DIRECTORATE OF DISTANCE EDUCATION
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR
COURSE CURRICULUM
FOR

POST-GRADUATE DIPLOMA IN INDUSTRIAL SAFETY MANAGEMENT

COURSE SCHEME
Pass Marks   **40% in each paper**

Paper Code	Nomenclature of Paper		Max Marks		Total
			External	Internal*	
PGDISM-01	Principles of Industrial Safety		70	30	100
PGDISM-02	Industrial Toxicology, Environment Pollution and Occupational Health		70	30	100
PGDISM-03	Industrial Hazards and Accidents		70	30	100
PGDISM-04	Safety Management and Organization		70	30	100
PGDISM-05	Safety Statistics and Accidents Inspection		70	30	100
PGDISM-06	Safety Legislation and Codes and Workmen's Compensation Pertaining to Factory, Boilers and Their Administration		70	30	100
PGDISM-07	Computer Applications	Theory	35	15	100
		Practical	50	-	
PGDISM-08	Dissertation on Field Work		100		100
PGDISM-09	Comprehensive Viva-Voce		100		100
Total			705	195	900

Note:
1. **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.**

2. **30% of the maximum marks are allocated for internal assessment in each theory paper based on two assignments (handwritten) of 15% marks each.**

PGDISM-01 PRINCIPLES OF INDUSTRIAL SAFETY

Total Marks – 100   **External -70; Internal -30**
                                                          Duration – 3 hrs.

1.   (a)   Concept, Need and importance of Industrial safety.
      (b)   Philosophy of accident prevention, safety – yesterday, today and tomorrow.

      (c)   Meaning, objectives and importance of ergonomics-fitting men with machines
             and machines with men-human activities and control-work- place designs and
             physical environment.

2.   Causes of Industrial accidents –unsafe acts and conditions – multiple causation
      vs.Facts.
3.   Cost and consequence of accident-types of economic losses-injuries and fatalities.
4.   Safety and Productivity
5.   Welfare and Safety
6.   Safety Movements in some industrially advanced countries-Safety movement in India
7.   (a)   Responsibilities of management, workers and trade unions.
      (b)   Responsibilities and roles of society, state, international agencies.
8.   (a)   System analysis including job safety analysis, failure mode analysis and
             hazards analysis.
      (b)   Concept of risk management including total loss control, critical incident,
             product safety etc.

Books recommended

1. H.W.Heirnich D Petersen and N.Roose. Industrial Accident Prevention.Mc. Graw
    Hill Book Co.New York 1980.

2. Dan Peter. Techniques safety Management. McGraw Hill Book Co. New York, 1978.

3. I.L.O.Accident Prevention: A Worker's Education Manual .I.L.O.Geneva. Second
    Edition. 1980.

4. I.L.O. Encyclopaedia of Health and Safety, I.L.O., Geneva.

5. Government of India. Report of the Royal Commission on Labour 1931.

6. Government of India. Report of the National Commission on Labour, 1969.

7. Wilson et al(2004), "Industrial Safety and Risk Management", Michigan state
    University Publication

Note:
1. **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type
    questions out of which the candidate will be required to attempt any seven questions
    (7×5=35). In section B there will be three questions with internal choice and the candidate will
    be required to attempt all questions (2×12)+(1×11)=35.**

2. **30% of the maximum marks are allocated for internal assessment based on two assignments
    (handwritten) of 15% marks each.**

PGDISM-02   INDUSTRIAL TOXICOLOGY, ENVIRONMENTAL POLLUTION AND OCCUPATIONAL HEALTH

Total Marks – 100   **External -70; Internal -30**
                                                     Duration – 3 hrs.

1.   Basic human Physiology and Pathology in relation to work- physiology and psychology of work – Stress factor – Oxygen consumption.

2.   Working environment-man and the environment including ecology and ecosystems-Elements of working conditions i.e. noise, ventilation, lighting, temperature, humidity etc, and effects on safe performance in industry.

3.   work Load – physical and mental work; light and heavy work-monotonous and non-monotonous work

4.   Fatigue-meaning and causes of fatigue- production curve-control and remedies of fatigue.

5.   Industrial toxicology-occupational diseases by certain chemicals, physical and biological agents- emergency antidotes.

