

**S.N.D.T Women's University**

**(www.sndt.ac.in)**

**Syllabus – Masters Programme in Resource Management**

**(Resource Management & Ergonomics)**

**(Revised – 2015)**



**SNDT Women's University**

**1, NathibaiThackersey Road,**

**Mumbai 400 020**



**SNDT Women's University**  
**1, NathibaiThackersey Road, Mumbai 400020**

**A. Eligibility for MSc Resource Management and Ergonomics**

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 :

- B. A. Minimum 45% 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.
- C. Minimum 50% or B grade for students with BSc Physiology, BSc Life Sciences, BSc Biology.

**D.Attendance Requirement**

1. This is a full time course. They should not be employed (fulltime or part time)
2. A Student shall be required to attend at least 75% of the total number of theory classes and practical/ tutorials separately for each course of study in each semester. Subject to the other conditions being fulfilled, a student shall be eligible to appear at either the department level or the University examination.
3. The Head of the department shall have the discretion to condone 10% of the overall attendance in the theory and /or practical of any course, if she is fully convinced of the student application on ground of ill-health or for reasons beyond her control. Such intimation with medical certificate or relevant supporting documents must be submitted to the Head of the department immediately.
4. The Vice Chancellor, however, reserves the right to condone additional absence up to 5% if duly reported by the student through the Head of the department. If the decision is pending of the Vice Chancellor on the above matter, the student shall be provisionally allowed to appear for the examination; subject to her guardian's undertaking in writing that the decision of the Vice Chancellor shall be final. In case the decision is adverse, the examination result **will** stand cancelled and the examination fee will not be refunded.

**E. Evaluation:**

1. Courses will have evaluated both **Internal** and **External**. The minimum passing percentage for internal as well as external is 50%.
2. **Internal assessment** comprises one or more of the following components
  - I. Submission of written reports/presentations
  - II. Continuous assessment of work done
  - III. Performance Quiz
  - IV. Project work
3. External Evaluation: At the end of the semester the examination will be held by the University.
4. The student **has to pass** all **internal assessments** in order to be eligible for appearing for the final examination.
5. There shall be **separate heads of passing** theory and practical.

**F.CBCS DETAILS:**

Introduction CBCS and NSQF guidelines from 2015-16. Under the Faculty of Home Science the details have been worked out as follows-

Distribution of Credits (PG- Masters Program) (Revised in 2015)

TOTAL CREDITS- **96 CREDITS**

(Duration- 2 Years)

Semester-I,II,III,IV

Sr. No	CBCS-Distribution Details of Courses	Weightage of credits	Credits	No of Courses offered	Remarks
1	Core Courses(CC)	50%	48	12	
2	Applied Component(AC)	30%	28	07	
3	Inter/ Intra Disciplinary Component(IC)	20%	20	05	
	Total	100%	96	24	

**Masters' Program in Resource Management & Ergonomics**  
**(2014-15)**

**Objectives: NEW**

*The Master's Programme in Resources Management & Ergonomics offers Courses in a variety of professional subjects, such as Environment Studies, Human Resource Management, Financial Management, Energy Management, Ergonomics ,Work &Work Posture Analysis, Job Analysis & Optimization, Occupational Ergonomics, Consumer Behavior, Consumer Ergonomics, Research Methodologies, Applied Statistics, Dissertation, Internship and Large range of Electives to choose from. (One courses in each Semester).*

*These courses will give the learner a comprehensive understanding of the subject. On successful completion of the Master's Program the student will have gained professional skills which will enhance work effectively and efficiently. The skills developed during training that will greatly enhance employability and careers prospects. The knowledge imparted would develop capabilities through the start of art in higher education.*

**SYLLABUS FORMATE-CBCS**

**PROPOSED SYLLABUS FORMAT- CBCS-UGC GUIDELINES (2015-16)**

Faculty Name: HOME SCIENCE

Master's Programme in Resource Management & Ergonomics

(2015-16)

2 YEARS TOTAL 96 Cr

Duration-2 years

Semester-I, II, III, IV (Each Semester-24Cr)

**SEMESTER-I**

Code No	Core Courses	Total Credits	Th-Cr	Pr-Cr	Int M	Ext M	Total Marks
19101	Environmental Studies (Th)	4	4	-	50	50	100
19102	Energy Management (Th)	4	3	1	50	50	100
19103	Ergonomics & Work Environment (Th)	4	4	-	50	50	100
19104	Ergonomics & Work Environment (Pr)	4	-	4	50	50	100
19105	Human Resource Management	4	3	1	50	50	100
19191	Elective-I-(Environmental Studies - Pr)	4	-	4	50	50	100
	Total	24	14	10	300	300	600

**SEMESTER-II**

Code No	Courses	Total Credits	Th-Cr	Pr-Cr	Int M	Ext M	Total Marks
00201	Research Methodology(Th)	4	3	1	50	50	100
19201	Financial Management (Th)	4	3	1	50	50	100
19202	Consumer Behaviour & Consumerism(Th)	4	3	1	50	50	100
19203	Work & Work Posture Analysis (Th)	4	4	-	50	50	100
19204	Work & Work Posture Analysis (Pr)	4	-	4	50	50	100
19291	Elective-II(Financial Management)(Th)	4	2	2	50	50	100
	Total	24	15	9	300	300	600

**SEMESTER-III**

Code No	Courses	Total Credits	Th-Cr	Pr-Cr	Int Cr/M	Ext Cr/M	Total Marks
00301	Research & Statistical Applications (Th)	4	3	1	50	50	100
19301	Job Analysis & Optimization (Th)	4	4	-	50	50	100
19302	Job Analysis & Optimization (Pr)	4	-	4	50	50	100
19303	Organizational Behaviour(Th)	4	3	1	50	50	100
19304	Occupational Health & Safety	4	2	2	50	50	100
19391	Elective III – Entrepreneurship Management)(Th)	4	2	2	50	50	100
	Total	24	14	10	300	300	600

**SEMESTER-IV**

Code No	Courses	Total Credits	Th-Cr	Pr-Cr	Int Cr/M	Ext Cr/M	Total Marks
00401	Dissertation (Pr)	8	-	8	100	100	200
00402	Internship (Th)	8	-	8	100	100	200
19401	Consumer Ergonomics (Th)	4	2	2	50	50	100
19491	Elective –IV(Ergonomics in Everyday Life)	4	2	2	50	50	100
	Total	24	4	20	300	300	600

## Human Resource Management (Theory)

**4-Credit Course: 4 Hours Class**

**Subject Code: 19105**

### Course Objectives

The learners will be able to: -

- Understand the nature and fundamentals of human resources.
- Use different methods in managing human resources.
- Select the hiring employees and deciding employee remuneration.
- Proficient in motivating and maintaining employees.
- Capable of developing industrial relations.
- Understand various methods of training methods and its implementation

### Module 1: Introduction to Human Resource Management

**Objectives:** After studying this module you will be able to:

1. Understand the nature, scope and objectives of human resource management
2. Differentiate between HRM & HRD
3. Understand Models of HRM
4. Describe qualities of HR manager
5. Assess training needs and evaluation of training program
6. Select training methods & procedures for employees
7. Understand advantages of training programs

### Content

#### 1.1 Introduction to Human Resource Management

- a. Nature, scope and significance of HRM
- b. Functions and Objectives of HRM
- c. Organization of HR Department
- d. Principles and policies of HRM
- e. HRM Model

#### 1.2 Human Resource Development

- a. Significance, concept & scope of HRD
- b. Need for HRD, objectives and techniques of HRD
- c. Functions and Attributes of HRD manager
- d. Communication skills and organizational development

#### 1.3 Employee Training

- a. Meaning of employee training and assessment of training needs
- b. Training methods, training procedures and advantages of training
- c. Evaluation of training programs

#### **1.4 Practical's**

- a. Interview existing HR Manager in any medium/large (MN) Industry, Identify and understand his/her role, duties responsibilities and the nature of his job.
- b. Organize guest lectures and speeches of HR Managers on current topics
- c. Carry out a survey (industry wise) to understand the type of training required and implemented in various sectors; also how to assess the need for training programs.
- d. Interview the employer, the trainer and the employee who received training for the benefits (if any) from such training programs.

