# ALAGAPPA UNIVERSITY

(Accredited with A+ Grade by NAAC (CGPA: 3.64) in the Third Cycle), Graded as Category-I University and granted autonomy by MHRD-UGC)

## DIRECTORATE OF COLLABORATIVE PROGRAMMES

# Diploma in Fire & Industrial Safety Management

Regulations and Syllabus

[For those who join the Course in July 2023 and after]

CHOICE BASED CREDIT SYSTEM

## GENERAL INSTRUCTIONS AND REGULATIONS

**Diploma in Fire and Industrial safety** conducted by Alagappa University, Karaikudi, Tamil Nadu through its Collaborative Institution. Applicable to all the candidates admitted from the academic year **2023**onwards.

1. **ELIGIBILITY:**

   A pass in the SSLC Examination conducted by the Government of Tamil Nadu, or an examination accepted as equivalent thereto by the Syndicate. Candidate for admission to **Diploma in Fire and Industrial Safety** shall be required to have passed qualifying examination.

2. **Admission:**
   Admission based on the marks in the qualifying examination.
3. **Duration of the course:**
   The course shall extend over a period of **One year** under Semester pattern

4. **Standard of Passing and Award of Division:**
   - **a.** Students shall have a minimum of 40% of total marks of the University examinations in each subject. The overall passing minimum is 40% both in external and aggregate of Continuous Internal Assessment and external in each subject.
   - **b.** The minimum marks for passing in each theory / Lab course shall be 40% of the marks prescribed for the paper / lab.
   - **c.** A candidate who secures 40% or more marks but less than 50% of the aggregate marks prescribed for three years taken together, shall be awarded **THIRD CLASS.**
   - **d.** A candidate who secures 50% or more marks but less than 60% of the aggregate marks prescribed for three years taken together, shall be awarded **SECOND CLASS.**
   - **e.** A candidate who secures 60% or more of the aggregate marks prescribed for three years taken together, shall be awarded **FIRST CLASS.**
   - **f.** The Practical / Project shall be assessed by the two examiners, by an internal examiner and an external examiner.
5. **Continuous internal Assessment:**
   a. Continuous Internal Assessment for each paper shall be by means of Written Tests, Assignments, Class tests and Seminars
   b. **25 marks** allotted for the Continuous Internal assessment is distributed for Written Test, Assignment, Class test and Seminars.
   c. One Internal Tests of 2 hours duration may be conducted during the semester for each course / subject and the best marks may be considered and one Model Examination will be conducted at the end of the semester prior to University examination. Students may be asked to submit at least five assignments in each subject. They should also participate in Seminars conducted for each subject and marks allocated accordingly.
   d. Conduct of the continuous internal assessment shall be the responsibility of the concerned faculty.
   e. The continuous internal assessment marks are to be submitted to the University at the end of every year.
   f. The valued answer papers/assignments should be given to the students after the valuation is over and they should be asked to check up and satisfy themselves about the marks they have scored.
   g. All mark lists and other records connected with the continuous internal assessments should be in the safe custody of the institution for at least one year after the assessment.
6. **Attendance:**

a. Students must have earned 75% of attendance in each course for appearing for the examination.
b. Students who have earned 74% to 70% of attendance to be applied for condonation in the prescribed form with the prescribed fee.

c. Students who have earned 69% to 60% of attendance to be applied for condonation in the prescribed form with the prescribed fee along with the medical certificate.
d. Students who have below 60% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme.