6.   Prevention and control of occupational diseases- environmental, personal and medical control.

7.   Environmental pollution-Definition of pollution- pollution of water resources land and air, catastrophic pollution affecting surroundings-basic approach for prevention and control of different types of pollution.

Books recommended

1.   I.L.O.Encyclopaedia of Health and Safety, I.L.O. Geneva.

2.   J.R.Redley(Editor) Safety at Work, Butterworths, London.

3.   W.Hammer, Occupaional Safety Management & Engineering, Prentice Hall, London, 1984.

4.   L.Levis, Stress in Industry: Causes, Effects and Prevention, I.L.O.Geneva, 1984.

5.   C.R.Asfaque, "Industrial Safety and Health", Prentice Hall

Note:
1.   **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.**

2.   **30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.**

PGDISM-03   INDUSTRIAL HAZARDS AND ACCIDENTS

Total Marks – 100   **External -70; Internal -30**
                                                   Duration – 3 hrs.

1. Principles of accident prevention related to (a) machine guarding, hand tools, portable electrical apparatus, portable ladders, acetylene cylinders; (b) fire and explosions (c) Protective measures including good house keeping, working clothes, personal protective equipments.

2. Mechanical hazards related to cutting and tearing, sheering, crushing, breaking welding, staining etc. machine guards and devices-precautionary measures.

3. Chemical hazards- Reactors, decomposition, association, dissociation and resultant hazards including fires, explosion- prevention and control.

4. Electrical hazards related to shocks bare conductors, electrical insulation failure, equipment failures, static electricity, lighting and over heating due to electric power, Circuit and equipment protection-prevention and control.

5. Inflammable and volatile materials including fuels, oxidizers, gasses, liquids fuels flammable and combustible liquids, ignition etc. and control of fires, explosion and detonations.

6. Hand tools, portable tools, power tools and resultant hazards-hazards related to strings, ropes, lifting tackles, hoisting etc. hazards related to manual and mechanical handling of materials – prevention and control.

7. Pressure hazards related to pressure vessel rupture, discharges from safety valves, dynamic pressure hazards, hoses, water hammers, leaks etc.- prevention and control.

8. Building and Construction – Hazards related to foundation and excavation, walling, lift well, demolition, roofing prevention.

9. Personal protective equipments – Safety equipments, appliances, instruments, protective clothing etc.- use, storage, facilities and maintenance.

10. Internal transport and safety.

Books recommended

1. W.Hammer, Occupational Safety Management and Engineering, Prentice Hall, London, 1981.

2. J.R.Ridley(Editor), Safety at work, Butterworths, London.

3. Dan Petersen, Analysing Safety Performance, Gardens STEM Press, New York, 1980.

4. I.L.O.Encyclopaedia of Health and Safety, I.L.O. Geneva.

5. Dr. N.K.Tarafdar & Mr. K.J.Tarafdar- Industrial Safety Management.

Note:
1. **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.**

2. **30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.**

Total Marks – 100   **External -70; Internal -30**
                                                             Duration – 3 hrs.

1.   Safety management at different levels. Basic approaches to safety management including work centered, employee centered and work-cum-employee centered approaches, site selection, layout etc. Behavioural sciences and safety – Past and current factors influencing safe behaviour.

2.   Planning for Safety Management, Meaning and basic considerations, Formulation of Safety programme-meaning content and nature how to make it acceptable, Problem analysis and decision making

3.   Organisation for Safety Management

      Systems of organization-Role of Safety department and safety specialists in the organization – staff or line.

      Responsibilities of Safety department, Fire Protection department, Medical department, Maintenance department, purchasing department in Safety Management.

      Responsibilities of plant managers, foremen, supervisors, full-time and part-time safety specialist, employees and others.

4.   Functions of Safety Department

      Motivating for safety; influences of personality, values, beliefs and behaviour; organizational climate influencing safe behaviour, safety performance analysis; Maslow's Need Hierarchy Theory, Herzberg's Hygiene and Motivation Theory, Vroom's Expectancy Theory, Argyris's Conflict Theories of Motivation and Safety

      Safety leadership; Powers of safety leaders, Leadership styles: X and Y theory, Managerial Grid, Likert's theory, Discipline and safety

      Communications in safety; Importance and types, Making verbal communications effective, Effects of non-verbal communications, small group and audience communications.

