



**SNDT Women's University, Mumbai**

**Department of Resource Management**

**Master of Science**

**Resource Management and Ergonomics**

*as per NEP-2020*

**Syllabus**

**(2023-24)**

HEAD OF THE DEPARTMENT  
UNIVERSITY DEPT. OF RESOURCE MANAGEMENT  
S.N.D.T. Women's University  
Juhu Road, Santacruz (West),  
Mumbai-400 049.

**Program Name: M.Sc. Resource Management & Ergonomics****Board of Studies: Resource Management****Faculty: Science & Technology**

<b>Program Degree in M.Sc.</b>		<b>Master of Science (Home Science)</b>
<b>Parenthesis if any (Specialization)</b>		<b>Resource Management &amp; Ergonomics</b>
<b>Preamble</b>		<p>“Ergonomics today is emerging field addressing issues and concerns related to human machine interaction, occupational health and safety related problems &amp; issues and aims at finding solutions to these work-related problems and implementing for better productivity and wellbeing of the workforce”.</p> <p>The Master’s Program in Resources Management &amp; Ergonomics is professionally designed program incorporating all the areas of global concern in ergonomics &amp; human-related factors. The program offers a variety of specialized courses, such as Human Resource Management, Financial Management, Ergonomics, Work &amp; Work Posture Analysis, Job Analysis &amp; Optimization, Occupational Ergonomics, Consumer Behavior, Consumer Ergonomics, Methods of Research, Statistics, Dissertation, Internship and Electives to choose in each Semester. The program in Resource Management &amp; Ergonomics is of global concern and fast growing and gaining popularity among all industries, organizations, and professional bodies. The program is specialized program; one of its kind and has various opportunities in international job market.</p>
<b>Program Outcome</b>		To enable the learner in a comprehensive understanding of the theoretical knowledge, subject skills, develop concept building and practical application of knowledge in different areas of work spheres.
		On successful completion of the Master’s Program the student demonstrates an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems.
		Empower the learner to Protect & promote sustainability through Environment & Energy management knowledge by bringing end to the misuse of natural resources.
		Demonstrate the understanding of business opportunities for future ventures by application of competency skills in management & leadership qualities.
		To boost employability and careers prospects in global market through the well curated theoretical and practical training knowledge.

<b>Program Specific Outcomes (POs)</b>		After completing this program, Learner will
	1.	Ability to organize Ergonomics Awareness among employees, employers, educational institutes, occupational groups and other professionals
	2.	Knowledge and skills will contribute to determine the prevalence, predisposing factors, presenting features and outcome of treatment for various health problems.
	3.	Develop products that solve common workplace problems by using ergonomic research methods and theoretical knowledge.
	4.	Ability to apply knowledge of the sciences of ergonomics, human factors, work environment and workplace ergonomics
	5.	Demonstrate an ability to work effectively, make wise decisions, good networking & communicate effectively with colleagues and other professionals.
	6.	Ability to identify and explain issues facing start-ups and entrepreneurial businesses; emphasizing on financing, marketing and organization.
	7.	Application of consumer knowledge in buying practices & use of legal aids
	8.	Apply the knowledge of finance in wise investments opportunities & daily life.
<b>Eligibility Criteria for Program</b>		<p>Students who have obtained any one of the following degrees from any recognized University and have obtained the degree as specified below are eligible to apply:</p> <ul style="list-style-type: none"> <li>• Minimum 50% percent or B grade for students with BSc Resource Management, BSc Home Management, BSc Family Resource Management, BSc Home Economics, BSc General Home Science, BSc Composite Home Science, BSc Family and Community Sciences, BA in Home Science, BSc in Microbiology/ Physiology/Physiotherapy.</li> <li>• Minimum 50% or B grade for students from any other allied fields.</li> </ul>
<b>Intake (For SNTD WU Departments and Conducted Colleges)</b>		25

## M.Sc. Resource Management & Ergonomics

Postgraduate Program of 2 years:

Year I

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	<b>Semester I</b>					
114611	Fundamentals of Ergonomics & Design (Th)	Major (Core)	4	100	50	50
114612	Human Resource Management (Th)	Major (Core)	4	100	50	50
114613	Work Physiology & Work Study (2+2)	Major (Core)	4	100	50	50
114624	Work Posture and Analysis (Pr)	Major (Core)	2	50	50	0
124611	Consumer Behaviour (Th)	Major (Elective)	4	100	50	50
134611	Research Methodology (Th)	Minor Stream (RM)	4	100	50	50
	<b>End of SEMESTER-I</b>		<b>22</b>	<b>550</b>	<b>300</b>	<b>50</b>
	<b>Semester II</b>					
214611	Occupational Health & Safety (2+2)	Major (Core)	4	100	50	50
214612	Industrial Ergonomics (2+2)	Major (Core)	4	100	50	50
214613	Workplace & Environmental Ergonomics (2+2)	Major (Core)	4	100	50	50
214614	Statistics (Th)	Major (Core)	2	50	0	50
224611	Organization Behaviour (Th)	Major (Elective)	4	100	50	50
244641	Internship – Industry/Organization (Pr)	OJT	4	100	50	50
	<b>End of SEMESTER-II</b>		<b>22</b>	<b>550</b>	<b>250</b>	<b>300</b>

**Exit option: (44 credit) after Three-Year UG Degree**

## M.Sc. Resource Management & Ergonomics

### Postgraduate Program of 2 years:

#### Year II

SN	Courses	Type of Course	Credits	Marks	Int	Ext
	<b>Semester III</b>					
314611	Product & Furniture Design (2+2)	Major (Core)	4	100	50	50
314612	Designing for Special Population (2+2)	Major (Core)	4	100	50	50
314613	Ergonomics for Sports & Leisure (2+2)	Major (Core)	4	100	50	50
314614	Behavioral & Cognitive Ergonomics (Th)	Major (Core)	2	50	0	50
324621	Statistical Software for Data Analysis (Pr)	Major (Elective)	4	100	50	50
354631	Research Project (Pr)	RP	4	100	50	50
	<b>End of SEMESTER-III</b>		<b>22</b>	<b>550</b>	<b>250</b>	<b>300</b>
	<b>Semester IV</b>					
414611	Ergonomics Standards & Certification (2+2)	Major (Core)	4	100	50	50
414612	Sustainable Ergonomics (2+2)	Major (Core)	4	100	50	50
414613	Technology in Ergonomics (2+2)	Major (Core)	4	100	50	50
424611	Scientific Writing (2+2)	Major (Elective)	4	100	50	50
454631	Research Project - Dissertation	RP	6	150	100	50
	<b>End of SEMESTER-IV</b>		<b>22</b>	<b>550</b>	<b>300</b>	<b>250</b>

#### Value-aided Course by Department of Resource Management: RM & Ergonomics

1. Financial Management (Savings & Investment) - 2 credits (30 hours)
2. Health and Fitness - 2 Credits (30 hours)

## Course Syllabus

### Semester I: Fundamentals of Ergonomics & Management

Sr.No.	Courses	Type of Course	Credits	Marks	Int	Ext
<b>Semester I: Fundamentals of Ergonomics &amp; Management</b>						
114611	Fundamentals of Ergonomics & Design (Th)	Major (Core)	4	100	50	50
114612	Human Resource Management (Th)	Major (Core)	4	100	50	50
114613	Work Physiology & Work Study (2+2)	Major (Core)	4	100	50	50
114624	Work Posture and Analysis (Pr)	Major (Core)	2	50	50	0
124611	Consumer Behaviour (Th)	Major (Elective)	4	100	50	50
134611	Research Methodology (Th)	Minor Stream (RM)	4	100	50	50
<b>End of SEMESTER - I</b>			<b>22</b>	<b>550</b>	<b>300</b>	<b>250</b>