**7. Examination:**

Candidate must complete course duration to appear for the university examination. Examination will be conducted with concurrence of Controller of Examinations as per the Alagappa University regulations. **University may send the representatives as the observer during examinations.** University Examination will be held at the end of the each semester for duration of 3 hours for each subject. Certificate will be issued as per the AU regulations. **Hall ticket will be issued to the 1st year candidates and upon submission of the list of enrolled students along with the prescribed course fee subsequent 2nd and 3rd year hall tickets will be issued.**

8. **Miscellaneous**

a. Each student posses the prescribed text books for the subject and the workshop tools as required for theory and practical classes.
b. Each student is issued with an identity card by the University to identify his / her admission to the course
c. Students are provided library and internet facilities for development of their `studies.
d. Students are to maintain the record of practicals conducted in the respective laboratory in a separate Practical Record Book and the same will have to be presented for review by the University examiner.
e. Students who successful complete the course within the stipulated period will be awarded the degree by the University.
f. The Internship / Project (any other viva-voce) where external examiner is assigned from the university, there may be changes in the exam dates as per the availability of the External Examiner.

**9. Fee structure**

Course fee shall be as prescribed by the University and 50% of the course fee should be disbursed to University. Special fees and other fees shall be as prescribed by the Institution and the fees structure must intimated to the University. Course fees should be only by Demand draft / NEFT and AU has right to revise the fees accordingly.

| Pattern | Course Fee payment deadline |
|---|---|
| Semester | Fee must be paid before 10th September of the academic year |

**10. Other Regulations:**

Besides the above, the common regulation of the University shall also be applicable to this programme.

# DIPLOMA IN FIRE & INDUSTRIAL SAFETY MANAGEMENT

| Semester | Course Code | Title of the paper | T/P | Cr. | Hrs./ Week | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Int. | Ext. | Total |
| I | 50111 | Basics of Fire Safety | T | 4 | 5 | 25 | 75 | 100 |
| | 50112 | Construction Safety | T | 4 | 5 | 25 | 75 | 100 |
| | 50113 | Fire Fighting & Rescue operation Practical | P | 5 | 10 | 25 | 75 | 100 |
| | 50114 | Confined Space Entry, Working, Exit and Rescue Operation Practical | P | 5 | 10 | 25 | 75 | 100 |
| | | **TOTAL** | | **18** | **30** | **100** | **300** | **400** |
| II | 50121 | Hazard Identification, Risk Assessment and Risk Control | T | 4 | 5 | 25 | 75 | 100 |
| | 50122 | Safety Inspection and Audit | T | 4 | 5 | 25 | 75 | 100 |
| | 50123 | Work At Height Practical | P | 5 | 10 | 25 | 75 | 100 |
| | 50124 | Industrial Internship Course | I | 5 | 10 | 25 | 75 | 100 |
| | | | | **18** | **30** | **100** | **300** | **400** |
| | **TOTAL** | | | **36** | **60** | **200** | **600** | **800** |