      Campaigns related to Audio-visual, consciousness raising, competition and awards, translating managerial decision etc.

      Safety training; Importance and steps in developing safety training programmes, Supervisory training, Employee safety training for new employees and continuous training.

      Safety committees; workers participation and their effectiveness; consideration in organizing of different types of committees, Function of Chairman, Secretary and Members of Safety committees.

5.   Industrial Relations and Safety

            (a)   Role of trade unions in safety
            (b)   Collective bargaining and safety in India
            (c)   Workers Participation in Management in India and Safety.

6.   Concept of Process Safety Management (PSM); OSHA issued PSM of hazardous chemicals standard(29 CFR 1910.119) contains requirement for management of hazards. Standards; recognition of chemical process hazards, evaluation and   control, Occupational safety and health management.

Books recommended:

1. Dan Petersen, Techniques of Safety Management, McGraw Hill Book Co. New York, 1978.

2. Dan Petersen, Analysing Safety Performance, Garland STEM Press, New York, 1980.

3. D.K. Denton, Safety Management: Improving Performance, McGraw Hill Book Co.New York, 1982.

4. Maurice Bryant, Success with Occupational Safety Programme, I.L.O.Geneva, 1984.

5. H.W. Heinrich, D. Petersen and N. Roose, Industrial Accident Prevention, McGraw Hill Book Co., New York, 1980.

Note:

1. There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.

2. 30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.

PGDISM-05 SAFETY STATISTICS AND ACCIDENT INSPECTION

Total Marks – 100   **External -70; Internal -30**

Duration – 3 hrs.

1. Definition, application and limitation of statistics- Explanations, sample, parameters, statistics etc.
2. Formation of frequency distribution – diagrammatic and graphical representation.
3. Measures of central tendency and dispersion – Moments including $P_1 P_2$ Skewness and Kurtosis and their measures and co-efficients.
4. (a) Correlation: Types of correlation, product moments and rank correlation coefficients.
   (b) Regression : Method of least squares, regression equations.
5. Probability and probability distribution : Meaning of probability and explanation of various terms used in its definition- Addition and multiplication laws of probability- Random variable and expectation-Binomial, Poisson and normal distribution and their main properties.
6. Time series Analysis: Definition and components of time series-methods of determination of trend and seasonal components.
7. Test of Significance:
   (a) T-test & F distributions.
   (b) Control Charts: Use of X,R,P & C Charts.
8. Inspections mode and periodicity- inspections by competent persons according to the provisions of law.
9. Accident investigation technique reporting technique, follow up, recommendations.
10. Safety check list and safety permit system-their need and usefulness.

Books recommended

1. Denton, D.K.: Safety Management: Improving Performance, McGraw Hill Book Co, New York.
2. Gupta, S.C.: Fundamentals of Statistics, Himalaya Publishing House, Mumbai.
3. I.L.O. Office: Encyclopedia of Occupational Health and Safety, I.L.O.Geneva.
4. Levin, R.I and Rubin, D.S.: Statistics for Management, Prentice Hall of India.
5. Petersen, Dan: Techniques of Safety Management, McGraw Hill Book co, New York.

Note:

1. **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.**

2. **30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.**

PGDISM-06 SAFETY LEGISLATION

Total Marks – 100   **External -70; Internal -30**
                                                                     Duration – 3 hrs.

1. Safety and Health provisions of the Factories Act 1948
2. Roles of Central and State Governments inspectorate of factories. Director General, factory advisory service-guide to the safety provisions of the Factories Act-mode of passing industrial risk on the other parties-insurance.
3. Workmen's Compensation Act, 1923- provisions of work injuries and benefits in the Employee's State Insurance Act, 1948.
4. Occupational diseases as specified in the Factories Act, 1948, Workmen's Compensation Act 1923 and Employees' State Insurance Act, 1948 – guide to recognition and modification of occupational diseases issued by the chief factory advisor.
5. Role of I.L.O. in promoting uniform safety standards-conventions and recommendations related to safety-other activities of the I.L.O.in the field of safety promotion.
6. Major safety related provisions of the following act and Rules:
   - Boilers' Act, 1923
   - Factories Act 1948
   - Atomic Energy Act, 1962
   - Occupational Safety & Health Act(OSHA),1970,USA
   - Radiation Protection Rules, 1971
   - Control of Industrial Major Accidents Hazards(CIMAH) Regulations,1984,UK
   - Hazardous Wastes Management Handling Rules,1989
   - Public Liability Insurance Act & Rules,1991