## Semester I: Fundamentals of Ergonomics & Management

### 1.1 Major (Core): Fundamentals of Ergonomics & Design (Th)

<b>Course Title</b>	<b>Fundamentals of Ergonomics &amp; Design</b>
<b>Course Credits</b>	4 (Th)
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Define and apply the ergonomics principles in everyday life activities
	2. Design the workspaces as per human dimensions and needs
	3. Carryout work efficiently by applying principles of good workplace design, postures, and environment at work
	4. Apply the principles of preventive ergonomics to overcome workplace and occupational risks
	5. Differentiate between good ergonomics and poor ergonomics
<b>Module 1 (Credit 1) : Domains of Ergonomics</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Define various domains of ergonomics
	2. Differentiate between fitting job to man and fitting man to job
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• History of Ergonomics, FJM &amp; FMJ</li> <li>• Physical Ergonomics – Anthropometry, Anatomy, Work Physiology, Biomechanics</li> <li>• Cognitive Ergonomics – Stress, Fatigue, perception, memory, reasoning, and motor response</li> <li>• Organizational Ergonomics - team work, job shifts, work satisfaction, schedules, policies, and ethics</li> </ul>
<b>Module 2 (Credit 1) : Ergonomics and Health</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Explore the occupational risks and apply preventive measures to reduce the risks
	2. Define the Man-Machine-Environment relationship and design the environment around it
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Relationship between Ergonomics and health, MME system</li> <li>• health, fitness and Postural risks – MSD's, Injuries, Pains/aches, etc.</li> <li>• Impact of environment on Human Health</li> <li>• Preventive measures</li> </ul>

<b>Module 3 (Credit 1) : Design Principles</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Use the various principles of design in designing different workplaces with different needs
	2. Design and analyze workplaces and products and apply innovative ideas to modify/develop user-friendly design
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Principles of Design, Universal Design, UX/UI Design</li> <li>• Six Pillars of Ergonomics Design</li> <li>• Product concept and design innovation</li> <li>• Workstation Design and Analysis</li> </ul>
<b>Module 4 (Credit 1) : Application &amp; Benefits of Ergonomics</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Differentiate between macro and micro ergonomics
	2. Design physical fitness program for workers/employees
	3. Use the knowledge of ergonomics for benefit of the varied population
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Macro &amp; Micro Ergonomics</li> <li>• Health and physical fitness</li> <li>• Application in Healthcare, Aging, IT, Transportation, etc.</li> <li>• Inclusive Designing for special population</li> </ul>

### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

#### **Total Marks – 50 (Internal)**

1. **Individual Assignment:** To observe and analyze various workplace in terms whether ergonomics principles are followed or violated.
2. **Group Project:** To make a checklist by referring various available checklist to assess the Impact of MME system on workers in terms of MSD's and other occupational risks.
3. **Individual Project:** Using principles of design, design/redesign/modify any one tool/product
4. **Case Study:** To take up any one area/population/sector and do case study from Ergonomics point of view

#### **References**

1. Anshel, J. (1998): Visual Ergonomics in the Work Place, Taylor and Francis (UK, USA); published by Taylor and Francis, C., London.
2. Anton, T.J. (1989): Occupational Safety and Health Management, 2nd edition, (SanFrancisco, Tokyo).
3. Astrand & Rodahl. (1977). Textbook of Work Physiology: Physiological Bases of Exercise McGraw-Hill Series, USA.



4. Bhattacharya, A. and McGlothlin (1996): Occupational Ergonomics: Theory and Applications, Marcel Dekker Inc. (New York, Basel, Hong Kong); Marcel Dekker Inc., New York
5. Dul, J. and Weerdmeestre, B. (2001): Ergonomics for Beginners: A Quick Reference Guide; 2nd edition, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
6. Harkness, S.P. (1976): Building without Barriers for the Disabled, Whitthey Library of Design, New York
7. Koncelik, J.A. (1982): Aging and the Product Environment, Hutchinson Ross Publication, Pennsylvania
8. Kroemer, K.H.E. and Grandjean, E. (1997) (5th edition): Fitting the Task to the Human, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
9. Nicholson, A. and Ridd, J.E. (1988): Health Safety and Ergonomics, Butterworths, London, Butterworths, C.
10. Osborne, D.J. (1982) (2nd edition): Ergonomics at Work, (Chichester, New York, Toronto); Chichester: John Wiley & Sons.
11. Pleasant, S. (2001): Body Space, Taylor and Francis (Great Britain); published by Taylor and Francis, C., London.
12. Pleasant, S. (1991): Ergonomics, Work and Health, Mac Millan Press, London

## 1.2 Major (Core): Human Resource Management (Th)

<b>Course Title</b>	<b>Human Resource Management</b>
<b>Course Credits</b>	<b>4 (Th)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Conversant with the nature and fundamentals of human resources.
	2. Apply different methods in managing human resources.
	3. Competent in hiring employees and deciding employee remuneration.
	4. Proficient in motivating and maintaining employees.
	5. Capable of developing industrial relations.
<b>Module 1 (Credit 1): Introduction to Human Resource Management</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Formulate the human resource policies in an organization
	2. Design and conduct training programmes for the employees efficiently
<b>Content Outline</b>	<p><b>HRM:</b> Nature, significance, scope, functions, objectives of HRM</p> <ul style="list-style-type: none"> <li>• Organization of HR Department</li> <li>• Principles, policies and Models of HRM</li> </ul> <p><b>HRD:</b> Significance, scope, objectives and techniques of HRD</p> <ul style="list-style-type: none"> <li>• Functions and Attributes of HRD manager</li> <li>• Communication skills and organizational development</li> <li>• Employee Training: Assessment of training needs, training methods, training procedures, advantages of training and evaluation of training programs</li> </ul>
<b>Module 2 (Credit 1): Human Resource Planning and placement</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Plan the requirement of human resource in organization and have good recruitment and selection strategies
	2. Efficiently organize the orientation and training programmes for new hired employees
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Nature of Human Resource Planning</b> - Benefits of HR planning, Process of HR planning, Problems, Factors affecting and recent trends in HRP</li> <li>• <b>Job Design and Job Analysis</b> - Meaning and approaches to job design, Factors affecting, purpose and process, problems, uses and recent developments in job analysis</li> <li>• <b>Recruiting Human Resources</b> - Need, Objectives and importance of recruitment, recruitment policy and strategy,</li> </ul>