| I -Semester | | | | | |
|---|---|---|---|---|---|
| **Course code50111** | **Core** | **Basics of Fire Safety** | **T** | **Credits:4** | **Hours:5** |
| **Objectives** | 1. To understand the basic theory of fire chemistry, the development of fire and its characteristics, and about different types of fire.<br>2. To study about the product of combustion and their characteristics.<br>3. Identify the purpose for head protection, why it's important, and how hardhats protect an employee's head<br>4. Understand employer and employee responsibilities for safety<br>5. Describe the Hierarchy of Control and the role of personal protective equipment (PPE) | | | | |
| **UNIT 1** | **INTRODUCTION OF BASICS SAFETY:**<br>Basics of Fire – Stage of Fire- Heat Transfer Methods- Identify The Ignition Source - Class of Fire, Fire Fighting Methods-Flash Point, And Auto Ignition Temperature-Fire Point-Bleve. Ppe- Introduction Safety, Hazards- Risk-Accident –Incident- Near Miss, Dangerous Occurrence –Basics of Ppe- Types of Ppe. | | | | |
| **UNIT 2** | **HEAD AND EYE PROTECTION PPE AND FIRE EXTINGUISHER**<br>Introduction of Head Protection –Hazards- Safety Helmet And Types –Parts And Construction of Safety Helmet- Care And Maintenance- Safety Glass And Goggles Differentiate – Potential Eye Hazards In Industry- Types of Goggles.Classification of Fire- Fire Extinguisher –Types of Fire Extinguisher-Water, Co2, Dcp, Foam, Halogenated Agent-Fire Extinguisher Operating Methods And Precaution Steps. | | | | |
| **UNIT 3** | **HAND AND LEG PROTECTION PPE AND SPRINKLER SYSTEMS**<br>Introduction Of Hand Protection-Injuries –Hazards-Emergency Measures-Prevention of Hand Injuries-Types of Hand Protection-Selection- Use And Care of Hand Protection-Leg Protection Important-Hazards-Protective Measures-Safety Shoe-Maintenance And Care. Water Based Sprinkler System- Sprinkler Heads-Wet Pipe System-Water Supply And Distribution-Piping And Valves –Water Flow Alarm – Dry Pipe System-Sprinkler System Inspection. | | | | |
| **UNIT 4** | **ALARM AND DETECTION SYSTEM AND SKIN PROTECTION**<br>Nfpa 72 Classification of Fire Alarm System-Power Supplies For Alarm System-Initiation Device-Basics Consideration For Installation-Types of Detectors- Heat Detector –Smoke Detector-Radiant Energy Sensing Detectors. Introduction of Skin Protections-Causes – Physical Hazards –Chemical Substances-Preventive Measure – Change Cloths often-Types Of Body Suit -Remove Irritant- Take Shower-Protective Crams. | | | | |
| **UNIT 5** | **RESPIRATORY PROTECTION AND SPECIAL WORKPLACE HAZARDS**<br>Introduction – Hazards – Oxygen Deficiency- Harmful Contaminants-Smoke And Fumes-Spray And Mists-Gases And Vapors-Respirators- Color Code Canister-Air Purifying Respirator-Self Contained Breathing Apparatus – Selection Use And Fit.<br>Flammable And Combustible Liquid –Storage And Transportation –Loading And Unloading-Hot Work. | | | | |

**References:**


NFPA Fire protection Handbook – 21st edition – NFPA - 2023

Principles of fire safety engineering – 2nd edition – Das Akhil kumar – PHL learning Pvt.Ltd – 2020.

Fire Officer – principles and practice – Michael J.Ward – NFPA – 2020.

Head, Eye, and Face Personal Protective Equipment New Trends, Practice and Applications -

| | | |
|---|---|---|
| Katarzyna Majchrzycka - CRC Press – 2023.<br>Personal Protective Equipment – OSHA – 2023. | | |
| **Web Resources:** | | |
| Related online content (MOOC, Swayam,NPTEL, Website etc.) | | |
| https://onlinecourses.nptel.ac.in/noc20_mg43/preview | | |
| https://archive.nptel.ac.in/courses/110/105/110105094/ | | |
| **Course outcomes** | | |
| CO – 1 | To Formulate the water requirement and the pump capacity for fire fighting and understand the basic fire ground operations. | K6 |
| CO – 2 | To Classify different types of fire protection systems/ installations in oil and gas industry. | K2 |
| CO – 3 | To identify the cost associated with PPE and describe the advantages and disadvantages of PPE and engineering controls | K3 |
| CO – 4 | To Describe the evaluation process of determining a successful PPE program | K1 |
| CO – 5 | To Define the role of PPE in training and education | K1 |

| I -Semester | | | | |
|---|---|---|---|---|
| **Course code: 50112** | **Construction Safety** | **T** | **Credits:4** | **Hours:5** |

