CURRICULUM FOR

"MASTER OF SCIENCE

ENVIRONMENTAL SCIENCE - INDUSTRIAL SAFETY AND MANAGEMENT (M.Sc. ES (ISM))"

w.e.f. Academic Year 2021-'22

॥ तमसो मा ज्योतिर्गमय ॥

VISION

To provide equal opportunities for value based global education for creating an Enlightened Society

MISSION

To establish and facilitate educational institutions in the region for providing affordable value based global education to all who aspire to study and to create opportunities to educators, social workers and philanthropists to serve society

SARVAJANIK UNIVERSITY

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creating an enlightened society...

UNIVERSITY OFFICE
Dr. R. K. Desai Marg, Athwalines,
Surat-395001, Gujarat, India.
Website: www.sarvajanikuniversity.ac.in
Email: admin@sarvajanikuniversity.ac.in
Email: info@sarvajanikuniversity.ac.in
Mo.:+919979102021 / +9197129 30321
Contact No .+912612660266

Constituent Institute:

SHREE RAMKRISHNA INSTITUTE OF COMPUTER EDUCATION AND APPLIED SCIENCES (SRKI)

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SARVAJANIK UNIVERSITY
Dr. R.K. Desai Marg, Athwalines, Surat – 395001, Gujarat, India
Contact: 0261-2660266 / 9979102021 / 9712930321
Email: admin@sarvajanikuniversity.ac.in
info@sarvajanikuniversity.ac.in

Course Curriculum
Master of Science (Industrial Safety & Management)

The Course Curriculum of Master of Science (Industrial Safety & Management) was proposed and drafted by **Academic and Curriculum Committee of Environmental Science** under the Faculty of Science in the meeting held on 10-12-2021 and recommended to **'BOARD OF STUDIES'** for approval.

Prof. Ratna Trivedi **Chairman,** **Academic & Curriculum Committee** **Science**	**Place of the meeting** **Sarvajanik University Office**	R.A.Trivedy **Sign**

The proposed Course Curriculum was approved by **Board of Studies, Science** under the Faculty of Sciencein the meeting held on 10-12-2021 and was recommended to the '**FACULTY**' for approval.

Prof. Chaulami Desai **Chairman,** **Board of Studies-** **Science**	**Place of the meeting** **Sarvajanik University Office**	Desai **Sign**

The Course Curriculum approved by the **Faculty of Science**in the meeting held on 10-12-2021 and was recommended to '**ACADEMIC COUNCIL**' for approval.

Prof. Chaulami Desai **Chairman&** **Dean, Faculty of** **Science**	**Place of the meeting** **Sarvajanik University Office**	Desai **Sign**

The Course Curriculum approved bythe '**Academic Council of Sarvajanik University**'in the meeting held on 10-12-2021.

Prof. Persi Engineer **Chairman, Academic Council** **&Hon'ble Provost,** **Sarvajanik University**	**Place of the meeting** **Sarvajanik University Office**	 **Sign**

- ***The approved curriculum of Masterof Science(Environmental Science)is with effect from the Academic year 2021 – '22 and to be reviewed before 2024 – '25***

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Industrial Safety and Management

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Faculty of Science

M.Sc. Environment Science

(Industrial Safety Management)

Semester - III

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Industrial Safety and Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Industrial Safety and Management)	**Type of Subject:** Theory + Practical
Subject: Legislation on Safety & Health	
Semester- III	

Student Learning Outcomes (SLOs):

- The paper will enable students to acquire knowledge, technical skills needed for sound organizational practice and effective health and safety management.
- The paper also deal with laws pertaining to safety and health.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – I, Siddharth Prakashan, Ahmedabad.
2. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – II, Siddharth Prakashan, Ahmedabad.
3. Leelakrishnan P. (2015): Environmental Law Case Book, LexisNexis.
4. Shantakumar S. (2005): Introduction to Environmental Law, LexisNexis.
5. Sahasranaman P.B. (2012): Handbook of Environmental Law in India, Oxford University Press (India).
6. Holder Jane and Lee Maria (2012): Environmental Protection, Law and Policy, Cambridge University Press.
7. Chapman S.R (1997): Environmental Law and Policy, Prentice Hall.
8. Nawneet Vibhav (2017): Environmental Law-An Introduction, LexisNexis.