	<p>Recruitment process, traditional and modern sources, techniques, factors affecting and alternatives to recruitment</p> <ul style="list-style-type: none"> <li>• <b>Selecting Human Resources</b> - Role, nature and definition of selection, Organization and process of selection, factors affecting and barriers to effective selection</li> <li>• <b>Inducting and Placing New Hires</b> - Nature, purpose and different stages of orientation process, employee orientation programs, evaluation and problems and placement-meaning and problems</li> </ul>
<b>Module 3 (Credit 1): Performance Appraisal and Job Evaluation</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Design the performance appraisal forms for different categories of employees and use right method for appraisal
	2. Differentiate between job evaluation and performance appraisal and have alternatives to job evaluation
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Performance Appraisal</b> - Need for performance appraisers and appraisal, Process and methods of performance appraisal - Modern methods (BARS, assessment center MBO, HRA, Psychological appraisals), Sensitivity training and management grid, Uses and purposes of performance appraisal, Potential appraisal and challenges in performance appraisal, Edward Deming's view on performance appraisal</li> <li>• <b>Job evaluation</b> - Meaning and objectives of job evaluation, difference between job evaluation and performance appraisal, Principles and Procedure of Job Evaluation, Problems and alternative to job evaluation</li> </ul>
<b>Module 4 (Credit 1): Employee Remuneration and Career Planning and Development</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Design and implement the remuneration and reward policy for the employees
	2. Guide the employees for career planning and developmental stages for career advancement
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Managing Remuneration</b> - Employee Remuneration, Components of employee remuneration, Theories of employee remuneration, Influencing factors of remuneration, Remuneration plans, challenges of remuneration. Concepts of wage and salary administration and their Objectives, Role of reward system, factors affecting wage/salary levels, Wage Boards and Pay Commissions, Wage Incentive, profit sharing, Bonus and Managerial Compensation, Fringe Benefits, Non-Monetary Rewards</li> <li>• <b>Career Planning and Development</b> - Career planning and development for employee and organization, career development programs, Job satisfaction, career personality test, career planning process, potential challenges in Career Planning and Development</li> </ul>

## **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

### **Total Marks: 50 (Internal)**

1. **Individual Assignment:** Differentiate between HRM & HRP
2. **Group Project:** Recruitment, selection and hiring methods employed by organizations
3. **Individual Project:** Design an appraisal form for different categories of employees
4. **Case Study:** To take up any one organization and study their career planning and career development strategies.

### **References:**

1. Ashwathappa, K. (2004) Human Resource and Personnel Management, 3rd edition Tata McGraw Hill Publication.
2. Bratton, J. & Gold, J (1999) Human Resource Management Theory and Practice, London, MacMillan Business.
3. Bhambra, A. (1999), Nature of Human Resource Management, New Delhi, Commonwealth Publishers.
4. Rao, S. (2002) Personnel and Human Resource Management, Himalaya Publishing House.
5. Armstrong, M. (1992): A Handbook of Human Resource Management, New Delhi, Adity Books Pvt Ltd
6. Chopra, R.K. (2001): Management of Human Resources. Allahabad, KitabMahal.
7. Dessler, G. (2001): Human Resource Management. New Delhi, Prentice Hall.
8. SubbaRao, P. (2002): Personnel and Human Resource Management, Himalaya Publishing House.

### 1.3 Major (Core): Work Physiology & Work Study (Th/Pr)

<b>Course Title</b>	<b>Work Physiology &amp; Work Study</b>
<b>Course Credits</b>	<b>2 (Th)+2 (Pr)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to <ol style="list-style-type: none"> <li>1. Gain the competencies to differentiate types of work and classify them in appropriate categories</li> <li>2. To assess physiological workload in laboratory and in field situations</li> <li>3. Develop skills in conducting time and motion studies and techniques of work measurements</li> <li>4. Develop skills in assessing physical fitness</li> <li>5. Find the relationship between posture and workload</li> </ol>
<b>Module 1 (Credit 1): Work Physiology (Th) (15 hrs))</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to <ol style="list-style-type: none"> <li>1. Differentiate people based on body types</li> <li>2. Design the need for food intake based on types of work</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Work, components of work, factors affecting work, types of work, fuel for work, physiological workload, energy expenditure</li> <li>• Skeletal Muscles – types, functions, structure, muscle contraction</li> <li>• Body Type and somatotypes</li> <li>• Effect of posture on physiological functions</li> <li>• Effects of physical work environment on the worker</li> <li>• Fatigue – types of fatigue, symptoms of fatigue, causes of fatigue, factors contributing to inefficiency and fatigue in industry, boredom, staleness.</li> </ul>
<b>Module 2 (Credit 1): Work Physiology (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to <ol style="list-style-type: none"> <li>1. Define the workload, physical fitness and fatigue</li> <li>2. Analyse the impact of working in different environment on worker</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Energy cost of various activities – physiological cost of work</li> <li>• Physical Fitness – Cardiorespiratory, Muscular Strength, Flexibility, etc.</li> <li>• Body composition</li> <li>• Effect of Heat, Light, Noise, Vibration on Worker</li> <li>• Effect of fatigue on work</li> </ul>

<b>Module 3 (Credit 1): Work Study (Th)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Carryout work measurement using different techniques
	2. Apply principles of time and motion study to improve performance
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Work study – Method study and Measurement study</li> <li>• Job Design – Method analysis, trends in job design, physical consideration in job design (work physiology-work-rest cycle and ergonomics-fitting job to man)</li> <li>• Behaviourial approaches to job design-job enlargement, job rotation, job enrichment</li> <li>• principles of motion economy, motion study techniques</li> <li>• Work measurement – purpose, techniques of work measurements, time study, work sampling</li> <li>• Need for developing new methods</li> </ul>
<b>Module 4 (Credit 1): Work Study (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Design work-rest cycle for different jobs
	2. Analyse and suggest the best method to perform task
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Work rest cycle study</li> <li>• Job analysis</li> <li>• Time and motion study</li> <li>• Method study – to examine job and find most suitable or efficient method to perform job.</li> <li>• To design workstation</li> </ul>

### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

1. **Individual Assignment:** To find out the physiological workload for different types of work
2. **Group Project:** To conduct time and motion study for different jobs
3. **Individual Project:** Job Design-job enlargement, job rotation, job enrichment
4. **Case Study:** Fatigue assessment using questionnaire method

### **References:**

1. Anton, T.J. (1989): Occupational Safety and Health Management, 2nd edition, (SanFransico, Tokyo).
2. Astrand & Rodahl. (1977). Textbook of Work Physiology: Physiological Bases of Exercise McGraw-Hill Series, USA.
3. Brouha, L. (1960). Physiology in Industry: Evaluation of industrial stresses by the physiological reactions of the worker. International Series of Monographs on Pure and Applied Biology. Division: Modern Trends in Physiological Sciences, Vol. 4. Pergamon Press.

4. Dul, J. and Weerdmeestre, B. (2001): Ergonomics for Beginners: A Quick Reference Guide; 2nd edition, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
5. Grandjean, E. (1971): Fitting the task to the man: An Ergonomic Approach. 2nd edition, Taylor and Francis Ltd (London, New York).
6. Karpovich P.V. (1965). Physiology of muscular activity. 6<sup>th</sup> Edition. W.B. Saunders Company. USA.
7. Koncelik, J.A. (1982): Aging and the Product Environment, Hutchinson Ross Publication, Pennsylvania
8. Kroemer, K.H.E. and Grandjean, E. (1997) (5th edition): Fitting the Task to the Human, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
9. Osborne, D.J. (1987): Ergonomics at Work. 2nd edition, John Wiley & Sons Ltd. Chichester, New York, Toronto.
10. Pleasant, S. (1991): Ergonomics, Work and Health, Mac Millan Press, London
11. Weiner, J.S. and Lourie. J.A. (1981). Practical Human Biology. Academic Press Inc. (London) Ltd.