### **Module 2: Nature of Human Resource Planning and Placement**

**Objectives:** After studying this module you will be able to:

- 1. Understand benefits of HR planning
- 2. Differentiate between different approaches to job design
- 3. Understand the purpose, processes & problems of job analysis
- 4. Know the recent trends in HRP
- 5. Understand recruitment. Selection, induction and placement needs, processes and procedures
- 6. Know the factors that affect recruitment and selection of employees

### **Content**

#### **2.1 Human Resource Planning**

- a. Meaning, objectives and benefits of HR planning
- b. Process of HR planning
- c. Problems of HRP Factors affecting and recent trends in HRP

#### **2.2 Job Design and Job Analysis**

- a. Meaning and approaches to job design
- b. Factors affecting job design
- c. Purpose and process of job analysis
- d. Problems of job analysis
- e. Uses and recent developments in job analysis

#### **2.3 Recruiting Human Resources**

- a. Need, Objectives and importance of recruitment
- b. Recruitment policy and strategy, Recruitment process
- c. Traditional and modern sources and techniques of recruitment

- d. Factors affecting recruitment
- e. Alternatives to recruitment

**2.4 Selecting Human Resources**

- a. Role, nature and definition of selection
- b. Organization for selection
- c. Process of selection
- d. Factors affecting selection and Barriers to effective selection

**2.5 Inducting and Placing New Hires**

- a. Nature, purpose and different stages of orientation process
- b. Employee orientation programs, evaluation and problems
- c. Placement-meaning and problems
- d. Assessment Classification Model and Employee Placement

**2.6 Practical's**

- a. Drafting of job description and job specification – (education, responsibilities, tasks tools and equipment, working conditions,, experience skill and ability)
- b. Analyzing the man power need of an organization from the “vacancy advertisements” in the media
- c. Designing a job –Assuming the needs of an organization in a particular desired skill set
- d. Compiling a list of recruitment agencies and to understand the nature of work in those agencies
- e. Designing application blank for the recruitment purpose
- f. Internet search; finding various job search sites
- g. Conducting mock tests and mock interviews
- h. Designing vacancy position advertisements
- i. Designing and organizing induction programs for new comers in the college/institute. (Regarding your own institute/college activities facilities etc

**Module 3: Appraising and Managing Performance**

**Objectives:** After studying this module you will be able to:

1. Understand and recognize the need for performance appraisal
2. Know different methods of assessing performance
3. Differentiate between job evaluation and performance appraisal
4. Identify problems of evaluating job
5. Apply the knowledge of Performance appraisal and job evaluation in industries
6. Design the performance appraisal form
7. Identify the challenges in performance appraisal



## Content

### 3.1 Performance Appraisal

- a. Meaning and need for performance appraisers and appraisal
- b. Process of performance appraisal
- c. Methods of performance appraisal Modern methods (BARS, assessment center MBO, HRA, Psychological appraisals) Sensitivity training and management grid
- d. Uses and purposes of performance appraisal, Potential appraisal
- e. Challenges in performance appraisal\Edward Deming's view on performance appraisal

### 3.2 Job Evaluation

- a. Meaning definition and objectives of job evaluation
- b. Difference between job evaluation and performance appraisal
- c. Principles and Procedure of Job Evaluation
- d. Problems of Job Evaluation
- e. Alternative to job evaluation

### 3.3 Practical's

- a. Collect information from various organizations regarding their performance appraisal procedures
- b. Group discussions on case studies to understand the concept and application of performance appraisal and job evaluation

## Module 4: Managing Remuneration and Career Planning

**Objectives:** After studying this module you will be able to:

1. Understand the different components of employee remuneration
2. Understand theories of remuneration
3. Differentiate between remuneration plans
4. Factors influencing and challenges of remuneration
5. Understand concept of wages
6. Recognize the employee benefits and services
7. Differentiate between Career Planning & Development
8. Know the roles in Career Development
9. Understand various Career Development initiatives

## Content

### 4.1 Employee Remuneration

- a. Components of employee remuneration
- b. Theories of employee remuneration

- c. Influencing factors of remuneration
- d. Remuneration plans, challenges of remuneration
- e. Concept of wages
- f. Definitions and Concepts of wage and Salary Administration and their Objectives
- g. Role of reward system, Factors affecting wage/salary levels
- h. Wage Boards and Pay Commissions
- i. Wage Incentive, profit sharing, Bonus and Managerial Compensation
- j. Meaning and Objectives of Fringe Benefits, Non- Monetary Rewards

**4.2 Career Planning & Development**

- a. Differentiate between Career Planning & Development
- b. Roles in Career Development
- c. Career Development initiatives

**4.3 Practical's**

- a. Group discussions on case studies to understand the concept and application of these topics, Role play
- b. Collect information from various organizations by way of survey regarding-fringe benefits, wages, and salary patterns.
- c. Use methods of job evaluation to design wage and salary structure of a fictitious organization.

**Evaluation/Assessment Scheme**

	Number of Items	Weightage
<b>Internal Assessment: 50%</b>		50%
1. Assignment	Two Assignment	15%
2. Project	Two Project's	15%
3. Quiz	Two Quizzes	10%
4. One Question Test	One Question – Two test	10%
<b>External Assessment: 50%</b>		
Final Semester Exam		50%
<b>Total</b>		<b>100%</b>

**References:**

1. **Ashwathappa, K.** (2004) Human Resource and Personnel Management, 3<sup>rd</sup> 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.

## Energy Management (Theory)

**4-Credit Course**

**Subject Code: 19102**

### Course Objectives

The learners will be able to: -

- Understand the meaning of energy and energy conservation.
- Use different methods of energy conservation.
- Understand renewable and non renewable energy sources and
- Use renewable and non renewable energy resources efficiently
- Select right type of fuel resources for doing various activities.
- Apply in day to day activities efficiently

### Module 1: Introduction to Energy Management

**Objectives:** After studying this module you will be able to:

1. Understand the meaning of energy, energy sources and fuels
2. Classify energy, units and uses of energy
3. Understand and analyze the potential, limitations and uses of different energy sources and the environmental impacts of their use.
4. Understand the need for energy resources and how it is associated with quality of life
5. Describe qualities and bring awareness about India and global energy resources
6. The energy conservation methods in various sectors like domestic, transport, agriculture and commercial
7. Understand the scope and need for energy conservation

### Content

#### 1.1 Introduction to Energy Management

- a. Meaning of energy and fuel
- b. Classification of energy, units and uses of energy
- c. Classification of fuels, Calorific Value of Fuels
- d. Global Energy Scenario, Energy profile in India
- e. Socio Economic Dimensions of energy and quality of life

#### 1.2 Energy Conservation

- a. Meaning and scope of energy conservation in the power sector
- b. Grassroots solutions to energy conservation

- c. Practical hints for conserving energy in the domestic, transport, industrial and agricultural Sector.
- d. Importance of proper maintenance of devices and equipment in saving fuel and energy
- e. Steps for maintenance

### 1.3 Practical

- a. Indian scenario of different sources of energy from different regions.
- b. Mapping of hydel power plants, nuclear power plants and thermal power plants in India along with the capacity and years of production.
- c. Survey among HIG, MIG and LIG for fuels used and energy consumption and relate it to their standard of living.