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|---|---|
| **Objectives** | 1. To know causes of accidents related to construction activities and human factors associated withthese accidents.<br>2. To understand the construction regulations and quality assurance in construction.<br>3. To have the knowledge in hazards of construction and their prevention methods.<br>4. To know the working principles of various construction machinery.<br>5. To gain knowledge in health hazards and safety in demolition work. |
| **UNIT 1** | **ACCIDENTS CAUSES AND MANAGEMENT SYSTEMS**<br>Problems Impeding Safety In Construction Industry- Causes of Fatal Accidents, Types And Causes of Accidents Related To Various Construction Activities, Human Factors Associated With These Accident –Construction Regulations, Contractual Clauses – Pre Contract Activates, Preconstruction Meeting -Design Aids For Safe Construction – Permits To Work – Quality Assurance In Construction - Compensation– Education And Training |
| **UNIT 2** | **HAZARDS OF CONSTRUCTION AND PREVENTION**<br>Excavations, Basement And Wide Excavation, Trenches, Shafts – Scaffolding , Types, Causes of Accidents, Scaffold Inspection Checklist – False Work – Erection of Structural Frame Work, Dismantling –Tunneling – Blasting, Pre Blast And Post Blast Inspection – Confined Spaces – Working on Contaminated Sites – Work over Water - Road Works – Power Plant Constructions – Construction of High Rise Buildings. |
| **UNIT 3** | **WORKING AT HEIGHTS**<br>Fall Protection In Construction Osha 3146 – Osha Requirement For Working At Heights, Safe Access And Egress – Safe Use of Ladders- Scaffoldings , Requirement For Safe Work Platforms, Stairways, Gangways And Ramps – Fall Prevention And Fall Protection , Safety Belts, Safety Nets, Fall Arrestors, Controlled Access Zones, Safety Monitoring Systems – Working on Fragile Roofs, Work Permit Systems, Height Pass – Accident Case Studies. |
| **UNIT 4** | **CONSTRUCTION MACHINERY**<br>Selection, Operation, Inspection And Testing of Hoisting Cranes, Mobile Cranes, Tower Cranes, Crane Inspection Checklist - Builder's Hoist, Winches, Chain Pulley Blocks – Use of Conveyors – Concrete Mixers, Concrete Vibrators – Safety In Earth Moving Equipment, Excavators, Dozers, Loaders, Dumpers, Motor Grader, Concrete Pumps, Welding Machines, Use of Portable Electrical Tools, Drills, Grinding Tools, Manual Handling Scaffolding, Hoisting Cranes – Use of Conveyors And Mobile Cranes – Manual Handling. |
| **UNIT 5** | **SAFETY IN DEMOLITION WORK**<br>Safety In Demolition Work, Manual, Mechanical, Using Explosive - Keys To Safe Demolition, Pre Survey Inspection, Method Statement, Site Supervision, Safe Clearance Zone, Health Hazards From Demolition- Indian Standard - Trusses, Girders And Beams – First Aid – Fire Hazards And Preventing Methods –Interesting Experiences At The Construction Site Against The Fire Accidents |

**References: -**


The Construction Technology Handbook - Hugh Seaton – Wiley – 2021.
Construction Project Manager's Pocket Book - Duncan Cartlidge – Routledge publication – 2020.
Construction Safety: Industrial Safety and Environment - S.Suresh Raja - Kindle Edition – 2018.
Introduction to Health and Safety in Construction – Phil Hughes – NEBOSH – 2003.
(3146) Fall Protection in Construction – OSHA – 2015.

| | | |
|---|---|---|
| **Web resources:**<br>Related online content (MOOC, Swayam,NPTEL, Website etc.)<br>https://onlinecourses.nptel.ac.in/noc20_mg43/preview<br>https://archive.nptel.ac.in/courses/110/105/110105094/ | | |
| **Course outcomes** | | |
| CO-1 | To Recall the problems impeding safety in construction industries. | K1 |
| CO-2 | To Summaries the types and causes of accidents, and designing aids for safe construction. | K2 |
| CO-3 | To Categories the hazards during construction of power plant, road works and high rise buildings. | K4 |
| CO-4 | To Interpret construction regulations and Indian standards for construction and demolition work. | K5 |
| CO-5 | To Elaborate the safety procedure for working at heights during construction. | K6 |

| I -Semester | | | | |
|---|---|---|---|---|
| **Course code: 50113** | **FIRE FIGHTING & RESCUE OPERATION** | **P** | **Credits:5** | **Hours:10** |

**OBJECTIVES**

1. To Impart the Fire Fighting & Emergency response to the students
2. To Express the Evacuating procedure and emergency response procedures

**EXPERIMENTS**

1. Identification of classes of fire.
2. Learning the methods of fire fighting.
3. Identification of appropriate fire extinguishers.
4. Evacuating workforce by means of emergency siren/alarm.
5. Steps for emergency planning and preparedness.
6. Emergency response team and their response.
7. Headcount procedures.
8. Fire mock drill & rescue operation.
9. Different types of sirens and siren coding.
10. Debriefing and resuming operations.

