








Ann II-P

**PATNA UNIVERSITY**  
**POST GRADUATE DIPLOMA COURSE IN**  
**INDUSTRIAL SAFETY MANAGEMENT**  
**COURSES OF STUDIES**

(Approved by the Board of Courses & Studies on 17.10.2015)

A meeting of the Board of Courses of S was held today, i.e. on Saturday, October 17, 2015 at 12:00 noon in the Department of Personnel Management & Industrial Relations, Patna University.

Following members were present:

- |   |                 |   |
|---|-----------------|---|
| 1. Dr. Shrawan Kumar<br>H.O. & PMIR, P.U.   | Internal Expert |    |
| 2. Prof. Prabhakar Jha<br>Professor & former Head<br>PMIR, P.U.                                     | "               |    |
| 3. Dr. Anjany Prasad<br>Associate Professor, PMIR P.U.  | "               |    |
| 4. Dr. Smita Ray<br>Asst. Professor, PMIR, P.U.   | "               |    |
| 5. Dr. Girind Kumar<br>Asst. Professor, PMIR, P.U.  | "               |   |
| 6. Dr. Kameshwar Pandit<br>Asst. Professor, PMIR, P.U.  | "               |  |
| 7. Dr. Rashindra Kumar<br>Professor & former Head<br>Dept. of I.R P.U.<br>T.M. Bhagalpur University | External Expert |  |

The members of the Board thoroughly discussed the syllabus and finally prepared a revised courses of studies and syllabus of M.A. PMIR of all four semesters, Rural Studies (All Semesters) and I.S.M. (All Semesters).

Office of the Dean  
Faculty of Social Sciences, Patna University

Notification

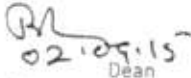
As per the provisions laid down in Sec. 27 of the Patna University Act, 1976 (Attended to the bare) and the statutes relating to the formation of Board of Courses and Studies, the Board of Courses and Studies in the Faculty of Social Sciences was constituted in the meeting of the Social Sciences held on 27<sup>th</sup> September 2015 as hereunder:


- |   |                         |
|---|-------------------------|
| 1. Dr. Sharan Prawal<br>Head, Department of PMIR<br>Patna University, Patna   | Chairman-ex-officio     |
| 2. Prof. Prabhakar Jha<br>Professor<br>Department of PMIR<br>Patna University, Patna                                | Member                  |
| 3. Dr. Sanjay Paswan<br>Associate Professor<br>Department of PMIR<br>Patna University, Patna                        | Member                  |
| 4. Dr. Sunita Roy<br>Assistant Professor<br>Department of PMIR<br>Patna University, Patna                           | Member                  |
| 5. Dr. Govind Kumar<br>Assistant Professor<br>Department of PMIR<br>Patna University, Patna                         | Member                  |
| 6. Dr. Kameshwar Pandit<br>Assistant Professor<br>Department of PMIR<br>Patna University, Patna                     | Member                  |
| 7. Dr. Bishwanibhar Jha<br>Professor and Former Dean<br>Faculty of Commerce<br>Banaras Hindu University<br>Varanasi | Member, External Expert |
| 8. Dr. Rabindra Kumar<br>Professor, IRPM<br>T.M. Bhagalpur University<br>Bhagalpur                                  | Member, External Expert |

The Board of Courses of Studies will take necessary steps as per the provisions of the relevant sections of the Act and Statutes.

Memo No. Dean/01/2015

Copy forwarded to (1) The Head, Dept. of Applied Eco & Commerce Patna University, Patna (2) All the members mentioned above, (3) The Principal, Vanijya Mahavidyalaya, P.U., (4) The Secretary to the Vice-Chancellor, Patna University, (5) The P.A. to the Pro-Vice-Chancellor, Patna University, Patna, (6) The S.O. Academic Section of information and necessary action.

  
02.09.15  
Dean  
Faculty of Social Sciences  
Patna University  
Dean of the Faculty of  
Social Sciences  
Patna University

  
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Patna University  
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Social Sciences  
Patna University

**Post Graduate Diploma in ISM  
Department of PMIR  
Patna University, Patna**

**SEMESTER - I**

1 Code	2 Course Component	3 Name of the Course	4 Credit	5 C.I.A.	6 End Semester Exam	7 Total Marks
				Marks		
ISM-PGD-101	Core	Fundamentals of Safety Management	4	30	70	100
ISM-PGD-102	Core	Industrial Toxicology, Environmental Pollution & Occupational Health	4	30	70	100
ISM-PGD-103	Core	Industrial Hazards & Accidents	4	30	70	100
ISM-PGD-104	Core	Safety Management & Organisation	4	30	70	100
ISM-PGD-105	Core	Computer Application in Safety Management	4	30	70(Th-50 Pract.-20)	100