#### 1.4 Major (Core): Work Posture and Analysis (Pr)

<b>Course Title</b>	<b>Work Posture and Analysis</b>
<b>Course Credits</b>	<b>2 (Pr)</b>
<b>Course Outcomes</b>	<p>After going through the course, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Differentiate between good posture and poor posture.</li> <li>2. Apply the knowledge of posture to design workplaces for normal and disable population to improve their quality of life.</li> <li>3. Demonstrate and use knowledge to practically train the people at workplace/organization to adopt right posture</li> <li>4. Independently carryout postural analysis by using right methods of postural assessment to enhance wellbeing of employees</li> <li>5. Develop the good relationship between man and machine/tool used.</li> </ol>
<b>Module 1 (Credit 1): Work Posture Study (15 hrs)</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Define types of postures and problematic postures</li> <li>2. Design workplaces that will help people to have good posture</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Study of Work Postures adopted at work</li> <li>• Case study for Awkward Postures at work</li> <li>• Fixed Postures – static postures at work</li> <li>• Dynamic Postures – types of postures adopted at movable jobs</li> </ul>
<b>Module 2 (Credit 1): Work Posture Analysis (15 hrs)</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Differentiate between postural assessment tools and their application</li> <li>2. Use the postural assessment tools effectively at workplaces</li> </ol>
<b>Content Outline</b>	<p>Methods of postural Assessment</p> <ul style="list-style-type: none"> <li>• OWAS</li> <li>• RULA</li> <li>• REBA</li> <li>• ROSA</li> <li>• WERA</li> <li>• QEC</li> </ul>



## **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

### **Total Marks – 25 (Internal)**

1. **Individual Assignment:** To observe various postures adopted at workplace or while performing any activity anywhere, classify them and make presentation.
2. **Case Study:** To carryout practical assessment of postures studied in a particular set-up/organization/workplace.

### **References:**

1. Dul, J. and Weerdmeestre, B. (2001): Ergonomics for Beginners: A Quick Reference Guide; 2nd edition, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
2. Kroemer, K.H.E. and Grandjean, E. (1997) (5th edition): Fitting the Task to the Human, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
3. Osborne, D.J. (1987): Ergonomics at Work. 2nd edition, John Wiley & Sons Ltd. Chichester, New York, Toronto.
4. Pleasant, S. (1991): Ergonomics, Work and Health, Mac Millan Press, London

### 1.5 Major (Elective): Consumer Behaviour (Th)

<b>Course Title</b>	<b>Consumer Behaviour</b>
<b>Course Credits</b>	<b>4 (Th)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Apply the knowledge of the determinants of consumer behaviour and techniques of decision-making process for purchasing
	2. Use the knowledge of legal aids and consumer laws to deal with consumer problems and fight to protect their rights
	3. Apply consumer legislations, rights, and responsibilities of the consumers to full use and understand their limitations
	4. Demonstrate the skills to understand the impact of global trade in the Indian Consumer Market
	5. Demonstrate the signs of empowered consumer by being a responsible consumer
<b>Module 1 (Credit 1): Introduction to Consumer Behaviour</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Apply the knowledge of decision-making models in buying habits
	2. Demonstrate the skills in anticipating global market and its effect on consumers
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Consumer behaviour</b> <ul style="list-style-type: none"> <li>• Introduction, Definition and concept of Consumer Behaviour</li> <li>• Ergonomic approach to consumer products and services</li> <li>• Different stages of consumer buying process</li> <li>• Consumer Motivation</li> </ul> </li> <li>• <b>Factors affecting Consumer Behaviour</b> <ul style="list-style-type: none"> <li>• Individual factors affecting buying behaviour</li> <li>• Group factors affecting buying behaviour</li> <li>• Social factors affecting buying behaviour</li> </ul> </li> <li>• <b>India's New Economic Policy and Its Impact on Consumers</b> <ul style="list-style-type: none"> <li>• Globalization, Privatization and Liberalization</li> <li>• Wider choice for consumers: Buying skills</li> <li>• Aggressive Marketing in the face of competition</li> <li>• Effects of Employment (Purchasing power of Consumers)</li> <li>• Effects on economy and developing countries- effect on consumer</li> <li>• Competition policy-Regulatory reforms</li> </ul> </li> </ul>
<b>Module 2 (Credit 1): Factors affecting Consumer Behaviour</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Demonstrate the behavioural changes based on social, geographical, group and individual influences on making purchases

	2. Differentiate the buying behaviour based on understanding of decision-making models
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Factors affecting</b> <ul style="list-style-type: none"> <li>• Individual factors affecting buying behaviour</li> <li>• Group factors affecting buying behaviour</li> <li>• Social factors affecting buying behaviour</li> </ul> </li> <li>• <b>Decision Making Models in Buying Behaviour</b> <ul style="list-style-type: none"> <li>• Psychological Process</li> <li>• Pavlovian Model</li> <li>• Input-Output Model</li> <li>• Sociological Model etc.</li> </ul> </li> </ul>
<b>Module 3 (Credit 1): Consumer Empowerment and Consumer Education</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Demonstrate the qualities of empowered consumer
	2. Apply the knowledge of consumer education to solve consumer problems
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Consumer Empowerment</b> <ul style="list-style-type: none"> <li>• Introduction and importance of consumer empowerment</li> </ul> </li> <li>• <b>Consumer Aids</b> <ul style="list-style-type: none"> <li>• Classification of consumer aids</li> <li>• Information, protection and product safety</li> <li>• Education and services</li> </ul> </li> <li>• <b>Consumer education</b> <ul style="list-style-type: none"> <li>• Scope of consumer education</li> <li>• Approaches to consumer education</li> </ul> </li> <li>• <b>Consumer Satisfaction/Dissatisfaction</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Theories of disconfirmed expectations</li> <li>• Post purchase dissonance</li> <li>• Factors affecting dissonance</li> <li>• Dissonance reduction</li> </ul> </li> </ul>
<b>Module 4 (Credit 1): Consumer Protection and Legislation and Consumerism</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Develop the skills to resolve consumer problems by applying knowledge of consumer protection acts
	2. Strengthen the consumer movement by consumer awareness training programmes
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Consumer Protection and Legislation [Pertaining to goods, services, housing etc.]</b> <ul style="list-style-type: none"> <li>• Consumer protection rights, Right to boycott and consumer laws</li> <li>• Consumer forum</li> <li>• Redressal mechanism as per the Consumer Protection act</li> <li>• Integrated three stage consumer complaint redressal mechanism:</li> <li>• Consumer Online Research and Empowerment (CORE) Centre</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• National Consumer Helpline (NCH)</li> <li>• Consumer Voice</li> <li>• FICCI Alliance for consumer care (FACC)</li> <li>• Non-Litigation Mechanism or Alternative Dispute Resolution (ADR)</li> <li>• Computerization and Computer Networking of Consumer Forums in the Country</li> <li>• <b>Consumerism</b> <ul style="list-style-type: none"> <li>• Need and Scope of Consumerism</li> <li>• Origin and Growth</li> <li>• Objectives of consumer movement</li> <li>• Consumer movement abroad</li> <li>• Consumer movement in India</li> <li>• Consumer movement in Maharashtra</li> </ul> </li> <li>• <b>Modern trends in Consumerism</b></li> </ul>
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### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

#### **Marks – 50 (Internal)**

1. Individual Assignment: Consumer Rights and Responsibilities
2. Workshop: To organize workshop on consumer awareness on consumer rights
3. Group Project: To carryout one case study on factors affecting consumer behaviour.
4. Discussion: Modern trends in consumerism

#### **References:**

1. Khan M. (2001): Consumer Behaviour, New Age International (P) Limited Publisher.
2. Nair, S. R. (2001): Consumer Behaviour (Test & Cases), Himalaya Publishing House.
3. Nair, S. R. (2001): Consumer Behaviour in Indian Perspective, Himalaya Publishing House.
4. Niraj Kumar (1999): Consumer Protection in India, Himalaya Publishing House.
5. Sharan, A.K. (1999): Consumer Psychology, Rajat Publications.