**REQUIREMENTS**

1. All type of Fire extinguishers
2. Emergency Services
3. Suitable water and sand buckets
4. All other required safety equipments for fire demo
5. Provision of Windsock

**OUTCOMES**

The students will be able to

- To Identify the Fire classifications and fire fighting methods.
- To Practice Fire Rescue and evacuation methods with ERP procedures
- To Operate fire mock drill with Headcount arrangements
- To classify Siren codings and simplify resuming operations.

| I -Semester | | | | | |
|---|---|---|---|---|---|
| **Course code: 50114** | **Core** | **CONFINED SPACE ENTRY, WORKING, EXIT & RESCUE OPERATION** | **P** | **Credits:5** | **Hours:10** |

**OBJECTIVES:**

1. To know about the Confined space characteristics and its hazards.
2. To expert in rescue operation.
3. To create awareness about the confined space related hazards to the students.

**EXPERIMENTS:**

1. Practice on gas detecting / testing and other inspection of toxic gases.
2. Practice on entry into confined space and rescue operation.
3. Practice on work permit system for confined space entry.
4. Purging/cleaning/removing of toxic gases or any other flammable gases.
5. Direct supervision of confined space attendant / hole watcher.

**REQUIREMENTS:**

1. Portable Gas tester.
2. Proper safety sign boards.
3. Suitable fire extinguisher.
4. First aid box.
5. Emergency escape breathing apparatus.
6. Required PPE.

**OUTCOMES:**

The students will be able to

- To Operate gas detecting and testing for inspection of toxic gases
- To Assess Entry and rescue operation in confined space
- To Evaluate work permit system for confined space entry
- To Priorities Cleaning and removing of toxic and flammable gases
- To describe about direct supervision of confined space to Hole watcher and Confined space attendant.