**SEMESTER - II**

1 Code	2 Course Component	3 Name of the Course	4 Credit	5 C.I.A	6 End Semester Exam	7 Total Marks
				Marks		
ISM-PGD -201	Core	Safety Statistics and Accident Inspection	4	30	70	100
ISM-PGD -202	Core	Safety Legislations, Codes and Compensation	4	30	70	100
ISM-PGD -203	Core	Environment & Disaster Management	4	30	70	100
ISM-PGD -204	Core	DISSERTATION (Based on field work/In plant training)	4	30	70	100
ISM-PGD -205	Core	VIVA VOCE (Based on dissertation and theoretical aspects of various papers)	4	30	70	100


  
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## SYLLABUS OF PGDISM

### SEMESTER-I

#### Paper-101 - Fundamental of Safety Management

- Unit-I
- (a) Meaning, needs and importance of Industrial Safety.
  - (b) Philosophy of accident prevention, safety - yesterday, today and tomorrow - a historical review.
  - (c) Causes of Industrial accidents-unsafe acts and conditions-multiple causation vs. facts.
- Unit-II
- (a) Cost and consequence of accident-types of economic losses-injuries and fatalities.
  - (b) Basic Principles of Loss control
  - (c) Safety and Productivity
- Unit-III
- (a) Welfare and Safety
  - (b) Safety movements in some industrially advanced countries-Safety movement in India
- Unit-IV
- (a) Responsibilities of management, workers and trade unions.
  - (b) Responsibilities and roles of society, state, international agencies etc.
  - (c) System analysis including job safety analysis, operational hazards analysis, failure mode analysis and hazards analysis.
- Unit-V
- (a) Meaning, objectives and importance of ergonomics - fitting men with machines and machines with men-human activities and control - work - place designs and physical environment
  - (b) Concept of risk management including total loss control, critical incident, product safety etc.

#### Recommended Books

1. H.W. Heirich D Petersen and N. Roose. Industrial Accident Prevention. Mc Graw Hill Book Co. New York 1980.
2. Dan Peter. Technique 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. Industrial Safety Management - R.K. Ojha (Technology Publications, Dehradun/2005)



**Paper-102 - Industrial Toxicology, Environmental Pollution & Occupational Health.**

- Unit-I (a) Basic human physiology and Pathology in relation to work-Meaning of work, physiology and psychology of work - stress factor - Oxygen consumption.  
(b) 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.
- Unit-II (a) Work Load - physical and mental work-physical work - light and heavy work - monotonous and non-monotonous work - factors governing work load-on Mental work.  
(b) Fatigue-meaning and causes of fatigue - production curve-control and remedies of fatigue.
- Unit-III (a) Industrial diseases - occupational diseases by certain chemicals and physical and biological agents - with stress on emergency antidotes.  
(b) Prevention and control of occupational diseases - environmental, personal and medical control.
- Unit-IV (a) Industrial toxicology- Toxicity in Industrial Hazards, types, toxic release, exposure and chemicals, Toxics effects  
(b) Toxicity assessment, Toxic limits.
- Unit-V (a) Toxic Chemicals - Factors relating to toxic chemicals, STEPEL and PEL for toxic chemicals.

**Recommended Books**

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, Occupational Safety Management & Engineering Prentice Hall, London, 1984.
4. L.Levis Stress in Industry : Causes, Effect and Prevention, I.L.O. Geneva, 1984.

**Paper-103 - Industrial Hazards and Accidents**

- Unit-I (a) Principles of accident prevention including good house keeping, working clothes, personal protective equipments etc.  
(b) Mechanical hazards related to cutting and tearing, sheering, crushing, breaking welding, staining etc. - machine guards and devices - precautionary measures.



- (c) Chemical hazards – Inhalation, Absorption, Ingestion, Hazardous Chemical Reactivity – prevention and control.
- (d) 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.
- Unit-II (a) Fire basic chemistry, Fire hazard and control of fires, explosion and detonations.
- (b) Hand tools, portable tools, power tools etc. and resultant hazards – hazards related to strings, ropes, lifting tackles, hoisting etc. – hazards related to manual and mechanical handling of materials – prevention and control.
- (c) Pressure hazards related to pressure vessel rupture, discharges from safety valves, dynamic pressure hazards, hoses, water hammers, leaks etc. – prevention and control.
- Unit-III (a) Building and Construction – Hazards related to foundation and excavation, walling, Lift well, demolition, roofing etc. – prevention –
- (b) Excavation & foundation (all types of open foundation & caissons & pile foundations), Walling, Roofing, Lifts & escalators
- Unit-IV (a) Fire – Safety : Travel distance, exits, fire-escapes, fire-towers, fire resistant construction, fire-fighting, Safety against natural calamities, Earthquake, Cyclones, Floods
- (b) Building Bye-laws & Codes, Demolition, Concrete construction, steel construction, Construction machinery e.g. Different types of cranes, bulldozers etc.
- Unit-V (a) Radiation hazard, Biological effect, Radiation detection, measurement, control and record keeping.
- (b) Personal protective equipments – Safety equipments, appliances, instruments, protective clothing etc. – use, storage, facilities and maintenance.
- (c) Disaster management – Designing, importance and implementation of control action plan.