## Module 2: Non Renewable Energy Sources

**Objectives:** After studying this module you will be able to:

1. Understand the non renewable energy sources, types, reserve and rate of extraction
2. Different methods of extraction, processing and distribution of fossil fuels
3. Understand the solid, liquid and gaseous fossil fuels
4. Know the efficiencies with efficient combustion devices
5. Understand the advantages and disadvantages of fossil fuels
6. Know the various alternate fuels used in various sectors and their efficiencies
7. Understand nuclear energy, its importance, uses and advantages and disadvantages.

## Content

### 2.1 Introduction to Fossil Fuels

- a. Introduction to fossil fuel, types, their reserves, rate of extraction
- b. Methods of Extraction, Processing, and Distribution
- c. Fuel efficiency-Combustion Devices used for different solid, liquid and gaseous fuels and their efficiencies.
- d. Fuels used in Domestic, Agricultural and Industrial sector.
- e. Alternative fuel for the transport sector and their efficiencies

### 2.2 Nuclear Energy

- a. Introduction, Basic Principles and processes involved
- b. Uses of Nuclear Energy

### 2.3 Practical

- a. World and Indian scenario on fossil fuels (reserves, future prospects, etc)
- b. Testing the of available combustion devices for their efficiency

### Module 3: Renewable Energy Sources

**Objectives:** After studying this module you will be able to:

1. Understand the various renewable energy sources,
2. Know the energy from biomass, types, conservation of energy from biomass, its advantages and disadvantages
3. Understand the hydel power, methods of production of energy from hydel power, its potentials and limitations
4. Know the solar energy, methods of harnessing solar energy, types of collectors and application of solar energy
5. Develop basic understanding of other alternative energy sources like wind energy, tidal energy, wave energy, OTEC and geothermal energy.

### Content

#### 3.1 Energy from Biomass

- a. Introduction to Biomass, Their Characteristics and Types
- b. Conversion of Biomass: Bio chemical and Bio thermal,
- c. biogas plants, types, merits and demerits
- d. Concept and Importance of 'Energy plantation', It's advantages.
- e. Smoke-less chullah, briquette and oils from vegetables

#### 3.2 Energy from Hydel Power

- a. Introduction to hydel Power, Methods Used for Production of electricity
- b. Potentials and Limitations of mini and major hydel power projects.

#### 3.3 Energy from Solar Energy

- a. Introduction to Solar Energy (Characteristics)
- b. Methods of Harnessing Solar Energy (Photo Thermal, Photo Chemical, Photo electrical Route)
- c. Types of Solar Collectors
- d. Application of Solar Energy for water heating, Cooking, Desalination, Power Generation, Refrigeration, Space Heating etc.

#### 3.4 Energy from Other Alternative Sources

- a. Meaning and Importance of Wind Energy, its Merits and Demerits
- b. Energy from oceans: Tidal energy, Wave energy, and OTEC.
- c. Uses and limitations of tidal, wave, and OTEC
- d. Geothermal energy, its uses and sources, limitations and environmental impact
- e. Environmental Impacts of using renewable and non-renewable energy sources

## Module 4: Practical Projects on Energy Sources

**Objectives:** After studying this module you will be able to:

1. Prepare project and case study about various renewable energy sources of energy
2. Conduct case study and collect information on current usage of renewable and non renewable sources
3. Understand the environment impacts using renewable and non renewable sources
4. Conduct survey on awareness regarding methods of energy conservation in various sectors
5. Document the Indian Scenerio and Global Scenerio of energy consumption and energy production

### Content

- 4.1 Documentation of use of nuclear energy used for different purposes in India and World over.
- 4.2 Case studies of nuclear disasters and the after effects. (Presentation and group discussion)
- 4.3 Case studies of impact of major Hydel projects on population
- 4.4 Collect information from various housing societies and organizations using solar energy by way of survey regarding type of installation, cost effectiveness, problems and level of satisfaction from use
- 4.5 Gather information regarding use of Bio-mass as fuel in different regions of India, the techniques implemented, Government incentives available and future prospects.
- 4.6 Case studies of use of Wind energy, Ocean energy and Geo-thermal energy in Maharashtra and India.
- 4.7 Collect and compile information on various documented environmental impacts of using conventional and non-conventional energy sources.
- 4.8 Conduct a survey on awareness regarding methods of energy conservation in households and industries.
- 4.9 Conduct energy conservation sessions at household levels, school level and rural areas during energy conservation week as a part of celebration.

### Evaluation/Assessment Scheme

	Number of Items	Weightage
<b>Internal Assessment: 50%</b>		50%
1. Assignment	Two Assignment	15%
2. Project	Two Project's	15%
3. Quiz	One Quiz	10%
4. One Question Test	Two Question test	10%

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<b>External Assessment: 50%</b>		
Final Semester Exam		50%
<b>Total</b>		<b>100%</b>

**References:**

1. **Abbasi, S.A. & Abbasi, N.** (2001) Renewable Energy Sources and their Environmental Impact, Prentice Hall India Pvt. Ltd., New Delhi.
2. **Chaturvedi, P.** (1997) Energy Management Policy, Planning and Utilization, Concept Publishing Company, New Delhi.
3. **Jadhav, H.V.** (1999) Energy and Environment, Himalaya Publishing, New Delhi.
4. **Rai, G.D.** (1996) Non- Conventional Energy, Khanna Publishers, Delhi.
5. **Sukhatme, S.P.** (1996) Solar Energy, Tata McGraw Hill Publishing Co Ltd.
6. **Parmar, A** (2001) Energy Future Coping with Critical Conditions, Dominant Publishers and distributors New Delhi-110002
7. **Chaturvedi, P.** (2004) Energy, Environment and Sustainable Development, Concept publishing company New Delhi-110059 India



**Ergonomics & Work Environment(Theory)**

**4-Credit Course**

**Subject Code: 19103**

**Course Objectives**

The learners will be able to: -

1. Understand the role of ergonomics and work environment in our daily life
2. Know the relationship between Man- Machine and Environment
3. Know the needs of special population and will be able to provide them with better facilities needed and to ensure safety and contribute to improve the quality of life
4. Describe the effects of different type of environment on human body
5. Understand the problems arising due to pollution and need to prevent pollution and conserve the environment

**Module 1: Basics of Ergonomics**

**Objectives:** After studying this module you will be able to:

1. Understand the nature, scope and objectives of Ergonomics study
2. Understand the interdisciplinary approach/nature of ergonomics
3. Apply the knowledge of MME system for designing workplaces
4. Assess the workplaces and redesign using anthropometry principles
5. Select right tools for various tools used at workplaces
6. Understand advantages of using ergonomics in day-to-day life

