

**CURRICULUM AND EXAMINATION RULES OF DIPLOMA IN INDUSTRIAL SAFETY
& ENVIRONMENTAL MANAGEMENT**

1st semester Diploma in Industrial Safety & Environmental Management

Paper name	Credit Hrs/week	Hrs/semester Semester = 16 weeks	Marks (Pass marks 50%)
Environment and Safety Philosophy	3	48	100
Appraisal, Analysis, Inspection and Control Procedures	3	48	100
Safety Engineering I	3	48	100
Pollution Sources and Measurements	3	48	100
Sessional 1 Safety Engineering, Fire Laboratory and First Aid Practical	10 days continuously 3 hrs per day	30	100
Total	12 (theoretical papers only)	222	500

2nd semester Diploma in Industrial Safety & Environmental Management

Paper name	Credit Hrs/week	Hrs/semester Semester = 16 weeks	Marks (Pass marks 50%)
Safety Engineering II	3	48	100
Fire Engineering and Explosion Control	3	48	100
Industrial Hygiene and Occupational Health	3	48	100
Pollution Control Strategies	3	48	100
Sessional 2 Environmental Analysis	10 days continuously 3 hrs per day	30	100
Total	12 (theoretical papers only)	222	500

3rd semester Diploma in Industrial Safety & Environmental Management

Paper name	Credit Hrs/week	Hrs/semester Semester = 16 weeks	Marks (Pass marks 50%)
Environmental Impact Assessment	3	48	100
Project	Minimum three weeks duration	Minimum three weeks duration	200 (100 for work and 100 for thesis and performance in viva-voce)
Sessional 3 Seminar			100
Sessional 4 Industrial Hygiene and Occupational Health Laboratory	10 days continuously 3 hrs per day		100
Total	3 (theoretical papers only)	48	500

Grand total = 1500 marks

EXAMINATION RULES

The following examination fees are fixed and should be paid before appearing in the theoretical papers:

Semester examination fee	Rs. 500/-
Grade Card	Rs. 500/-
Repeat examination fee	Rs. 500/- (for students who may fail in one or more theoretical papers)
Certificate fee	Rs. 100/-

1. The diploma course will be of three semesters duration and semester examination system.
2. A student has to pass each theoretical subject, sessionals **within three consecutive academic sessions** from his/her admission to the course. A student will be promoted to the next semester irrespective of his/her performance in theoretical subjects provided he/she has passed the sessionals in that semester. A student will be ineligible to appear in the semester examination, if he/she fails to pass the sessionals in that semester. In such cases he/she will have to take readmission in that particular semester paying full fees for that semester.
3. Pass marks will be 50% in each subject (theoretical or sessional).
4. Minimum 70% attendance is necessary for appearing in the examination. However appeals for waivers will be heard by the Coordination Committee.
5. A student will have to appear in all theoretical papers taken by him/her at a regular semester examination to be held at the end of the semester.
6. The diploma will be awarded to the candidate on successful completion of all semester examinations (theoretical and sessionals).
7. **There will no separate repeat examinations.** Any student who has failed in one or more papers must appear for those specific papers with the junior batch in the following session. Preparatory classes or specific guidance will be given to unsuccessful students to rectify their deficiencies.
8. A student who is successful in all the papers (theoretical and sessional) in one attempt will be considered for a merit position and he/she who is successful in multiple attempts will be considered as "pass" without any merit position.

9. Candidates securing 65% or more of aggregate marks in the total number of papers (including sessionals) will be declared to have passed in First Class and other successful candidates securing less than 65% marks will be placed in the Second class.
10. All students will have to appear in written examinations in each semester conducted by the Controller of Examinations, Jadavpur University and the venue of the theoretical and sessional examinations will be decided upon by the Controller of Examinations, Jadavpur University.
11. Controller of Examination on the recommendation from the Coordinator, Diploma in Industrial Safety & Environmental Management will appoint the paper setters as well as examiners of the answer scripts. The paper setters and examiners may be internal or external members.
12. The students' performance will be indicated as grade points and credit hours and Cumulative Grade Point Average (CGPA) in both the semesters' grade cards and the total percentage of marks and class will be additionally mentioned in the third (final) semester's grade card.

Classification of grades

<i>% marks obtained</i>	<i>Performance</i>	<i>Grade</i>	<i>Grade Points</i>
90 and above	Outstanding	S	10
80 to 89	Excellent	A	9
70 to 79	Very Good	B	8
60 to 69	Good	C	7
50 to 59	Fair	D	6
Less than 50	Fail	X	0

SYLLABUS OF DIPLOMA IN INDUSTRIAL SAFETY & ENVIRONMENTAL MANAGEMENT

**(IN COLLABORATION WITH M/S NUVOCO VISTAS CORP. LTD., FORMERLY
LAFARGE INDIA LTD.)**

FIRST SEMESTER

Paper 1

ENVIRONMENT AND SAFETY PHILOSOPHY

Ethics of environmental conservation: Need for conservation and concept of sustainable development

Environmental Policy and Laws: Environmental policy issues and Planning – Corporate Environmental Policies – Provisions of Environment (Protection) Act 1986 and Rules, Factories Act and Rules, Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and control of pollution) act 1981, Public Liability Insurance Act 1991 – Coastal Regulation Zone (CRZ) Notification.