#### Recommended Books

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
6. National Building Code
7. Industrial Safety - Mistry.



**Paper-104 - Safety Management & Organisation**

- Unit-I
- (a) Meaning of safety management at different levels.
  - (b) Basic approaches to safety management including work centered, employee centered and work-cum-employee centered approaches, Research design, layout, site selection etc.
  - (c) Behavioural sciences and Safety - Past and current factors influencing safe behaviour.
  - (d) 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.
- Unit-II
- (a) Organising for Safety Management - System of organization -Role of Safety department and safety specialists in the organization-staff or line.
  - (b) Responsibilities of Safety department, Fire Protection department, Medical department, Maintenance department, Purchasing department etc. in Safety Management.
  - (c) Responsibilities of plant managers, foremen, supervisors, full-time and part-time safety specialist, employees and others.
- Unit-III
- (a) Functions of Safety Department - Motivating for safety. Concept, factors, theories- Maslow's Need Hierarchy Theory, Herzberg's Hygiene and Motivation Theory, Vroom's Expectancy Theory, Argyn's Conflict Theory of Motivation and Safety.
  - (b) Safety leadership - Powers of safety leaders, Leadership styles : X and Y theory, Management Grid, Likert's theory, Discipline and safety.
  - (c) Communications in safety - Concept and types, Channels of Communications, systems of communication, barriers of communications.
- Unit-IV
- (a) Safety training - Importance and steps in developing safety training programmes, Supervisory training, Employee safety training for new employees and continuous training.
  - (b) Safety committees - Forms of workers participation and their effectiveness, consideration in organizing of different types of committees, composition and function of different types of committees, function of chairman, secretary and members of safety committees.
- Unit-V
- (a) Industrial Relations and Safety - Concept, Importance, Actors of Industrial Relations, Aspects of Industrial Relations, Role of trade unions in safety.
  - (b) Collective Bargaining and Safety in India - Meaning, Pre-requisite conditions, failure and success.

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- (c) Workers participation in Management in India and Safety-Concept, Importance, Schemes, failure and success.

**Recommended Books**

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

**Paper-105 - Computer Application in Safety Management**

**Unit (I) Computer Fundamental**

Introduction to Computer, Generation of Computers, Major Component of Computer. Input/Output devices, Classification of Memory, Computer Arithmetics Codes (Conversion), 1's & 2's Complements, Classification of Computer According to their Sizes, Type of Computer. Software and Hardware, Application & System Software. Operating System, Compiler. Type of processing –Batch, Real time & On line processing, Compiler, High Level Language, Low level language, Assembly Language, Compiler, interpreter, Assembler, Multiuser, Multitasking, Multiprogramming & Multiprocessing Command & Program.

**Unit (II) System Analysis & Design (SAD) & Management Information System (MIS)**

Introduction to MIS : Information System for Operational Control, Management Control Strategie Planning etc. MB Based organization function. Concept of System Analysis & Design, Characteristics of System, Type of System, Data flow Diagrams, Different Stages of SDLC.

**Unit (III) Introduction to Information Technology (Networking & Internet)**

Introduction to Networking, Advantages of Networking, LAN, MAN, WAN, Topology – Bus, Star, Ring, Hybrid. ATM, EFT & ECS, EDI. Internet and its application, Internet Operation, HTTP, WWW, TCP/IP, EFT, Routers, URL, Gopher, ISP, Modem, Telnet, DNS, Client/server, Web server, Web Browsers, Gateway, HTML, Firewall, Uploading & Downloading, Concept of Cloud Computing.

**Unit (IV) Introduction to Operative System**

MS DOS with Internal and External Commands and series of Window Operating System.

**Unit (V) Introduction to MS-Office :**

- MS- Word
- MS-Excel
- MS-Power Point

**Practical**

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1. MS DOS (Internal Command)
2. MS-Office (MS Word, Excel, Power Point)
3. Internet Operation

**BOOK – RECOMMENDED**

- |    |   |   |   |
|----|---|---|---|
| 1. | Computer Fundamental & Organization                 | - | Dr. B. Ram<br>BCE, Patna                        |
| 2. | Computer Fundamental                                | - | V.K. Jain                                       |
| 3. | Fundamental of Computer & Information<br>Technology | - | Dr. C.P. Gupta<br>Lakshmi Narayan Agrawal, Agra |
| 4. | Introduction to Information Technology              | - | ITLES- Pearson Publication                      |
| 5. | MIS   | - | C.S.V. Murthy                                   |
| 6. | Data base System                                    | - | B.C. Desai                                      |
| 7. | SAD   | - | E.Award   |
| 8. | MS-DOS  | - | Russell A Stultz (6.22)                         |
| 9. | MS-Office   | - | 2000 BPB  |