**Content:**

**1.1 Introduction to Ergonomics**

- a. Definition, Scope and Importance
- b. History of Ergonomics as a discipline- Past to present
- c. Interdisciplinary Nature of Ergonomics
- d. Reflection of Ergonomics across the world
- e. Inter relation of Man-Machine - Environment
- f. Need for Public Awareness

**1.2 Anthropometry &its Applications**

- a. Human body as a system
- b. Anthropometry
  - i. Introduction to Anthropometry
  - ii. Static and Dynamic Anthropometry
  - iii. Basic ergonomics design philosophies & Human Factors in Design
  - iv. Statistical basis of Anthropometry

- v. Anthropometric data
- vi. Body surface area
- vii. Body Segments
- c. Applications of Anthropometric data to product design

## **Module 2: Designing Needs of Special Population**

**Objectives:** After studying this module you will be able to:

1. Understand the nature of disabilities
2. Understands the needs of designing for special population
3. Apply knowledge in designing and assessing assistive devices used by various special population
4. Describe postural methods to be used while using computers
5. Assess training needs and evaluation of training program
6. Suggest the ways for purchasing consumer products
7. Understand the working capacities and capabilities of diverse groups
8. Suggest ergonomic considerations for special groups

**Content:**

### **2.1 Design for Persons with Disabilities**

- a. Overview
- b. Defining and Measuring Disabilities
- c. Ergonomics for One
- d. Locomotion Aids
- e. Use of Computers
- f. Consumer Products
- g. Selection of Assistive Technology
- h. Sources of Information and Advice
- i. Summary

### **2.2 Design for Aging**

- a. Overview
- b. What to Expect as One Ages
- c. Aging-Related Changes and Their Ergonomic Counteractions
- d. Designing for the Older Person
- e. Designing Computer Systems for the Aging
- f. Designing Living Quarters for the Aging
- g. Sources of Information and Advice
- h. Summary

### **2.3 Design for Expectant Mothers**

- i. Overview
- ii. Special Designs for Women? Changes in Body Dimensions of Expectant Mothers

- iii. Changes in Work Capacity During Pregnancy
- iv. Ergonomic Design Recommendations
- v. Summary

#### **2.4 Design for Children and Adolescents**

- i. Overview
- ii. Children Grow Into Adolescents
- iii. Anthropometry of Children and Adolescents
- iv. Body Mass of Children and Adolescents
- v. Body Strength of Children and Adolescents
- vi. Designing for Children and Adolescents
- vii. Summary

### **Module 3: Behavioral Ergonomics**

**Objectives:** After studying this module you will be able to:

1. Understand the nature of stress
2. Differentiate between stress and strain
3. Understand work related stress and other stress
4. Describe the personality types, motivation and skills
5. Assess alertness at work
6. Understand causes of boredom and its effect on productivity
7. Identify the behavioral changes at work

**Content:**

#### **3.1 Introduction to Stress and Strain**

- a. Work related stress
- b. Stress Management and
- c. Personality type

#### **3.2 Study on-Elements of Brain work**

- a. Uptake of Information
- b. Memory
- c. Motivation , Skill etc

#### **3.3 Sustained alertness ( Vigilance)**

- a. Boredom Causes and
- b. Effects in relation to work productivity

### **Module 4: Work Environment**

**Objectives:** After studying this module you will be able to:

1. Understand various workplace environment

2. Differentiate between impact of working in different environment
3. Understand various factors affecting work productivity
4. Describe various work related problems while working in different environment like heat, cold, noise, working with vibrating tools, etc.
5. Assess different environment using various methodologies
6. Apply the standards needed for working in different environment
7. Understand the health problems associated with job

**Content:**

**4.1 Visual Environment**

- a. Eye (Structure, Function, Mobility, Sight etc.
- b. Factors effecting Vision - Visual Problems, Ageing, Intensity of light, Color and work productivity-Light Fatigue

**4.2 Noise and Vibration**

- a. Ears (Structure, Function Range of Hearing),
- b. Vibration and Sound (cause Effects on Whole Body, hands)
- c. Noise (Physics of sound, Sound Pressures, Equipments to measure sound and its measurement)
- d. Impact of Vibration on work performance, injuries and Disorders besides subjective response

**4.3 Body Interacts with Hot and Cold Environment**

- a. Thermo- regulation of the human body (Energy balance, Heat exchange with environment, Temperature regulation)
- b. Assessment of Thermal Environment (Air Temperature, Humidity, Air Movement, Radiation)
- c. Reaction of Human Body to Hot environment (Heat exhaustion), Cold Environment)
- d. Standards for hot and cold environment- thermal comfort
- e. Acclimatization of Human body to hot and Cold environment
- f. Effect of hot or cold environment on Human body, work productivity

**4.4 Air Pollution**

- a. Sources,
- b. Classification
- c. Impact of Air Pollution on human health
- d. Need to assess the work area

**Evaluation/Assessment Scheme**

	<b>Number of Items</b>	<b>Weightage</b>
<b>Internal Assessment: 50%</b>		50%
1. Assignment	Two Assignment	15%
2. Project	Two Project's	15%
3. Quiz	Two Quizzes	10%
4. One Question Test	One Question – Two test	10%
<b>External Assessment: 50%</b>		
Final Semester Exam		50%
<b>Total</b>		<b>100%</b>

**References:**

1. **Anshel, J.** (1998): Visual Ergonomics in the Work Place, Taylor and Francis (UK, USA); published by Taylor and Francis, C., London.
2. **Astrand and Rodahl** (1986). Textbook of Work Physiology. 3<sup>rd</sup> edition, McGrawHill Publication.
3. **Anton, T.J.** (1989): Occupational Safety and Health Management, 2<sup>nd</sup> edition, (Sanfransico, Tokyo).
4. **Bhattacharrya, 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; 2<sup>nd</sup> 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, Whittney Librang 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) (5<sup>th</sup> 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. **Pheasant, S.** (2001): Body Space, Taylor and Francis (Great Britain); published by Taylor and Francis, C., London.
12. **Pheasant, S.** (1991): Ergonomics, Work and Health, Mac Millan Press, London

**Ergonomics & Work Environment(Practical)**

**4-Credit Course: 8 Hours Class**

**Subject Code: 19104**

**Course Objectives**

The learners will be able to: -

1. Understand the role of ergonomics and work environment in our daily life
2. Carry out the Investigation and analysis of Man- Machine and Environment
3. Learn compendium of methods and techniques available for assessment
4. Apply different methods of assessment in different work areas
5. Understand the needs of special population
6. Apply knowledge of anthropometry in designing for special population
7. Understand how people behave in various environment
8. Describe stress and its effects on human body
9. Practically assess the environmental factors like heat, light, noise and vibration.
10. Understand the problems arising due to pollution and how to test the pollutants in environment and how to conserve the environment
11. Write reports, presentation of data, gathering data, assess the impact of environment on humans
12. Know the lab. Assessment through field visits

**Module 1: Basics of Ergonomics**

**Objectives:** After studying this module you will be able to:

- a. Design simple Man-Machine- Environment keeping Ergonomics principles in mind
- b. Analyze and Understand each component at work place
- c. Measure the various anthropometric dimensions
- d. Apply the body dimensions for designing workplaces
- e. Collect, document and present anthropometric data
- f. Be sensitive towards the need of special population

**Content:**

**1.1 Introduction to Ergonomics (MME System)**

- a. Lab study: Introduction to Ergonomics Equipments Inter-disciplinary approach to Ergonomics, Ergonomics across the World.
- b. Lab and Field Study of Man-Machine- Environment Inter phase (Assignment: Computer Workstation Design)

**1.2 Anthropometry and Its Applications**

- a. Lab study: Measuring Static and Dynamic human body dimensions

- b. Lab and Field study: Application of Anthropometry to workplace and Product Design.
- c. Field Survey- Data collection- Documentation- Presentation

### **1.3 Designing for Special Population**

- a. Field and Lab Study: Need base Assessment of Product for- Children, Pregnant Women, Aged Population, Less Able (Disabled Population)
- b. Case Study-based on data collection of users, market survey, and presentation for said Categories

## **Module 2: Behavioral Ergonomics**

**Objectives:** After studying this module you will be able to:

- a. Apply different methods of assessing stress for different types of workers and workplaces
- b. Analyze and Understand each component at stress work place
- c. Measure the memory uptake information by applying different methods
- d. Know and Analyze the level of motivation and skills among workers
- e. Reason out the causes and symptoms of fatigue and boredom
- f. Find out the impact of boredom and fatigue on productivity

**Content:**

### **2.1 Stress Management**

- a. Lab study: To assess the Work related stress and
- b. Application of methods of Stress Management.