## 1.6 Minor Stream (RM): Research Methodology (Th)

<b>Course Title</b>	<b>Research Methodology</b>
<b>Course Credits</b>	<b>4 (Th)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Develop a scientific approach and know the processes of research
	2. Develop the competence for selecting methods and tools appropriate for research topics
	3. Understand concepts of statistical measures of central tendency, dispersion, variability and probability
<b>Module 1 (Credit 1): The Research Process</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Understand process of research and its relationship to knowledge and science.
	2. Identify research process based on actual researches conducted.
	3. Recognize process of research problem formulation.
<b>Content Outline</b>	<p><b>The Research Process</b></p> <ul style="list-style-type: none"> <li>• Scientific approach to enquiry in comparison to native, common-sense approach</li> <li>• Knowledge, theory and research</li> <li>• Role, need and scope of research in the discipline of Home Science</li> <li>• Assignment: Differentiate between investigative reporting and research report (with examples to be brought by students as exercise)</li> </ul> <p><b>Steps in Research Process and Elements of Research</b></p> <ul style="list-style-type: none"> <li>• Identifying interest areas and prioritizing</li> <li>• Selection of topic and considerations in selection</li> <li>• Review of related literature and research</li> <li>• Variables- types of variables including discrete and continuous variables</li> <li>• Conceptual definitions and operational definitions</li> <li>• Concepts, hypotheses and theories</li> <li>• Hypothesis- meaning, attributes of a sound hypothesis, Stating the hypothesis and types of hypothesis</li> <li>• Hypothesis testing- null hypothesis, sample distribution, level of significance, critical regions, Type I and Type II errors</li> <li>• Research Design</li> <li>• Research questions, objectives and assumptions</li> <li>• <b>Ethics in Research</b></li> </ul>
<b>Module 2 (Credit 1): Types of Research</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to

	1. Understand and apply different types of research procedures.
	2. Able to design research studies by knowing methods of research.
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Basic and Applied research, Qualitative and Quantitative research (brief review of differences)</li> <li>• Historical research</li> <li>• Descriptive research methods – survey, case study, correlational study, content analysis, causal-comparative research</li> <li>• Analytic studies- pre-experimental, experimental research, quasi experimental research</li> <li>• Qualitative research, Ethnography</li> <li>• Evaluative research- general characteristics, use of qualitative methods in enquiry</li> <li>• Scope and importance in Home Science.</li> </ul>
<b>Module 3 (Credit 1): Sampling</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Understand different techniques of sampling.
	2. Apply sampling procedures for specific research problems.
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Rationale, characteristics- meaning, concept of population and sample, and utility</li> <li>• Types of sampling and generalizability of results</li> <li>• Probability sampling - simple random sample, systematic random sample, stratified random sampling etc - random and non-random samples, random numbers and use</li> <li>• Non-probability sampling - purposive samples, incidental samples, quota samples, snowball samples</li> <li>• General consideration in determination of sample size</li> </ul>
<b>Module 4 (Credit 1): Tools for Data Collection</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Define and differentiate different tools of data collection.
	2. Design different tools of data collection
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Primary and secondary methods of data collection</li> <li>• Different types of questionnaires, rating scales, check lists, schedules, attitude scales, inventories, standardized tests, interviews, observation</li> <li>• Development of tools, estimation of reliability and validity of tools</li> <li>• Procedure for preparation of the tool, administration of tools for data collection</li> <li>• Procedure for data collection</li> <li>• Planning for data analysis-coding of responses</li> </ul>

## **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

1. **Assignment 1:** Recognize different Types of variables.
2. **Classroom activity 1:** Hypothesis formations and research questions from Research readings – students identify hypothesis/research questions – Discussion
3. **Presentation 1:** Construction of tools for data collection a) types of questions b) Questionnaire c) interview schedule d) observation e) scales
4. **Presentation 2:** Types of sampling methods used in research
5. **Classroom Activity 2:** Differentiate between (a) basic and applied research (Exercise to be based on actual research papers published in accredited journals) (b) qualitative and quantitative research
6. **Assignment 2:** Identify 5 research papers on particular area/topic of research and write review.

## **References**

1. Bell, J. (1997): How to Complete Your Research Project Successfully: A Guide for First-time Researchers, UBSPD, New Delhi.
2. Festinger, L. and Katz, D. (ed.) (1977): Research Methods in the Behavioral Sciences, Amerind Publishing, New Delhi.
3. Gupta, S. (2001) "Research Methodology and Statistical Techniques", Deep and Deep, New Delhi.
4. Jain, G. (1998): Research Methodology: Methods and Techniques, Mangal Deep, Jaipur.
5. Kothari, C.R. (2000): Research Methodology: Methods and Techniques, WishwaPrakashan, New Delhi.
6. Kumar, A. (1997): Social Research Method (The Art of Scientific Investigation), Anmol Publication, New Delhi.
7. Kumar, A. (2002): Research Methodology in Social Sciences, Sarup and Sons, New Delhi.
8. McBurney, D.H. (2001): Research Methodology, Thomson-Wadsworth, Australia.

**END OF SEMESTER I**

## Course Syllabus

### Semester II: Industrial & Occupational Ergonomics

Semester II						
Sr. No.	Courses	Type of Course	Credits	Marks	Int	Ext
<b>Semester II: Industrial &amp; Occupational Ergonomics</b>						
214611	Occupational Health & Safety (2+2)	Major (Core)	4	100	50	50
214612	Industrial Ergonomics (2+2)	Major (Core)	4	100	50	50
214613	Workplace & Environmental Ergonomics (2+2)	Major (Core)	4	100	50	50
214614	Statistics (Th)	Major (Core)	2	50	0	50
224611	Organization Behaviour (Th)	Major (Elective)	4	100	50	50
244641	Internship – Industry/ Organization (Pr)	OJT	4	100	50	50
	<b>End of SEMESTER - II</b>		<b>22</b>	<b>550</b>	<b>250</b>	<b>300</b>



## 2.1 Major Core: Occupational Health & Safety (2Th+2Pr)

<b>Course Title</b>	<b>Occupational Health &amp; Safety</b>
<b>Course Credits</b>	<b>2(Th)+2(Pr)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Understands the Safety and health policy, importance of training
	2. Understand the occupations hazards, diseases and disorders and measures undertaken to make workplace safe
	3. Identify the impact of occupational hazards and occupational hygiene on employee's health
	4. Use the knowledge of occupational laws, rules and regulations for solving workers problems related to health and safety
	5. Set the stage for an overview of health care, Risk and the harm caused by the healthcare, Human error and complex systems, Ethics, professional behaviours and regulation
<b>Module 1 (Credit 1): Occupational Hazards and Risk Assessment (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Determine the risks on exposure to different occupational settings
	2. Use different methods to assess risk at workplaces and communicate preventive measures
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Physical, Chemical, Biological and Ergonomical Hazards</li> <li>• Initial Ergonomics Risk assessment (INERA) – Awkward posture, Fixed posture, Forceful exertions, Repetitive motions, Vibrations, contact stress &amp; environmental factors</li> <li>• Hazards identification methods – Hazard Identification &amp; Risk Assessment (HIRA), HAZOP, HAZID, Failure Mode Effect Analysis (FEMA), Job Safety Analysis (JSA), Human Error Analysis (HEA), Technic of operation Review (TOR), Fault Tree Analysis, Event Tree Analysis</li> </ul>
<b>Module 2 (Credit 1): Occupational Diseases (Th)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Identify the occupational health problems and suggest preventive measures
	2. Use knowledge of physiology to suggest workplace changes
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Occupational infections</li> <li>• Respiratory and cardiovascular diseases</li> <li>• Musculoskeletal disorders</li> <li>• Occupational carcinogen</li> <li>• Reproductive disorders</li> </ul>