Books recommended

1. Dr.V.G.Goswami, Labour & Industrial Laws, Central Law Agency, Allahabad.
2. A.M. Sharma, Industrial Jurisprudence & Labour Legislation, Himalaya Publishing House, New Delhi.
3. Bihar Factory Manual, Malhotra Publications
4. E.S.I. Act, 1948.
5. Workmen's Compensation Act, 1923.

Note:

1. **There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.**

2. **30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.**

PGDISM-07 COMPUTER APPLICATIONS IN SAFETY MANAGEMENT

Total Marks – 100   **External -70; Internal -30**
                                         Duration – 3 hrs.

1. Introduction to Computers: This course provides introduction to computers and computing. Topics include the impact of computer on society, ethical issues, hardware/software applications, including word processor, spreadsheets, database, the internet and operating systems. Upon completion, students be able to demonstrate an understanding of the role and functions of computers and use of computer to solve problems.

   (b) Spreadsheet 1 & II: This course introduces basic spreadsheet design and development. Topics include writing formulas, using functions, enhancing spreadsheets, creating charts, and printing. The second part covers advance spreadsheet design and development. Topics include advanced functions, charting, macros, database and linking.

   (c) Word Processing: This course introduce word processing concepts and applications. Topics include preparation of a variety of documents and mastery of specialized software function. Upon completion students should be able to work effectively in a computerized word processing environment.

   (d) Database Concept and Applications: This course introduce database design and creation using a DBMS product. Topics include database terminology, usage in industry, design theory, types of DBMS models, and creation of simple table, queries, reports and forms.

   (e) Business Presentation: This course provide hands on experience with a graphic presentation package. Topics include terminology, effective chart usage, design and layout, integrating hardware components, and enhancing presentations with text and graphics.

2. Helpdesk, Analysis & Design : This course examines established and evolving methodologies for the analysis, design and development of a helpdesk system emphasis is placed on business systems characteristics, managing information systems projects, prototypes, CASE tools, and system development life cycle phase.

Books recommended

1. B.P.B- MS Office-2000, Business Promotions Bureau, Delhi.
2. TAXALI – Fundamentals of Software
3. Object Orientation through C++-Parimala N, Mcmillan
4. Systems Analysis and Design – Don Yeaters, Maura Shields and David Helmay.
5. Programming Language – Programming in CS, C++-Schaum Series(TMH) Tata McGraw Hill, New Delhi.
6. Basic Commands of MS DOS and UNIX Operating System- Microsoft Windows NT 4.0
7. Data Structures Using C and C++- Yedidyah Langsam, Moshe J. Augenstein, Aavon M. Tenenbaum, Prentice Hall of India New Delhi
8. Lotus 123- A Guide and Workbook- E Bala Guruswamy, M.L.Saikumar, M.S. Sarma, McMillan

Note:

1. There will be two sections A & B. (35+35=70). In section A there will be ten short answer type questions out of which the candidate will be required to attempt any seven questions (7×5=35). In section B there will be three questions with internal choice and the candidate will be required to attempt all questions (2×12)+(1×11)=35.

2. 30% of the maximum marks are allocated for internal assessment based on two assignments (handwritten) of 15% marks each.

PGDISM-08   DISSERTATION ON FIELD WORK

Total Marks – 100

A student must undergo at least one month practical training before the diploma is awarded. During this period, investigations into various aspects of safety in factories and other organizations will be undertaken under the guidance and supervision of the faculty members. After the training is over, a written report will be submitted for evaluating the candidate's work during the period. This report will carry 100 marks.

PGDISM-09   COMPREHENSIVE VIVA-VOCE

Total Marks – 100

The viva-voce examination carrying 100 marks will be held after a student has complied with all the above requirements of the course. While the viva-voce examination will be a comprehensive one, special emphasis will be placed on the subject of field-work.