### **2.2 Memory**

- a. Field and Lab study: To assess Uptake of Information (Memory test).
- b. Different methods used in field

### **2.3 Motivation and Skill**

- a. Field work: To assess Motivation and Skill.

### **2.4 Boredom**

- a. Field and Lab work: To assess causes of Boredom and its effects in relation to work productivity.

## **Module 3: Assessment of Environment**

**Objectives:** After studying this module you will be able to:

- a. To assess visual problems among different types of workers
- b. Analyze and Understand each component at lighting levels at work places
- c. Suggest lighting levels and placement of lighting in workplaces
- d. Measure noise levels at various places and suggest improvements
- e. Understand the impact of noise on human health
- f. Understand causes and impact of heat and cold environment on human beings
- g. To learn about different work environment and its impact on workers
- h. Suggest improvements needed at workplaces
- i. Learn in detail through Visits to industries by having practical experience
- j. To practically analyse the problems faced by the workers in actual work situations

**Content:**

**3.1 Visual Ergonomics**

- a. Lab Study: Factors effecting Vision (Visual Problems, Ageing, Intensity of light, Color and Light, Fatigue)
- b. Lab work – Computer- visual fatigue

**3.2 Noise and Vibration**

- a. Field and lab Work: to assess the Noise in different areas (In college campus)
- b. Student Project on Noise Pollution (traffic noise, industrial noise, community programs and festivals noise, household noise, canteen and public noise)
- c. Presentations of file and report.

**3.3 Hot and Cold Environment**

- a. Documentation of impact of Environment on Human body
- b. Field Work- To assess environmental heat stress in different areas (Small Scale Industry, Home, Canteen, etc)
- c. Field Work: To assess cold environment (Cold Storage unit and AC workplaces).

**3.4 Air Pollution**

- a. Lab assessment of air Pollution
- b. Field work on impact of pollution on human health

**Module 4: Visits to Industries**

- a. Visit to CLI Institute- Sion, (Human Physiology and Hygiene Lab, Memory and psychological testing Lab and PPE – NRTL Lab)
- b. Visit to NITIE (for Instrumentation and Fitness Lab)



- c. Visit to AAHI – Bandra (For Noise assessment)
- d. Visit Local small scale industry/bakery/glass industry (For Heat stress assessment)
- e. Visit to NNERI, BMC (Air Pollution Lab)

#### Evaluation/Assessment Scheme

	Number of Items	Weightage
<b>Internal Assessment: 50%</b>		50%
4 Lab Assignment	Four Assignment	15%
5 Field Projects	Four Project's	15%
6 Small research project	Two	10%
7 Visit Reports	As per visits	10%
<b>External Assessment: 50%</b>		
Final Semester Exam		50%
<b>Total</b>		<b>100%</b>

#### References:

1. **Pheasant, S.** (2001): Body Space, Taylor and Francis (Great Britain); published by Taylor and Francis, C., London
2. **Wilson & Corlett.E.N** (2001): Evaluation of Human Work, a practical ergonomics Methodology Taylor and Francis (Great Britain); published by Taylor and Francis, C., London.
3. **Astrand & Rodahl** ( 1986 ). Textbook of Work Physiology

**SEMESTER: II****Name of Course: Consumer Behavior & Consumerism (Theory)****Credits 4****Objectives:**

The Student:

- Understands the determinants of consumer behavior and the techniques of decision-making process for buying
- Becomes aware of the legal rights and responsibilities of consumers, along with that of manufacturers and dealers
- Gets familiar with the importance of consumer legislations and their limitations
- Understands the impact of global trade in the Indian Consumer Market

**Contents:**

<b>Module No</b>	<b>Topics</b>	<b>Marks</b>
<b>1</b>	<b>Consumer Behavior</b>	<b>25</b>
	Introduction, Definition and concept of Consumer Behavior Ergonomic approach to consumer products and services Different stages of consumer buying process Consumer Motivation	
	<b>Various Perspectives &amp; Dimensions of Consumer Behaviour</b> Economic Social Cultural Psychological	
	<b>India's New Economic Policy and Its Impact on Consumers</b>  Globalization, Privatization and Liberalization Wider choice for consumers: Buying skills  Aggressive Marketing in the face of competition	

	<p>Effects of Employment (Purchasing power of Consumers)</p> <p>Effects on economy and developing countries- effect on consumer</p> <p>Competition policy-Regulatory reforms</p>	
<b>2</b>	<b>Factors affecting Consumer Behavior</b>	<b>25</b>
	<p><b>Factors affecting</b></p> <p>Individual factors affecting buying behavior</p> <p>Group factors affecting buying behavior</p> <p>Social factors affecting buying behavior</p>	
	<p><b>Decision Making Models in Buying Behavior</b></p> <p>Psychological Process</p> <p>Pavlovian Model</p> <p>Input-Output Model</p> <p>Sociological Model etc.</p>	
<b>3</b>	<b>Consumer Protection and Consumerism</b>	<b>25</b>
	<p><b>Consumer Empowerment</b></p> <p>Introduction and importance of consumer empowerment</p>	
	<p><b>Consumer Aids</b></p> <p>Classification of consumer aids</p> <p>Information, protection and product safety</p> <p>Education and services</p>	
	<p><b>Consumer education</b></p> <p>Scope of consumer education</p> <p>Approaches to consumer education</p>	
	<p><b>Consumer Satisfaction/Dissatisfaction</b></p> <p>Definition</p> <p>Theories of disconfirmed expectations</p> <p>Post purchase dissonance</p> <p>Factors affecting dissonance</p> <p>Dissonance reduction</p>	
<b>4</b>	<p><b>Consumer Protection and Legislation [Pertaining to goods, services, housing etc.]</b></p> <p>Consumer protection rights, Right to boycott and consumer laws</p> <p>Consumer forum</p> <p>Redressal mechanism as per the Consumer Protection act</p> <p>Integrated three stage consumer complaint redressal mechanism:</p> <p>a) Consumer Online Research and Empowerment (CORE) Centre</p>	<b>25</b>

	b) National Consumer Helpline (NCH) c) Consumer Voice FICCI Alliance for consumer care (FACC) Non Litigation Mechanism or Alternative Dispute Resolution (ADR) Computerization and Computer Networking of Consumer Forums in the Country	
	<b>Consumerism</b> Need and Scope of Consumerism Origin and Growth Objectives of consumer movement Consumer movement abroad Consumer movement in India Consumer movement in Maharashtra	
	<b>Modern trends in Consumerism</b>	

**References:**

1. Khan M. (2001): Consumer Behaviour, New Age International (P) Limited Publisher.
2. Nair, S. R. (2001): Consumer Behaviour (Text & 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.