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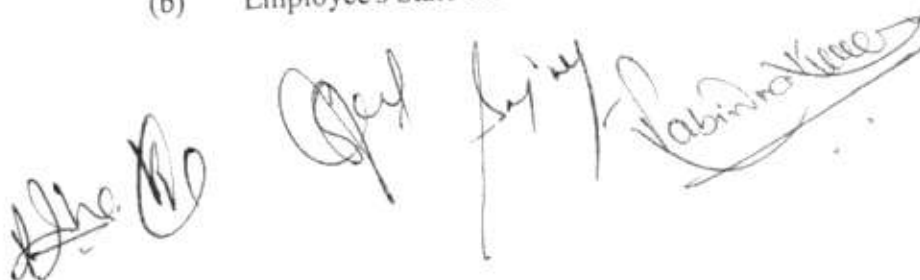
## SEMESTER-II

### Paper-201 - Safety Statistics and Accident Inspection

- Unit-I Definition, application and limitation of statistics - Explanations, sample, parameters, statistics etc.  
Formation of frequency distribution - diagrammatic and graphical representation.
- Unit-II Measures of Central Tendency- Arithmetic Mean, Median, Mode, Geometric Mean, Combined Mean and Combined Variances. Measures of dispersion - Quartile, Range, Standard Deviation and Coefficient of Variation. Moments- Central and rth moments Skewness and Kurtosis and their measures and their measures.
- Unit-III Correlation : Types of correlation, product moments and rank correlations coefficients. Regression : Two lines of regression equations, Method of least squares.
- Unit-IV Probability and probability distribution : Meaning of probability and explanation of various terms used in its definition - Addition and multiplication laws of probability. Mathematical Expectation. Addition Law of Mathematical Expectation and Multiplication Law of Mathematical Expectation. Random variable and expectation -
- Unit-V Distribution - Binomial, Poisson and Normal Distribution and their main properties.  
Time series Analysis : Definition and components of time series - methods of determination of trend and seasonal components.  
Accident investigation and Safety check list

### Paper-202 - Safety Legislations, Codes and Compensation

- Unit-I (a) Safety and Health provisions of the Factories Act, 1948, including Bihar Factory Rules.  
(b) Safety provisions of Boilers Act, 1923.
- Unit-II (a) Administration of Factories Act, 1948, and Boilers Act, 1923. Roles of Central and State governments inspectorate of factories.  
(b) Director General, factory advisory service-guide to the safety provisions of the Factories Act - mode of passing industrial risk on the other parties - insurance.
- Unit-III (a) Employee's Compensation Act, 1923 - Provisions of work injuries.  
(b) Employee's State Insurance Act, 1948 - Provisions and benefits.



- Unit-IV (a) International Labour Organisation (I.L.O.) - Principles, Constitutions, Functions and Role of I.L.O. in promoting uniform safety standards -  
(b) Conventions and recommendations related to safety-other activities of the I.L.O. in the field of safety promotion.
- Unit-V (a) Hazards and codes, rules and regulation in specific industries - Iron and Steel Industry, Engineering industries, Chemical Industry  
(b) Codes in construction industries and national building code.

**Paper-203**

**Environment and Disaster Management**

- Unit-I (a) Introduction to environment - Basic Concepts of environment.  
(b) Types of environment : Business environment, economic environment, political and regulatory environment, demographic, cultural and geographical environment.
- Unit-II (a) Environmental Chemistry - Concept and Scope, formation of ozone in the stratosphere, oxygen, Nitrogen, carbon cycles etc.  
(b) Radio-Nuclide in the Environment.
- Unit-III (a) Causes of Environment degradation, effects of major environment pollution on health and productivity leading to disasters, solid waste management : Sources, types and Classification of solid waste, Methods of solid waste treatment.  
(b) Environmental Pollution - Definition of pollution, pollution of water resources, land and air - catastrophic pollution affecting surroundings - basic approach for prevention and control of different type of pollution.
- Unit-IV (a) Water Pollution - Classification of water pollution, characteristics of waste water, treatment methods.  
(b) Air pollution - Classification of air pollution, climate change : Natural and man made cause. Causes and effects of pollution, Air pollution control, methods and equipments.
- Unit-V (a) Disaster Management : General Meaning of Disaster, Types of disaster, Major channels of disaster in the world, pro-active disaster management and its main aims, scope, needs and requirement of disaster management. factors of disaster management.  
(b) Government efforts in the area of disaster management, designing importance and implementation of control action plan.

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