Safety Laws: Provisions of Factories Act and Rules, Employees State Insurance Act. Safety Philosophy: Physical, Physiological and Psychological Factors of Safety – Safety Organization – Safety Education and Training – Employees Participation in Safety – Economics of Safety – Behavioral Safety.

Principles of Accident Prevention. Measurement of safety performance

Key elements of Safety Management system (ISO 14001, OHSAS 18001 etc.). ILO Legislations – Convention and Recommendation concerning Safety, Health and Environment – Safety, Health and Environment as Human Right Issue.

Relevant provisions of the constitution of India for protection and improvement of environment, Responsibility of the State (48A), Fundamental Duties (51A), Responsibility of Panchayet (243G), Responsibility of Municipalities (243W).

Paper 2

APPRAISAL, ANALYSIS, INSPECTION AND CONTROL PROCEDURES

Laws and Regulation: Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000, Chemical Accidents (Emergency Preparedness, Planning and Response) Rules 1986, Hazardous Waste (Management, Handling and Trans boundary Movement) Rules 2008.

Hazards and Risks: Understanding of Hazards and Risks – Risk Assessment Techniques – Accident Investigation Reporting and Analysis Techniques – Measurement and Control of Performances. Hazard analysis techniques and measurements.

Major Accident Hazard Control: Conception of Major Accident Hazard – Evaluation of major hazards – Onsite and Offsite Emergency Planning – Case Studies.

Importance of Disaster Management: Concept – Emergency preparedness at local level – Contingency Plans – Emergency planning and preparedness in international standards like ISO 14001, OHSA's 18001 and OSHA's Process Safety Management System.

Paper 3

SAFETY ENGINEERING - I

Laws and Regulations – Relevant Provisions of Factories Act and Rules, Indian Electricity Act and Rules, Explosive Act and Rules, Gas Cylinders Rules.

Housekeeping – Concept of 5S and its significance.

Safety in Workplace – Plant / Work area Design – Hand tools and Portable power tools – Manual and Mechanical Material Handling – Ergonomics – Machine Guarding – Storage of Materials.

Electrical Safety – Safety in Electricity Industry – Types of Electrical Hazards – Energy Isolation – Industrial Illumination.

Special Precautions – Working at Height – Working in Confined Spaces – Work Permits for Working at Height and Working in Confined Spaces.

Paper 4

POLLUTION SOURCES AND MEASUREMENTS

Pollutants – Air pollutants – Measurement of air pollutants

Water and soil pollutants – Pathogens. Solid wastes.

Noise Pollution Measurements – Community Noise Sources and Industrial Noise Sources – Noise Pollution Measurements.

Measurement of water/soil pollutants – Physical, Chemical and Biological Determinations.

SESSIONAL 1

SAFETY ENGINEERING, FIRE LABORATORY AND FIRST AID PRACTICAL

Measurement of illumination level, assessment of heat stress in work environment, measurement of the number of air changes, measurement of sound levels, determination of concentration of inflammable vapors, determination of fire load, types and uses of different types of fire canisters, fire hose and fire truck, measurement of vibrations of machines and equipment, continuity test for electrical circuits, earthing continuity test, measurement of insulation resistance.

First Aid: In Consultation with St. John Ambulance.

SECOND SEMESTER

Paper 1

SAFETY ENGINEERING – II

Safety in Engineering Industry – Introduction – Safety in Operations of Hazardous Machines – Safety in welding and gas cutting – Safety in cold forming and hot working of metals – Work Permits for hot Work and Cold Work – Safety of Pressure vessels – Safety in inspection and testing – Safety in radiography.

Laws and Regulations – Relevant Provisions of Factories Act and Rules, Static and Mobile Pressure Vessels (Unfired) Rule.

Safety in Construction Industry – Scope of safety in construction – Safety in Construction and Demolition Operation – Safety in use of construction machineries and equipments – Safety in special Construction Operations – Prevention of falls of persons – Precautions from falling of materials.

Laws and Regulations – Relevant Provisions of Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act and Rules – National Building Codes.

Safety in Chemical Industries – Introduction – Bulk / Isolated storage – Pipeline Safety – Chemical Reaction, Processes and its Hazards – Safety maintenance in Chemical Plants – Hazardous Operation Control Mechanism – Case studies.

Laws and Regulations – Relevant Provisions of Factories Act and Rules.

Paper 2

FIRE ENGINEERING AND EXPLOSION CONTROL

Fire – Introduction – Fire Chemistry and its Physics – Fire Engineering – Theories of Fire – Fire Protection, Prevention and Control – Fire Design – Fire load.

Explosion – Theories of Explosion – Types of Explosions – Explosion Protection, Prevention and Control.

Laws and Regulations – Relevant Provisions of Factories Act and Rules – Explosive Act and Rules–Petroleum Act and Petroleum (Amendment) Rules – Calcium Carbide Rule.