<table>
<tr><th colspan="6">II-Semester</th></tr>
<tr><td>Course code: 50121</td><td>Core</td><td>Hazard identification, Risk Assessment and Risk Control</td><td>T</td><td>Credits: 4</td><td>Hours:5</td></tr>
<tr><td>Objectives</td><td colspan="5">1. To Describe fundamentals of Hazard and risk with Human error analysis<br>2. To Express Risk analysis with Root cause analysis methods and Cost benefit analysis<br>3. To Evaluate HAZOP studies with its methodologies<br>4. To Prioritize Hazard Identification & Risk Assessment with Qualitative and Quantitative site assessment<br>5. To Develop credibility of risk assessment techniques through Past accident analysis</td></tr>
<tr><td>UNIT 1</td><td colspan="5">FUNDAMENTALS OF HAZARD, RISK<br>Introduction- Hazard & Risk-Risk Register-Checklist-Hazard Characterization-Horseplay-Hazardous Event- Unsafe Act-Unsafe Condition Preliminary Hazard Analysis-Alarp- Concept of Alarp and its Application in Risk Assessment -Safety Warning System-Human Error Analysis</td></tr>
<tr><td>UNIT 2</td><td colspan="5">RISK ANALYSIS METHODS<br>Risk Analysis-What is Risk Identification-What is Risk Analysis-Benefits of Risk Analysis-Risk Analysis Process-Root Cause Analysis. Job Safety Analysis-Risk-Benefit and Cost-Benefit Analysis.</td></tr>
<tr><td>UNIT 3</td><td colspan="5">SAFETY MANAGEMENT TOOLS<br>Hazard and Operability Studies (Hazop)- Hazop Methodology-Hazard Analysis (Hazan)-Fault Tree Analysis (FTA)-Event Tree Analysis (ETA)-Failure Mode &Effect Analysis (FMEA)- FMEA Methodology-Types of FMEA -When To Use FMEA – FMEA Procedure-Steps-Risk Priority Number-Control Measure Of FMEA.</td></tr>
<tr><td>UNIT 4</td><td colspan="5">HAZARD IDENTIFICATION & RISK ASSESSMENT<br>HIRA- Objectives Of HIRA Study-Principles of Risk Assessment Steps Involved in Hazard Identification and Risk Assessment- Identification of The Hazard- Risk Analysis- Evaluation of Hazard and Risk –Risk Matrix-Risk Control Method-Preventive Measure- Control Measure-Reporting-Implementation &Monitoring-Reviewing-Types of Risk Assessment-Quantitative and Qualitative Risk Assessment-Specific Site Assessment.</td></tr>
<tr><td>UNIT 5</td><td colspan="5">CREDIBILITY OF RISK ASSESSMENT TECHNIQUES<br>Past Accident Analysis as Information Sources For Hazard Analysis and Consequences Analysis of Chemical Accident, Mexico Disaster, Flixborough, Bhopal, Seveso, Pasadena, Feyzin Disaster (1966), Port Hudson Disaster-Convey Report.</td></tr>
<tr><td colspan="6"><u>References</u><br>Risk Assessment: Theory, Methods, and Applications - Marvin Rausand, Stein Haugen – Wiley – 2020.<br>A New Approach to HAZOP of Complex Chemical Processes - Fabienne-Fariba Salimi& others - Kindle Edition – 2023.<br>The HAZOP Leader's Handbook: How to Plan and Conduct Successful HAZOP Studies - Philip K Eames – Elsevier – 2022.<br>A Practical Approach to Hazard Identification for Operations and Maintenance Workers - Wiley – 2010.</td></tr>
<tr><td colspan="6"><u>Web resources: -</u><br>Related online content (MOOC, Swayam,NPTEL, Website etc.)<br>https://onlinecourses.nptel.ac.in/noc20_mg43/preview<br>https://archive.nptel.ac.in/courses/110/105/110105094/</td></tr>
</table>

| **Course outcomes** | | |
|---|---|---|
| CO-1 | To Recall Fundamentals of Hazard and Risk with concept of ALARP | K1 |
| CO-2 | To Illustrate Risk analysis methods with Risk Identification | K2 |
| CO-3 | To Interpret Safety Management tools with HAZOP | K4 |
| CO-4 | To Justify HIRA with Risk Matrix and Risk Control Methods | K5 |
| CO-5 | To Elaborate credibility of Risk Assessment Techniques | K6 |