**SEMESTER: II**

**Name of Course: Work and Work Posture Analysis (Theory)**

**Credits 4**

**Objectives:**

The Student:

1. To become aware of the role of Physical performance in daily life.
2. To gain knowledge about the Anatomy, Biomechanics and work physiology aspects of human body.
3. To understand the impact of workstation design on human health.
4. Learns functioning of various human body system and its relation to physical performance.

**Contents:**

<b>Module No</b>	<b>Topics</b>	<b>Marks</b>
<b>1</b>	<p><b>Structure of the Body</b></p> <p>The Cell (Structure &amp; Function, Different Types of cells, tissues and there function)</p> <p>Skeletal System</p> <p>The Muscle and its Contraction</p> <p>Neuromuscular Function</p> <p>Respiration (Anatomy, Physiological function, Lung volume, Gas exchange and transport, control of respiration)</p> <p>Body Fluids, Blood (Composition and function of blood) and Circulation (Function of Heart, Control of Heart Rate, Peripheral circulation).</p>	<b>10</b>
<b>2</b>	<p><b>Biomechanics and its Application</b></p> <p>Introduction to Biomechanics</p> <p>Different types of bone joints (Natural / Artificial Joints) their anatomy and functions, joint and motion studies.</p> <p>The Vertebral Column, brief anatomy and functions</p> <p>Muscle (Architecture of Muscles, muscle types)</p> <p>Principles of lever</p> <p>Describing Human Motion (Kinematics)</p> <p>Body Kinetics (CG, Biomechanics of the back, postures and back stress)</p> <p>Application of Biomechanics</p> <p>Posture – Locomotion – Muscle fatigue. Effect of posture on blood flow.</p> <p>Muscular skeletal disorder Problems</p>	<b>15</b>

3.	<p><b>Physical Performance</b>                      Aerobic Process and Anaerobic Process (Aerobic power, O<sub>2</sub> depth, O<sub>2</sub> replacement, Demands, Capability)                      Lactate Production, Distribution and Disappearance                      Interaction between Aerobic and Anaerobic Energy Yield                      Maximal Aerobic Power (Sex and Age)                      Anaerobic Power (Sex and Age)                      Factors influencing Physical Work Performance</p>	25
4.	<p><b>Applied Work Physiology</b>                      Factors Affecting the Ability to Perform Sustained Physical Work                      Assessment of Workload in relation to Work Capacity                      Energy Expenditure of Work, Rest and Leisure                      Physiological Fatigue                      Vibration and its effect                      Energy balance study</p>	25
	<p><b>Work Space Design and Posture</b>                      Principles of Work Station Design                      Human Task, Posture Analysis, Different Methods                      Workplace Postures, awkward posture</p>	25

**References:**

1. Anshel, J.: Visual Ergonomics in the Work Place
2. Anton, T.J. : Occupational Safety and Health Management
3. Bhattacharrya, A. and Meglathin: Occupational Ergonomics: Theory and Applications
4. Corlett, N. and others: The Ergonomics of Working Postures: Models, Methods and Cases
5. Dul, J. and Weerdmeestre, B.: Ergonomics for Beginners: A Quick Reference Guide.
6. Dul, J. and Weerdmeestre, B.: Ergonomics Design for People at Work, Vol. 1.
7. Dul, J. and Weerdmeestre, B.: Ergonomics Design for People at Work, Vol. 2.
8. Heller, A.: Team Workbook: Your Guide to Developing an Ergonomics Process.
9. Kroemer, K.H.E. and Grandjean, E. : Fitting the Task to the Human.
10. Kumar, S.: Biomechanics in Ergonomics
11. Kumar, S. and Mital A.: Electromyography in Ergonomics
12. Lee, G. C.H.: Advances in Occupational Ergonomics and Safety
13. Mital A.: Trends in Ergonomics/Human Factors I.
14. Nag, P.K.: Ergonomics and Work Design: Emerging Issues in Organisational Science.
15. Nicholson, A. and Ridd, J.E.: Health Safety and Ergonomics
16. Osborne, D.J. Ergonomics at Work.
17. Pleasant, S.: Ergonomics, Work and Health
18. Pleasant, S.: Body Space
19. Woodside, G. and Kocurek, D.: Environmental, Safety and Health Engineering
20. Rachko, B.B.: Housing Interiors for the Disabled and Elderly
21. Schmitt, G.: Micro-computer Aided Design
22. Radford, A.D. and Gero, J.S. : Design by Optimization in Architecture, Building and Construction
23. Statham, R. : House Adaptations for People --- Manual for Practitioners
24. Pilatowicz, G.: Eco-interiors; A Guide to Environmentally Conscious Interior Design
25. Negroponte, N. : Reflections on Computer Aids to Design and Architecture
26. Koncelik, J.A. Aging and the Product Environment

## Semester II

**Name of Course: Work and Work Posture Analysis (Practical)**  
**Credits 4**

**Objectives-**

1. To become aware of the role of Physical performance in daily life.
2. To gain knowledge about the Anatomy, Biomechanics and work physiology aspects of human body.
3. To understand the impact of workstation design on human health.

**Contents:**

Module No	Topics	Marks
1	<b>Introductory Anatomy and Ergonomics Methodologies</b>	25
2	<b>Biomechanics and Its Applications-</b> Unit 1- Introduction to Biomechanics Techniques, Precision and Errors, Sampling (Demonstration) Practical work on Biomechanics by each student. Case Study	25
	Data collection for Case Study to assess different postures using different techniques. Student to document. Analyses and Present a report.	
3	<b>Physical Performance and work load-</b> Assessment of Physical performance VO <sub>2</sub> max, VO <sub>2</sub> , Workload, RPE Scale Documentation of Target group Women/Children/Industry Worker/Different occupation etc.	25
4	<b>Work Space Design--</b> Documentation of work Space Design in different occupations, Analysis of field data. Live case study report	25

**References:**

1. Anshel, J.: Visual Ergonomics in the Work Place
2. Pleasant, S.: Ergonomics, Work and Health
3. Pleasant, S.: Body Space
4. Pilatowicz, G.: Eco-interiors; A Guide to Environmentally Conscious Interior Design
5. Negroponte, N. : Reflections on Computer Aids to Design and Architecture

## SEMESTER: II

**Name of Course:** Research Methodology(Theory)**Credits- 4****Objectives:****This course will enable students 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

**Contents:**

Module No	Topics	Marks
1	<p><b>The Research Process</b></p> <p>a. Scientific approach to enquiry in comparison to native, common sense approach</p> <p>b. Knowledge, theory and research</p> <p>c. Role, need and scope of research in the discipline of Home Science</p> <p><b>Assignment :</b> <i>Differentiate between investigative reporting and research report (with examples to be brought by students as exercise)</i></p> <p><b>Steps in Research Process and Elements of Research</b></p> <p>a. Identifying interest areas and prioritizing Selection of topic and considerations in selection</p> <p>b. Review of related literature and research</p> <p>c. Variables- types of variables including discrete and continuous variables Conceptual definitions and operational definitions</p> <p>d. Concepts, hypotheses and theories</p> <p>e Hypothesis- meaning, attributes of a sound hypothesis, Stating the hypothesis and types of hypothesis Hypothesis testing- null hypothesis, sample distribution, level of significance, critical regions, Type I and Type II errors</p> <p>f. Research Design Research questions, objectives and assumptions</p> <p><b>Assignment:</b> <i>Types of variables Hypothesis formations and research questions from Research readings –students identify hypothesis/research questions – Discussion</i></p> <p><b>Ethics in Research</b></p>	25