Paper 3

INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

Industrial Hygiene – Concepts – Physical, Chemical and biological Hazards – Industrial Physiology –Ventilation and Heat – Noise and Vibration.

Occupational Health – Concepts – Occupational Health Services.

Personal Protective Equipment – Types and uses.

ILO Legislations – Convention and Recommendation concerning Occupational Health and Safety –Trade Policy affecting Occupational Health and Safety.

Paper 4

POLLUTION CONTROL STRATEGIES

Water Pollution Control Strategies – Domestic Wastewater: Physical Unit Operations – Chemical Unit Processes – Fundamentals of Biological Treatment – Suspended Growth Biological Treatment Processes – Attached Growth Treatment Processes – Disinfection Process – Industrial Wastewater: Concepts of Remediation Technologies – Remediation Approaches for Different Chemical Contaminants – Tertiary Treatment Technologies.

Air and Noise Pollution Control Strategies – Methods for Particulate Control – Minimization of gaseous Emissions – Emission Reduction in Industries – Desulphurization – Nitrogen Oxide Reduction.

Noise pollution control strategies – Control of Noise Source by Design – Noise Control in Transmission Path – Noise control by Redress – Protection of receiver.

Land and Sea Pollution Control Strategies – Concept of Bioavailability – Recalcitrant Molecules – In-Situ and ex-Situ Soil Remediation Technologies.

Solid waste management – Solid waste generation – On-site Handling, Storage and Processing – Collection of Solid Wastes – Processing Techniques – Land Filling Operations – Hazardous Wastes Management.

Marine and coastal pollution control strategies – Marine and Coastal Water Characteristics – Coastal Zone Management – Mechanics of Pollutant Transport – Physical Operations for Pollutant Removal. Bioremediation Approaches.

SESSIONAL 2

ENVIRONMENTAL ANALYSIS

Laboratory work related to 1st Semester Paper 4 (Measurement of Pollution).

THIRD SEMESTER

Paper 1

ENVIRONMENTAL IMPACT ASSESSMENT

Introduction to EIA – Relation between Development and Environment – Sustainable Development and Carrying Capacity – Origin and Development of EIA – Legal Aspect – Objective of EIA – General Methodology-Guidelines in India – Baseline Studies and Monitoring – Rapid and Comprehensive EIA –Public Participation – Identification and Prediction of Impact – Use of Various Models – Mitigation Measures – EMP – Case studies.

PROJECT

Training in industries for at least three weeks. Project report should be submitted, followed by a presentation before external examiners

SESSIONAL 3

SEMINAR

Presentation based on industry visit and case studies related to safety, occupational health and environment. Students should submit a written report.

SESSIONAL 4

INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH LABORATORY

Demonstration and calibration of air sampling equipment, sampling and estimation of gasses in work environment, sampling and estimation of solvent vapors in work environment, sampling and estimation of dust gravimetric method

Lung function test, ear testing on audiometer, study of notifiable diseases by use of models, demonstration of personal protective equipment.

**ELIGIBILITY CRITERIA AND OTHER DETAILS FOR 3-SEMESTER DIPLOMA IN
INDUSTRIAL SAFETY AND ENVIRONMENTAL MANAGEMENT**

**(IN COLLABORATION WITH M/S NUVOCO VISTAS CORP. LTD. FORMERLY
LAFARGE INDIA PVT. LTD.)**

Eligibility: B.Sc from any recognized university approved by UGC with Physics, Chemistry and Mathematics or equivalent to previously mentioned degree.

B.E. / B. Tech (any engineering discipline) or B. Arch / B. Pharm approved by AICTE or equivalent to all previously mentioned degrees.

Diploma in any engineering discipline except Information Technology and Computer Science awarded by the State Council / State Board of concerned state and approved by AICTE or equivalent to all previously mentioned diploma.

Successful students who has passed the course approved by the State Council, West Bengal for Junior Safety officer. However, students having arts and commerce backgrounds will not be eligible.

Those appearing in the final examination are eligible to apply but they must produce their final mark sheet within three months from the date of commencement of classes or date of admission, whichever is later. Otherwise their candidature will stand cancelled.

Students will be admitted through a written admission test, the syllabus of which will be based on the common courses taught in the degree courses mentioned in the eligibility criteria. Students who are successful in the written examination will appear in an interview.

Intake: Total intake is 30 (including general and industry sponsored candidates). Industry sponsored candidates will be given preference.

Duration: Three Semesters, Six months for each semester).

Timing and venue: Classes will be held from 6.00 p.m. to 9 p.m. (four days a week) at School of Environmental Studies; Jadavpur University Main Campus. All factory visits and laboratory classes will be held during daytime.

Fees: Fees for 3-semester course is Rs.50, 000/- (plus GST) to be paid in two installments: Rs.30, 000/- (plus GST) is to be paid at the time of admission and the rest is to be paid at the beginning of the 2nd Semester. For industry sponsored candidates the fees for 3-Semester course is Rs. 60,000/- (plus GST); to be paid in one installment: at the time of admission as total tuition fee.

In addition, each student has to pay his/her examination fees as per the university rules.