potential mapping; unmanned aerial vehicle (UAV) for 3 D based fire detection and monitoring; spatial decision support system (SDSS) for fire risk assessment and management: fire risk modeling; GIS based on site and off site plans; map creation for action plan, identification of risk, and planning needs.

Reading List:

1. Jenssen, Lucas L.F. and Grrit C. H. (2001) Principle of Remote Sensing. ITC Educational Text Book series 2. International Institute of Geo information Science and Earth Observation (ITC). Enschede.
2. Jensen, J. R. (2004) Introductory Digital Image Processing: A Remote Sensing Perspective Prentice Hall.
3. Jensen, J. R. (2009) Remote Sensing of the Environment: An Earth Resource Perspective, 2nd Edition, Dorling Kindersley.
4. Joseph and George. (2005) Fundamentals of Remote Sensing, 2nd Edition. University press India.

Mapping of Course Outcomes with Program outcomes and Program Specific Outcomes

The Table depicts the degree of relationship between course outcomes and the programme outcomes, where "3" indicates a high degree of relationship, "2" indicates a moderate degree of relationship, and "1" indicates a low degree of relationship between CO and PO.

Program Level Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	1	2	1	1	1	1	1	1
CO2	2	1	2	3	2	1	1	2	1	2
CO3	2	2	2	3	2	2	1	2	1	3
CO4	1	2	3	2	3	2	1	3	2	3
AVG	**1.75**	**1.5**	**2**	**2.5**	**2**	**1.5**	**1**	**2**	**1.25**	**2.25**

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Field Visits/ Presentation

Course Code: PGDF 152 **L - 0, Credits - 4**

The field visit and presentation should focus on the practical application of management concepts, theories, or techniques learned throughout the Post Graduate Diploma program. Students will visit organizations or institutions relevant to their area of study to observe real-world management practices and gather insights on specific organizational or social issues. During the presentation, students will summarize their field visit experiences, highlight key observations and connect them to theoretical frameworks. Students are expected to demonstrate critical thinking and practical understanding by articulating their findings and reflections. Upon completion, a detailed report summarizing the visit, methodology, observations, and conclusions will be submitted.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, NEW DELHI

POST-GRADUATE DIPLOMA IN FIRE AND INDUSTRIAL SAFETY

Dissertation

Course Code: PGDF 154 **L - 0, Credits - 6**

The dissertation should focus on applying management concepts, theories, or techniques acquired throughout the program to explore and address a specific organizational or social issue or challenge. Students may utilize either primary or secondary data sources for their research. Upon completion of the dissertation, students must submit a comprehensive report detailing their methodology, findings, and conclusions.