<b>Module 3 (Credit 1): Occupational Hygiene &amp; Safety (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Design workplace to reduce the impact of exposure on workers
	2. Monitor exposures and prevent its impact on workers by using various control measures
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Occupational Hygiene overview</li> <li>• Monitoring exposures</li> <li>• Biological monitoring</li> <li>• Prevention and control of exposures</li> </ul>
<b>Module 4 (Credit 1): Legislation Governing Health and Safety in different Types of Work and Work Settings (Th)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Use the knowledge of labour laws to ethically safeguard the interest of workers
	2. Make workers aware about responsibilities and rights of employees and employers
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Ethics</li> <li>• Policies</li> <li>• Acts and rules</li> <li>• Health surveillance</li> </ul>

### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

#### **Marks 50 (Internal)**

1. **Assignment 1:** Identify different Types of occupational health problems/diseases/disorders in 5 occupations
2. **Classroom activity 1:** To make a checklist to identify occupational disease in some occupations
3. **Presentation 1:** Construction of tools for data collection a) types of questions b) Questionnaire c) interview schedule d) observation e) scales
4. **Classroom Activity 2:** To learn to use ergonomics equipment's to measure the environmental exposures

#### **References**

1. Ajmal A. (2023). Ethics in Occupational Health and Safety. Notion Press, India.
2. Bare Act: The Professional Safety, Health and Working Conditions Code, 2020 (37 of 2020). Professional Book Publishers.
3. Balge M. Z. (2000). Occupational Health and Safety. Third Edition. National Safety Council.
4. Friend M and Kohn J. (2006). Fundamentals of occupational Health and Safety. Fourth Edition, Government Institutes.
5. Goetsch, D. L. (2010). Occupational Safety and Health for Technologists, Engineers, and Managers. Ninth Edition. Pearson Publication.

6. Haldar S.K. (2020). Occupational Health and Hygiene in Industry. CBS Publishers.
1. Haldar S.K. (2023). Industrial and Occupational Health. Second Edition. CBS Publishers & Distributors Pvt. Ltd.
2. Oxford Handbook of Occupational Health, Oxford Medical Publications, 2013, edited by Dr Julia Smedley, Dr Finlay Dick, Dr Steven Sadhra
3. Lee, G. C.H. (1999): Advances in Occupational Ergonomics and Safety, IOS Press, Amsterdam, Berlin, Oxford, Tokyo, Washington) Amsterdam IOS Press C.
4. Mital A. (1988): Trends in Ergonomics/Human Factors I, Butterworths, London, Butterworths, C.
5. Stranks, J. (1995). Occupational Health and Hygiene: (Health and Safety in Practice Guide). First Edition, Pitman, London.

## 2.2 Major Core: Industrial Ergonomics (2 Th+2 Pr)

<b>Course Title</b>	<b>Industrial Ergonomics</b>
<b>Course Credits</b>	<b>2 (Th)+2 (Pr)</b>
<b>Course Outcomes</b>	<p>After going through the course, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Gain competence on recommended standards in industries and apply them whenever and wherever needed</li> <li>2. Identify the reasons for human error/accident in particular workplace and rectify the problem effectively</li> <li>3. Apply standards of noise, light, and vibration to improve the quality of life of the workers.</li> <li>4. Use the knowledge of impact of environment on workers to design better workplaces.</li> <li>5. Identify industrial problems and with knowledge of visits can suggest improvements in work environment</li> </ol>
<b>Module 1 (Credit 1): Introduction to Industrial Ergonomics (Th)</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Apply principles of design in work places</li> <li>2. Design the workflow and good work practices for different types of work in organizations</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Human factors application (Human error, accidents, social aspects, work environment, MMH, repetitive activities, work capacity, stress)</li> <li>• User-design Experience-Human Computer Interaction</li> <li>• Work organization design-Work organization, work flow, workload, job design, job analysis, work practices</li> </ul>
<b>Module 2 (Credit 1): Industrial Safety &amp; Acts (Th)</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Identify the safety at workplace and design problems with displays and controls</li> <li>2. Gain competence to resolve industrial health issues within the labour laws and acts</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Workplace design – Displays &amp; controls</li> <li>• Safety at workplace</li> <li>• Working in enclosed spaces</li> <li>• Industrial Health issues</li> <li>• Ethics in industrial safety</li> <li>• Legislation &amp; regulation</li> </ul>
<b>Module 3 (Credit 1): Industrial Work Environment (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to

	1. Develop competence in designing good work environment
	2. Define the issues related to the working environment and mitigate them
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Assessment of Heat Stress</li> <li>• Assessment of working in Cold environment</li> <li>• Impact of vibration among people working with vibrating tools in industries or drivers driving vehicles</li> <li>• Health problems among people working in chemical industries</li> <li>• Air pollution and its impact on human health</li> </ul>
<b>Module 4 (Credit 1): Industrial Visits (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Apply the theoretical knowledge in practical situations
	2. Visualize the working conditions, workplace design, workflow, risk factors in various industrial set-ups
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Visit to Consumer Product Manufacturing Unit</li> <li>• Visit to Pharmaceutical Packing unit</li> <li>• Visit to Automobile/Textile Industry</li> <li>• Visit to Furniture Manufacturing Industry</li> </ul>

### Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

#### Marks 50 (Internal)

1. **Assignment 1:** To study the workflow of the activity in work situation
2. **Classroom activity 1:** To prepare checklist for repetitive work
3. **Presentation 1:** Study of controls and displays
4. **Classroom Activity 2:** To learn how to use ergonomics equipment's to measure the environmental exposures
5. **Report Writing:** Writing reports for industrial visits.

#### References

1. Ajmal A. (2023). Ethics in Occupational Health and Safety. Notion Press, India.
2. Bare Act. (2020). The Factories Act, 1948 (63 of 1948) with State Amendments. Professional Book Publishers.
3. Haldar S.K. (2017). Industrial and Occupational Health. CBS Publishers & Distributors Pvt. Ltd.
4. Oxford Handbook of Occupational Health, Oxford Medical Publications, 2013, edited by Dr Julia Smedley, Dr Finlay Dick, Dr Steven Sadhra
5. Lee, G. C.H. (1999): Advances in Occupational Ergonomics and Safety, IOS Press, Amsterdam, Berlin, Oxford, Tokyo, Washington) Amsterdam IOS Press C.
6. Mohapatra R. (2002). Occupational Health Hazards and Remedies. Jaypee Publication
7. Mital A. (1988): Trends in Ergonomics/Human Factors I, Butterworths, London, Butterworths, C.