2	<p><b>Types of Research</b></p> <p>a. Basic and Applied research, Qualitative and Quantitative research (brief review of differences)</p> <p>b. Historical research</p> <p>c. Descriptive research methods – survey, case study, correlation study, content analysis, causal-comparative research</p> <p>d. Analytic studies- pre-experimental, experimental research, quasi experimental research</p> <p>e. Qualitative research, Ethnography</p> <p>f. Evaluative research- general characteristics, use of qualitative methods in enquiry</p> <p>Scope and importance in Home Science</p> <p><b>Assignment:</b> <i>Differentiate between (a) basic and applied research (Exercise to be based on actual research papers published in accredited journals)</i></p> <p style="text-align: center;"><i>(b) qualitative and quantitative research</i></p> <p><i>Based on Journal contents undertake a critical appraisal of studies/research papers and discuss types of Research with examples</i></p>	25
3	<p><b>Sampling</b></p> <p>a. Rationale, characteristics- meaning, concept of population and sample, and utility</p> <p>b. Types of sampling and generalizability of results</p> <p>c. Probability sampling - simple random sample, systematic random sample, stratified random sampling etc - random and non-random samples, random numbers and use</p> <p>d. Non-probability sampling - purposive samples, incidental samples, quota samples, snowball samples</p> <p>e. General consideration in determination of sample size</p>	25
4	<p><b>Tools for Data Collection</b></p> <p>a. Primary and secondary methods of data collection</p> <p>b. Different types of questionnaires, rating scales, check lists, schedules, attitude scales, inventories, standardized tests, interviews, observation</p> <p>c. Development of tools, estimation of reliability and validity of tools</p> <p>d. Procedure for preparation of the tool, administration of tools for data collection</p> <p>e. Procedure for data collection</p> <p>f. Planning for data analysis-coding of responses</p> <p><b>Assignment :</b> <i>Construction of tools for data collection a) types of questions b) Questionnaire c) interview schedule d) observation d) scales</i></p> <p><i>For a given topic students to frame and discuss the different possibilities of methods and tools</i></p>	25

### References

1. Bell, J. (1997): *Doing Your Research Project: A Guide for First-time Researchers in Education and Social Science*, Viva Books, New Delhi
2. Bell, J. (1997): *How to Complete Your Research Project Successfully: A Guide for First-time Researchers*, UBSPD, New Delhi.
3. Bulmer, M.C. (1984): *Sociological Research Methods: An Introduction*, Macmillan, Hong Kong.
4. Festinger, L. and Katz, D. (ed.) (1977): *Research Methods in the Behavioral Sciences*, Amerind Publishing, New Delhi.
5. Holloway, I. (1997): *Basic Concepts of Qualitative Research*, Blackwell Science, London.
6. Jain, G. (1998): *Research Methodology: Methods and Techniques*, Mangal Deep, Jaipur.
7. Kothari, C.R. (2000): *Research Methodology: Methods and Techniques*, WishwaPrakashan, New Delhi.
8. Kumar, A. (1997): *Social Research Method (The Art of Scientific Investigation)*, Anmol Publication, New Delhi.
9. Kumar, A. (2002): *Research Methodology in Social Sciences*, Sarup and Sons, New Delhi.
10. McBurney, D.H. (2001): *Research Methodology*, Thomson-Wadsworth, Australia.
11. Pande, G.C. (1999): *Research Methodology in Social Sciences*, Anmol Publication, New Delhi.

**ELECTIVE –III****Name of Course: Financial Management (Theory)****Credits 4****Objectives:**

The Student:

1. Gets conversant with the Financial System in India
2. Learns the principles, mechanisms and concepts of investment
3. Is able to formulate investment goals intelligently and make wise investment decisions
4. Gains competence to administer the financial planning process and financial controls
5. Learns the techniques of managing personal and family finance

**Contents:**

<b>Module No</b>	<b>Topics</b>	<b>Weightage (%)</b>
<b>1</b>	<b>Financial Systems</b>	<b>25</b>
	<b>Nature and Role of Financial Systems-</b> Introduction Functions of a Financial System Stages of financial development The structure of Financial System Financial System and its Linkages with Saving and Investment	
	<b>An overview of the Indian Financial System-</b> Institutional Development Institutional Changes Financial Markets Financial Instruments Financial Services Regulators	
	<b>Financial Sector Reforms in India-</b> Introduction to Financial Reforms Objectives and Strategies of reforms Policy Reforms New Issue and stock Market reforms Government Securities Market Reforms Banking and external Sector Reforms Vision Document Impact of Financial reforms Flow of funds	
<b>2</b>	<b>Fundamentals of Investment</b>	<b>25</b>
	<b>Nature of Investments-</b> Introduction to types of Investments	

	Considerations and Objectives in Investment Investment Opportunities	
	<b>Investment Risks and Returns relationship</b> Risks Defined Types of risks	
	<b>Sources of company Information</b> Information and Investing Annual Report, Income Statement Statement of Changes in financial Position Schedules and foot notes, Additional disclosures Auditor's Report, Stockbrokers, Merchant Banks' Advisory Services Other Sources (Consultants, Managers, Agents, Auditors, Newspapers, Journals)	
	<b>Analysis of Financial Statement</b> Liquidity Ratios Profitability Ratios Gearing Ratios Investment Ratios Growth and Stability Ratios	
<b>3</b>	<b>Investment Choices</b>	<b>25</b>
	<b>Shares:</b> Ordinary Shares: Types, Features, Classification and Rationale for Investing Bonus Shares, Rights Issues Preference Shares: Types and Analysis. Considerations in Selection of Shares Debentures: Types, Benefits to Investors Public Sector Bonds Credit Rating	
	<b>Mutual Funds:</b> Types, Guidelines for and various Schemes, advantages and disadvantages Units: Types, Advantages of Investing in Units	
	<b>Public Deposits</b> Insurance and other Government Schemes Investing in Precious Metals Housing Finance, Real Estate Trading in the stock Market, Commercial Paper Electronic commerce	
	<b>Managing Debt, Credit and Borrowing</b> Uses, Merits and Demerits Criteria for Borrowing, Managing Debts Sources and Analysis of Consumer Loans Mortgages Risk Assessment and risk Coverage	

<b>4</b>	<b>Investment Analysis and Management</b>	<b>25</b>
	<b>Investment Analysis</b> Fundamental Analysis Approach Economic Analysis Industry Analysis Company Analysis	
	<b>Technical Analysis</b> Tools of Technical Analysis Chartism Relative Strength Analysis Confidence Index Odd lot trading Index Breadth of Market Analysis Dow Theory Efficient Market Theory	
	<b>Considering the Tax Factor</b> Income Tax, Wealth Tax, Gift tax law Taxation and Investment Decision	
	<b>Designing an Investment Portfolio</b> Rationale, Personal considerations Determining Financial ability Components of Investment Portfolio Investment Portfolio at different Phases Investors' Evaluation Maintaining Investment Records Investor Protection	