UNIT 1: Industrial Hygiene **07 Hours**

1.1 Industrial Hygiene Vs Occupational Health
1.2 Occupational Health Hazard
1.3 Routes of Entry & Toxic Effects
1.4 Control Measures

UNIT 2: Physiology of Work **07 Hours**

2.1 Terminology
2.2 Physiology of Respiration
2.3 Physical Work Capacity
2.4 Assessment of Work Capacity

UNIT 3: Ergonomices **07 Hours**

3.1 Load Carrying
3.2 Hand Tools & their use
3.3 Work Station Design
3.4 Machine Controls and Display

UNIT 4: Occupational Health **07 Hours**

4.1 Occupational Diseases
4.2 Occupations with Risk of Diseases
4.3 Evaluation of Injuries
4.4 Occupational Health Service & Examination

UNIT 5: Personal Protective Equipment **08 Hours**

5.1 Need and Limitations
5.2 Indian and Other Standards
5.3 Selection and Classification
5.4 Training, Maintenance, Precaution and Care of PPE

UNIT 6: First Aid **08 Hours**

6.1 Need of First Aid
6.2 General Principles for rendering First Aid
6.3 Injuries and First Aid
6.4 First Aid and Antidotes

UNIT 7: Factories Act **08 Hours**

7.1 History of Safety Movement
7.2 The Acts and Rules
7.3 Subjects of the Schedules
7.4 Subjects of the Forms

UNIT 8: Safety Laws **08 Hours**

8.1 Laws on Boiler Safety
8.2 Laws on Fire & Explosion Safety
8.3 Laws on Transportation Safety
8.4 Laws on Dock Safety

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Faculty of Science
M.Sc Industrial Safety and Management

Practicals:

1. Submission of Report based on Industrial Visit.
2. Seminar on various Case Studies.

SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Industrial Safety and Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Industrial Safety Management)	**Type of Subject:** Theory + Practical
Subject: Hazard and Risk Identification, Assessment & Control Techniques	
Semester- III	

Student Learning Outcomes (SLOs):

- The course is designed to provide comprehensive knowledge to the students regarding accident or loss prevention and is also structured to provide knowledge regarding techniques of inspection, audit, review analysis, study etc.
- The course will also provide comprehensive knowledge to the students regarding the quantitative appraisal, preventive appraisal and corrective appraisal.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – I, Siddharth Prakashan, Ahmedabad.
2. Mistry K.U (2012): Fundamentals of Industrial Safety & Health – II, Siddharth Prakashan, Ahmedabad.

UNIT-1: Safety Appraisal, Analysis and Control - I **07 Hours**

1.1 Appraisal System and Codes
1.2 Damage Control and TLC
1.3 JSA and Inventory System
1.4 Safety Work Permit and Tagging

UNIT-2: Safety Appraisal, Analysis and Control - II **07 Hours**

2.1 Standard Operating Procedure
2.2 Incident Recall & Critical Incident Review Technique
2.3 Procedures & Methodical Analysis
2.4 THERP, PERT and CPM

UNIT-3 Plant Safety Inspection **07 Hours**

3.1 Types and Procedure
3.2 NDT and Safety Checklist
3.3 Safety Survey, Study, Tour, Review, Sampling
3.4 Contact Scheme and GMP

UNIT-4 Accident Investigation **07 Hours**

4.1 Philosophy and Purpose

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4.2 Process of Investigation
4.3 Types of Investigation
4.4 Agencies Investigating Accidents

UNIT-5 Accident Analysis and Reporting **08 Hours**

5.1 Accident Analysis
5.2 Industrial Classification (NIC 2004) and Reporting
5.3 Collating and Tabulating Data
5.4 Corrective Action and Records

UNIT-6 Hazard and Risk Management **08 Hours**

6.1 Hazard detection and Progression Chart
6.2 Risk Analysis, Assessment and Management
6.3 PHA, HAZAN, FMEA, HAZOP, ETA, FTA
6.4 Hazard Ranking, CCA, MCAA, Vulnerability & WHAT IF Analysis

UNIT-7 Major Accident Hazard Control **08 Hours**

7.1 Concept, Types and Consequences of MAH
7.2 Criteria for MAH
7.3 Role of Management, Govt. Authority, Worker, Public
7.4 Safety Report, Safety Audit report & Risk Assessment Report

UNIT-8 Emergency Plans **08 Hours**

8.1 Need and Types of Emergency Plans
8.2 Statutory Provisions
8.3 On-Site Emergency Plans
8.4 Off-Site Emergency Plans

Practicals:

1. Submission of Report based on Safety Work Permit.
2. Preparation of "Accident Investigation Report"
3. Preparation of "Work Injury Investigation Report"
4. Preparation of Hazard detection and Progression Chart

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SARVAJANIK UNIVERSITY
Faculty of Science
M.Sc Industrial Safety and Management

Faculty: Science	**Department:** Environmental Science
Program: M. Sc. Environmental Science (Industrial Safety and Management)	**Type of Subject:** Theory + Practical
Subject: Industrial Hygiene and Occupational Health	
Semester- III	

Student Learning Outcomes (SLOs):

- Recognize major classes of occupational and environmental contaminants and how to apply to them the basic industrial hygiene tenets of anticipation, recognition, evaluation and control.
- Correctly use and handle basic industrial hygiene assessment and analysis instrumentation and will understand the types and selection of Personal Protective Equipment used in practice

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. M. H. Fulekar (I.K. International Publishing House Pvt. Ltd., New Delhi), Industrial Hygiene and Chemical Safety. ISBN: 81-88237-92-2.
2. Koren Herman and Bisesi Michael (Lewis Publishers), Handbook of Environmental Health, Volume 1 and 2. ISBN: 1-56670-536-3.
3. Gatchel Robert J. and Schultz Izabela Z. (Springer Publications) Handbook of Occupational Health and Wellness. ISBN: 978-1-4614-4838-9
4. Farzana Zahir (Bentham Books) Frontiers in occupational health and safety. Introduction to occupational health hazards. Volume 1 and 2. ISBN: 978-981-14-0690-4.

UNIT-1: Industrial Hygiene and Chemical Safety **07 Hours**

1.1 Industrial Hygiene, principles and practices
1.2 Chemical agents at workplace
1.3 Chemical Safety
1.4 Material Safety Data Sheets (MSDS)
1.5 Occupational Safety and Health Legislations - OHSAS18001, ILO Conventions, The Factories Act, 1948, Water (Prevention & control of pollution) Act, 1974, Air (Prevention & control of pollution) Act, 1981 and Rules. Environment protection Act 1986 (Amended)

UNIT-2: Concept of Industrial Hygiene **07 Hours**

2.1 Introduction
2.2 Industrial hygiene and Industrial hygienist
2.3 Recognition, Evaluation, Monitoring and Control of Industrial Hygiene
2.4 Physical and Chemical Classification of Airborne Contaminants

UNIT-3: Toxicity of Hazardous Chemicals **07 Hours**

3.1 Physiological Classification of Chemicals
3.2 Threshold limit values

3.3 Industrial Processes / Operations
3.4 Modes of Entry

UNIT-4: Physical and Chemical Stress in Industry **07 Hours**

4.1 Introduction
4.2 Physical Stress: Noise, Vibrations, Heat and Illumination
4.3 Chemical Stress: Paining, Metal Coating, Electroplating
4.4 Basic preventive measures
4.5 Proposed Biological Monitoring Methods in Occupational Exposure
4.6 Benefits of Environmental Monitoring

UNIT-5: Occupational Diseases **08 Hours**

5.1 Pneumoconiosis
5.2 Silicosis
5.3 Asbestosis
5.4 Lead and its Compounds
5.5 Mercury, Chromium and its Compounds

UNIT-6: Operational Control Measures **08 Hours**

6.1 Introduction and Operation Control
6.2 Air Pollution Control Measures
6.3 Plant Strategies
6.4 Air Sampling Calibration
6.5 Interpretation of results

UNIT-7: Personal Protective Equipment **08 Hours**

7.1 Introduction, legal requirements and selection guidelines
7.2 Head, eye and face protection
7.3 Hand, leg and foot protection
7.4 Respirators and canisters
7.5 Indian Standards on Personal Protective Equipment

UNIT-8: Classification and Transportation of Hazardous Chemicals **08 Hours**

8.1 Hazardous Chemicals Classification and transportaion mechanism
8.2 Emergency Information Panel
8.3 Hazchem Code
8.4 Hazard and Operability (HAZOP Techniques)
8.5 Major Accidents involving Hazardous Substances

Practicals:

1. Assessment of air flora of different places by gravity settling technique.
2. Study of safety in industries by suggesting safety measures and PPE.
3. Prepare OHS Policy for a medium sized organization.
4. Prepare an Organisation Chart & define roles & responsibilities.

5. Conduct any two Active monitoring systems & make a report: (a) Site Inspection (b) Survey of Safe Systems (c) Health surveillance of workers.