### 2.3 Major Core: Workplace & Environmental Ergonomics (2Th+2Pr)

<b>Course Title</b>	<b>Workplace &amp; Environmental Ergonomics</b>
<b>Course Credits</b>	<b>2 (Th)+2 (Pr)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Design the workplaces and work environment ergonomically
	2. Use the knowledge of impact of environment on workers to design better workplaces.
	3. Apply standards of noise, light, and vibration to improve the quality of life of the workers.
	4. To Understands the effects of different types environment like heat and cold on human body and solve the problems.
5. Gain the knowledge of various assessment tools to assess work environment and suggest improved work environment	
<b>Module 1 (Credit 1): Workplace Ergonomics (Th)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Design the spaces as per human needs
	2. Apply the anthropometric data for designing
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Anthropometry</li> <li>• Design Principles, Universal Design, Inclusive Design</li> <li>• Workplace design principles and guidelines</li> <li>• Design of Tools and equipment's</li> <li>• Office workplace design</li> </ul>
<b>Module 2 (Credit 1): Workplace Design (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Gain competence in designing workplaces using design principles
	2. Prepare guidelines for designing workplaces
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• To study different workplaces using design principles and prepare report with suggestions for improvement</li> <li>• To design new workplace based on the requirements of design</li> <li>• To develop guidelines based on the workplaces studied</li> </ul>
<b>Module 3 (Credit 1): Environmental Ergonomics (Th)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Develop products and barriers to the systems to reduce environmental stress

	2. Design workplaces environment friendly using theoretical knowledge
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Introduction to Environmental Ergonomics</li> <li>• Impact of Heat stress, Cold stress, Noise &amp; Vibration, Lighting on human health</li> <li>• Air Pollution and its impact on humans, animals and vegetation</li> </ul>
<b>Module 4 (Credit 1): Assessment of Work Environment (Pr)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Independently use equipment's for physical environment study
	2. Use knowledge of equipment's to assess and interpret data based on standards available.
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Laboratory study of the equipment's and checklists for assessment of physical work environment</li> <li>• Use of equipment's to assess work environment in lab and on field settings</li> <li>• Compilation of data collected, analysis and interpretation of results</li> <li>• Solutions and suggestions for improving work environment</li> </ul>

### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

#### **Marks 50 (Internal)**

1. **Assignment 1:** To search anthropometric data for workplace design and guiding principles
2. **Classroom activity 1:** To study the workplace and make layout of the area and analyze
3. **Presentation 1:** Factors affecting work environment
4. **Classroom Activity 2:** To learn how to use ergonomics equipment's to measure the physical environmental.

#### **References**

1. Anton, T.J. (1989): Occupational Safety and Health Management, 2nd edition, (SanFrancisco, Tokyo).
2. Astrand & Rodahl. (1977). Textbook of Work Physiology: Physiological Bases of Exercise McGraw-Hill Series, USA.
3. Brouha, L. (1960). Physiology in Industry: Evaluation of industrial stresses by the physiological reactions of the worker. International Series of Monographs on Pure and Applied Biology. Division: Modern Trends in Physiological Sciences, Vol. 4. Pergamon Press.
4. Dul, J. and Weerdmeestre, B. (2001): Ergonomics for Beginners: A Quick Reference Guide; 2nd edition, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
5. Grandjean, E. (1971): Fitting the task to the man: An Ergonomic Approach. 2nd edition, Taylor and Francis Ltd (London, New York).

6. Karpovich P.V. (1965). Physiology of muscular activity. 6<sup>th</sup> Edition. W.B. Saunders Company. USA.
7. Koncelik, J.A. (1982): Aging and the Product Environment, Hutchinson Ross Publication, Pennsylvania
8. Kroemer, K.H.E. and Grandjean, E. (1997) (5th edition): Fitting the Task to the Human, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
9. Osborne, D.J. (1987): Ergonomics at Work. 2nd edition, John Wiley & Sons Ltd. Chichester, New York, Toronto.
10. Pleasant, S. (1991): Ergonomics, Work and Health, Mac Millan Press, London
11. Weiner, J.S. and Lourie. J.A. (1981). Practical Human Biology. Academic Press Inc. (London) Ltd.



## 2.4 Major Core: Statistics (Th)

<b>Course Title</b>	<b>Statistics</b>
<b>Course Credits</b>	<b>2 (Th)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Discriminate between parametric and non-parametric tests
	2. Apply statistical tests for data analysis for both large and small samples
	3. Analyse and interpret the results based on statistical inferences drawn
<b>Module 1 (Credit 1): Introduction to Statistics</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Use the concept of statistical measures in research
	2. Carryout the management of data using SPSS and MS Excel
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Concepts</b> <ul style="list-style-type: none"> <li>• Definition, conceptual understanding of statistical measures, popular concepts and misuse of statistics</li> </ul> </li> <li>• <b>Normal Distribution and its Properties</b> <ul style="list-style-type: none"> <li>• Normal distribution</li> <li>• Binomial distribution</li> <li>• Probability, use of normal probability tables, area under normal distribution curve</li> <li>• Parametric and non-parametric tests</li> </ul> </li> <li>• <b>Data Management</b> <ul style="list-style-type: none"> <li>• Planning for data analysis – coding of responses, preparation of code book</li> <li>• Coding of data</li> <li>• Use of statistical programs</li> <li>• MS Excel</li> <li>• SPSS</li> </ul> </li> </ul>
<b>Module 2 (Credit 1): Data Analysis</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Define the grouped and un-grouped data
	2. Apply the large sample and small sample tests and interpret results
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• <b>Data Analysis</b> <ul style="list-style-type: none"> <li>• Quantitative analysis, descriptive statistics, inferential statistics: Uses and limitations, Summation sign and its properties</li> <li>• Proportions, percentages, ratios</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Measures of central tendency-mean, median, mode-arithmetic mean and its uses, mid – range, geometric mean, weighted mean</li> <li>• Measures of dispersion /variability- range, variance, standard deviation, standard error, coefficient of variation, Kurtosis, skewness</li> <li>• Grouped data-frequency distribution, histogram, frequency polygons, percentiles, quartiles, tertiles, ogive</li> <li>• <b>Large and Small Sample tests and interpretation</b> <ul style="list-style-type: none"> <li>• Z-test for single proportions and difference between proportions</li> <li>• Large sample test for single mean and difference between means</li> <li>• Small sample tests- 't'-test, paired 't'-test, 'F' Test</li> </ul> </li> </ul>
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### Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)

#### Total Marks – 25 (Internal)

1. **Individual Assignment:** Assignment on probability, Non-parametric & parametric tests
2. **Classroom Assignment:** To carryout large and small sample tests and interpretation of results

#### References:

1. Gupta S.P. (2019). Statistical Methods. 46<sup>th</sup> Edition. Sultan Chand and Sons, India.
2. Pandit, D.N. (2022). Statistics: A Modern Approach. Hindustan Publishing Corporation, India.
3. Gun, A.M., Gupta, M.K. and Dasgupta, B. (2013). Fundamentals of Statistics. Vol. 1, World Press.
4. Levin R.I. and Rubin D.S. (2006). Statistics for Management. Edition Seventh. Prentice-Hall of India Pvt. Ltd. New Delhi.