| II-Semester | | | | | |
|---|---|---|---|---|---|
| **Course code: 50122** | **Core** | **Safety Inspection and audit** | **T** | **Credits:4** | **Hours: 5** |
| **Objectives** | 1. To achieve understanding of safety inspection and audit<br>2. To enable students to conduct safety audit and write audit report effectively in auditing situation<br>3. The course could provide basic knowledge of OHSMS and EMS<br>4. To educate about the various steps to be taken for certification of ISO 14001(EMS)<br>5. To impart knowledge on environmental impact assessment, life cycle assessment of product and principles of eco labeling | | | | |
| **UNIT 1** | **SAFETY INSPECTION**<br>Importance of Workplace Inspection- Planning of Workplace Inspection- Purpose of Workplace Inspection- Hazards in Workplace- Information's Required in Workplace- Inspection Report- Inspection Team- Duration of Inspection - Frequency of Inspection - Follow Up & Monitoring - Summary | | | | |
| **UNIT 2** | **SAFETY AUDIT**<br>Introduction Types of Audits- Audit Objectives- Methodology to Conduct Safety Audit- Pre Audit Activities - Background Information to be Gathered -Data to be Gathered - On Site Activities - Understanding Management Systems- Assessing Strengths & Weaknesses - Collecting Audit Evidence - Interviewing – Observation- Evaluating Audit Evidence -Reporting Audit Findings - Post Audit Activities. | | | | |
| **UNIT 3** | **OH & S MANAGEMENT SYSTEM STANDARD**<br>Introduction To ISO 45001 – Development of Various OHSMS Standards – Aim of OH & S Management System–Success Factors– Plan Do Check Act Cycle- Contents and Scope of ISO 45001-Terms and Definitions –Leadership and Worker Participation –Leadership and Commitment - OH & S policy- Organizational Roles and Responsibilities and Authorities – Consultation and Participation of Workers | | | | |
| **UNIT 4** | **ISO 14001**<br>EMS, ISO 14001, Specifications, Objectives, Environmental Policy, Guidelines and Principles (Iso 14004), Clauses 4.1 To 4.5. Documentation Requirements, 3 Levels of Documentation for a ISO 14000 Based EMS, Steps In ISO 14001 | | | | |
| **UNIT 5** | **ENVIRONMENT IMPACT ASSESSMENT**<br>ISO 14040(LCA), General Principles Of LCA, Stages Of LCA, Report And Review. ISO 14020 (Eco Labeling) – History, 14021, 14024, Type I Labels, Type II Labels, ISO 14024, Principles, Rules for Eco Labeling Before Company Attempts For It. Advantages. EIA In EMS, Types of EIA, EIA Methodology EIS, Scope, Benefits. | | | | |

**References**

Safety, Health and Environmental Auditing APractical Guide, Second Edition - Simon Watson Pain – CRC press – 2023.
ISO 45001:2018 Occupational Health & Safety Management System- Ramesh Lakhe – 2018.
ISO 14001:2015 Environmental Management Systems - EMS CheckList - Marius Hauta – 2023.
A Handbook Of Environment Impact Assessment - V.S. Kulkarni , S.N. Kaul & R.K. Trivedy - Scientific Publishers – 2023.

**Web Resources**

Related online content (MOOC, Swayam,NPTEL, Website etc.)
https://onlinecourses.nptel.ac.in/noc20_mg43/preview
https://archive.nptel.ac.in/courses/110/105/110105094/

| **Course outcomes** | | |
|---|---|---|
| CO-1 | To recall basic safety audit and prepare a report for safety audit | K1 |
| CO-2 | To Illustrate safety inspection and prepare a report for safety inspection | K2 |
| CO-3 | To interpret various standards for maintaining OHSMS | K4 |
| CO-4 | To Justify ISO 14001standards on Safety audit and inspection | K5 |
| CO-5 | To Discuss EIA and ecosystem development | K6 |

| II -Semester | | | | | |
|---|---|---|---|---|---|
| **Course code: 50123** | **Core** | **WORK AT HEIGHT PRACTICAL** | **P** | **Credits: 5** | **Hours: 10** |

**OBJECTIVES:**

1. To Provide Safety in Work at Height to students
2. To Impart PTW for Work height with illustrations to students.

**EXPERIMENTS:**

1. 100% tied off procedure.
2. 3 point anchorage while ascending and descending.
3. Wearing the full body harness with double lanyard.
4. Using method of vertical / horizontal lifeline.
5. Training on the use of fall arrestor – rope grab and retractable.
6. Using the safety net for man falling and material handling.
7. Inspection of all fall protection equipments.
8. Learning of technical data about fall protectors.

**REQUIREMENTS:**

1. Fall protection harness with double lanyard.
2. Rope grab.
3. Vertical / horizontal lifeline.
4. Fall arrestor – retractable.
5. Safety net and Debris net.
6. Mobile ladders.
7. All other training and safety required equipments.

**OUTCOMES:**

The students will be able to

- To Illustrate tie off procedure and anchorage ascending and descending methods
- To Interpret the full body harness and method of vertical / horizontal lifeline
- To Priorities use of fall arrestor and safety net
- To Justify technical data's on Fall arrestors and Fall protection equipments