## 2.5 Major Elective: Organization Behaviour (Th)

<b>Course Title</b>	<b>Organization Behaviour</b>
<b>Course Credits</b>	<b>4 (Th)</b>
<b>Course Outcomes</b>	<p>After going through the course, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Understands the behaviour of individuals and group processes in organizations.</li> <li>2. Know the processes used in organization to achieve efficiency and effectiveness</li> <li>3. Know organizational structure through practical experience</li> <li>4. Understand different personality traits of individuals, their values, attitudes, and perceptions</li> <li>5. Demonstrate the characteristics and qualities needed for leadership and motivation</li> <li>6. Comprehend the knowledge to understand the group behavior, power and politics used in organizations</li> <li>7. Understand the reasons for conflicts and apply techniques to resolve them for development of the organization and employees</li> <li>8. Demonstrate organizational skills to communicate the organizational structure, culture and changes taking place in organization</li> </ol>
<b>Module 1 (Credit 1): Introduction to Organisational Behaviour</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Define history of organizational behaviour in chronological order</li> <li>2. Demonstrate the knowledge of various models of organizational behaviour</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Scope, significance, History and development of Organisational Behaviour as a subject.</li> <li>• Meaning and definition of Organisational Behaviour</li> <li>• Models of Organisational Behaviour</li> </ul>
<b>Module 2 (Credit 1): The Individual</b>	
<b>Learning Outcomes</b>	<p>After learning the module, learners will be able to</p> <ol style="list-style-type: none"> <li>1. Identify leadership qualities and apply in organization</li> <li>2. Differentiate individual aspects of human behaviour in organization</li> </ol>
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Foundation of individual behaviour.</li> <li>• Personality and learning.</li> <li>• Perception and attribution.</li> <li>• Values, attitudes and job satisfaction.</li> <li>• Motivation, concept and application.</li> <li>• Leadership.</li> </ul>

<b>Module 3 (Credit 1): The Group</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Identify the importance of working as a team and team building in organization
	2. Define different aspects of human behaviour like power, politics, conflicts in organizations
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Foundation of group behaviour.</li> <li>• Communication.</li> <li>• Power and politics</li> <li>• Conflicts and negotiation</li> </ul>
<b>Module 4 (Credit 1): Organizational Dynamics</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Develop the organization structure for different types of organizations
	2. Bring about change in the organizations when needed for organizational development
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Foundation of organisational structure.</li> <li>• Organisational culture</li> <li>• Organisational change.</li> <li>• Organisational Development.</li> </ul>

### **Assignments/Activities towards Comprehensive Continuous Evaluation (CCE)**

#### **Marks 50 (Internal)**

1. **Assignment 1:** To study different organizational structures
2. **Classroom activity 1:** To prepare organizational structure for different types of organizations
3. **Presentation 1:** Individual presentations on personality, perception, values and attitudes, motivation and leadership
4. **Presentation 2:** Team presentation on communication, power & Politics and Conflicts & Negotiations
5. **Classroom Activity 2:** Quiz on Organization Culture and Organization Change

#### **References**

1. K. Ashwathappa (2002) Organisational Behaviour, Mumbai, Himalaya Publishing House.
2. Stephen P. Robbins (2001): Organisational Behaviour – concepts, controversies and applications – New Delhi, Prentice Hall of India.
3. Fred Luthons (1998) Organisational Behaviour, Boston, McGraw-Hill Publishing Co.
4. Mcshane, S.L. & Glinow, M.A. (2000): Organisational Behaviour – New Delhi, McGraw-hill Publishing Co. Ltd.
5. Singh, M. (2001), Organisational Behaviour – New Delhi, Deep and Deep Publications Pvt. Ltd.
6. Newstom, J.W. & Devis, K. (2000): Organisational Behaviour – New Delhi, McGraw-hill Publishing Co. Ltd.
7. Gupta, R. (2001) Organisational Behaviour – New Delhi, KitabMahal.

8. Cook, C.W. & Hunaskar, P.L. (2001): Management and Organisational Behaviour – Boston, McGraw-hill Irwin.
9. Kumar, M. & Mittal R. (2001) Organisational Behaviour – New Delhi, Anmol Publication Pvt. Ltd.
10. Chandan, J.S. (2001): Organisational Behaviour – New Delhi, Vikas Publishing House Pvt. Ltd.
11. Pettinger, R. (1996): Organisational Behaviour – London, Macmillan Press Ltd.
12. Hersey, P. & Blanchard, K. (1996): Management of Organisational Behaviour – New Delhi, Prentice Hall India.

## 2.6 OJT: Internship – Industry/Organization (Pr)

<b>Course Title</b>	<b>Internship – Industry/Organization</b>
<b>Course Credits</b>	<b>4 (Pr)</b>
<b>Course Outcomes</b>	After going through the course, learners will be able to
	1. Absorb the knowledge gained during internship to connect to practical applications and gain work experience
	2. Apply professional training gained for career planning and development.
	3. Understand and apply work ethics while working in an organization.
	4. Demonstrate the ability to handle projects independently with confidence and show good leadership qualities in managing people
5. Apply skills of record keeping and report writing learnt during the internship	
<b>Module 1 (Credit 1)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Develop good communication skills
	2. Demonstrate professionalism and work ethics
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Identification of Organization for Internship- Formal communication, permission/ approval, identifying and planning the assignment to be undertaken during the internship programmer</li> </ul>
<b>Module 2 (Credit 1)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Document the records precisely
	2. Demonstrate the skill to review tasks efficiently
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Review of the assignment- Documentation of the different tasks/activities within the organization</li> </ul>
<b>Module 3 (Credit 1)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Apply theoretical knowledge, practically in an organization
	2. Demonstrate sound theoretical knowledge in field situation

<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Application of theoretical and practical inputs to real field situation</li> </ul>
<b>Module 4 (Credit 1)</b>	
<b>Learning Outcomes</b>	After learning the module, learners will be able to
	1. Compile the data and present
	2. Write formal structured reports for the organizations
<b>Content Outline</b>	<ul style="list-style-type: none"> <li>• Compiling the report with – introduction, observation, remarks, conclusion with recommendation</li> </ul>

**Reference:**

University Manual for Internship for the Department of Resource Management

**The PG Program in Resource Management and Ergonomics Visits and List of Journals for reference:**

**Field Visits to the**

1. Industries - Manufacturing Units, textile industries, etc.
2. Institutions – IDC (IIT, Bombay), NITIE (Now IIM, Mumbai), CIFE - Mumbai, CLI - Mumbai, FurniTech - Pune, Alok Industry – Silvassa, etc.

**List of Ergonomics & Human Factors Journals for reference**

1. Ergonomics by Taylor & Francis
2. Human Factors by Sage Publications
3. Human Factors and Ergonomics by ResearchID
4. Journal of Agromedicine by Taylor & Francis
5. Journal of Ergonomics by Longdom Publishing
6. Applied Ergonomics by ScienceDirect.com by Elsevier
7. International Journal of Human Factors and Ergonomics (IJHFE) by Inderscience Publishers
8. Ergonomics in Design by Sage Publications
9. Journal of Ergonomics Research by Scholars Central
10. International Journal of Occupational and Environmental Safety
11. Journal of Occupational Health by Wiley
12. Occupational and Environmental Health by Oxford University Press
13. Indian Journal of Occupational and Environmental Medicine by Wolters Kluwer Health
14. International Journal of Occupational Safety and Ergonomics (JOSE) by Taylor and Francis
15. International Journal of Industrial Ergonomics by ScienceDirect by Elsevier.