**References:**

1. Alexander, G.J. (2001) Fundamentals of investment, Pearson Education India, New Delhi, ISBN: 8129700239.
2. Dutta, A. (2003) Penguin Guide to Personal Finance, Penguin Books, New Delhi.
3. Morris, K.M. (1999) Wall Street Journal Guide to Understanding Money and Investment, Fireside, New York. ISBN: 08489020.
4. Lal, J. (2000) Personal Investing, Penguin Books, New Delhi
5. Banwait, S. S. (2008) Portfolio Management Theories and Practices, Cyber Tech Publications, Daryaganj, New Delhi
6. Ramesh Babu, G. (2005) Financial Services in India, Concept Publishing Company, Mohan Garden New Delhi.
7. Singh, P. (2008) Dynamics of Indian Financial System: Markets, Institutions and Services, Ane Books Private, Limited New Delhi

## SEMESTER-III

Name of Course : Organization Behaviour (Theory)

Credit:4

**Objectives:**

The Student:

1. Understands the behaviour of individuals and group processes in organisations.
2. Knows the processes used in conducting organization efficiently and effectively

Sr. No	Topic and Details	Marks
1	<b>Introduction to Organisational Behaviour</b>	<b>25</b>
	Scope, significance, History and development of Organisational Behaviour as a subject.	
	Meaning and definition of Organisational Behaviour	
	Models of Organisational Behaviour	
2	<b>The Individual</b>	<b>25</b>
	Foundation of individual behaviour.	
	Personality and learning.	
	Perception and attribution.	
	Values, attitudes and job satisfaction.	
	Motivation, concept and application.	
	Leadership.	
3	<b>The Group</b>	<b>25</b>
	Foundation of group behaviour.	
	Communication.	
	Power and politics	
	Conflicts and negotiation	
4	<b>Organisational Dynamics</b>	<b>25</b>
	Foundation of organisational structure.	
	Organisational culture	

	Organisational change.	
	Organisational Development.	
5	<p><b>Practical</b></p> <p>Module 1.</p> <p>a. Case study for structural explanation of Organisational Behaviour</p> <p>b. Team exercise to know how Organisational Behaviour/knowledge help them to understand nature of organisation</p> <p>Module 2. Project related to motivation, leadership and communication</p> <p>Module 3. Case study / team exercise / project on work attitudes, job designing, power dynamics etc.</p> <p>Module 4. Select an organisation for analyzing the organisational culture and structure</p>	

**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, McGrawhill Publishing Co.
4. Mcshane, S.L. & Glinow, M.A. (2000): Organisational Behaviour – New Delhi, McGrawhill 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, McGrawhill Publishing Co. Ltd.
7. Gupta, R. (2001) Organisational Behaviour – New Delhi, Kitab Mahal.
8. Cook, C.W. & Hunaskar, P.L. (2001): Management and Organisational Behaviour – Boston, McGrawhill Irwin.
9. Judson, S.A. (2000): Organisational Behaviour – New Delhi, Infinity Books.
10. Kumar, M. & Mittal R. (2001) Organisational Behaviour – New Delhi, Anmol Publication Pvt. Ltd.
11. Chandan, J.S. (2001): Organisational Behaviour – New Delhi, Vikas Publishing House Pvt. Ltd.
12. Pettinger, R. (1996): Organisational Behaviour – London, Macmillan Press Ltd.

13. Hersey, P. & Blanchard, K. (1996): Management of Organisational Behaviour – New Delhi, Prentice Hall India.

**SEMESTER-III**

**Name of Course : Occupational Health ( Theory+ Practical)      Credit:4**

**Objectives:**

**The Student:**

- Safety and health policy, importance of training,
- Setting the stage: an overview of health care, Risk and the harm caused by the healthcare,
- Human error and complex systems,
- Ethics, professional behaviors and regulation,
- What to do when things go wrong, preventing things from going wrong.

<b>Module no</b>	<b>Topic and Details</b>	<b>Marks</b>
1	<b>Occupational Hazards</b>	<b>25</b>
	Unit 1- Physical hazards	
	Unit 2 - Chemical hazards	
	Unit 3- Biological Hazards	
	<b>Practical/ Assignment</b> Assessment of occupational hazards i.e noise, vibration, dusts etc.	
2	<b>Occupational Diseases</b>	<b>25</b>
	Unit 1- Occupational infections	
	Unit 2- Respiratory and cardiovascular diseases	
	Unit 3- Musculoskeletal disorders	
	Unit 4 – Occupational carcinogen	
	Unit 5- Reproductive disorders	
	<b>Practical/ Assignment</b> Understanding and conducting Lung function tests	



3	<b>Occupational Hygiene &amp; Safety</b>	<b>25</b>
	Unit 1- Occupational Hygiene overview	
	Unit 2- Monitoring exposures	
	Unit 3- Biological monitoring	
	Unit 4- Prevention and control of exposures	
	<b>Practical/ Assignment</b> Case study / team exercise / project on.	
4	<b>Legislation governing health and safety in different types of work and work settings</b>	<b>25</b>
	Unit 1- Ethics	
	Unit 2- Policies	
	Unit 3- Acts and rules	
	Unit 4-Health surveillance	
	<b>Practical/ Assignment</b> Select an profession analyzing the occupational health	

**References:**

Oxford Handbook of Occupational Health, Oxford Medical Publications, 2013, edited by Dr Julia Smedley, Dr Finlay Dick, Dr Steven Sadhra

**SEMESTER-III**

**Name of Course :Job Analysis and Optimization ( Theory)**

**Credit:4**

**Objectives:**

The Student:

1. Develops skill in assessing job content, types of job and its impact on human performance

**Contents:**

<b>Module. No.</b>	<b>Topic and Details</b>	<b>Marks</b>
<b>1</b>	<b>Introduction to Job Analysis &amp; Optimization.</b> Meaning and importance of Job Analysis. Criteria for job analysis – work skill, work hours, work shift, monotony, work stress, nature of work, work-rest cycle etc-	<b>10</b>
<b>2</b>	<b>Job Optimization-</b> Meaning , Process and need for job optimization Techniques of job optimization, Types of Work cycle	<b>15</b>
<b>3</b>	<b>Nature of Work-</b> Skilled and unskilled work, techniques to acquire skill in work. Intrinsic and Extrinsic factors, Impact on work productivity	<b>25</b>
<b>4</b>	<b>Prevention of Accidents</b> Introduction, Different measures for prevention of accidents, Rules and regulations, Factory’s Act, ISO Certification - Introduction to international standards (ISO 1400, 9000 etc.)	<b>25</b>
<b>5</b>	<b>Work Related Health Hazards-</b> Introduction Health hazards (minor, major), curable and not curable, Occupational Health & Safety.  Human Computer interaction interface design	<b>25</b>

**References**

1. Anton, T.J. (1989): Occupational Safety and Health Management, 2<sup>nd</sup> edition, (Sanfransico, Tokyo).
2. Bhattacharrya, A. and Meglothlin (1996): Occupational Ergonomics: Theory and Applications, Marcel Dekker Inc. (New York, Basel, Hong Kong); Marcel Dekker Inc., New York.
3. Dul, J. and Weerdmeestre, B. (1983): Ergonomics Design for People at Work, Vol. 1., Van Nostrand Reinhold (New York), Van Nostrand Reinhold (New York).

4. Dul, J. and Weerdmeestre, B. (1983): Ergonomics Design for People at Work, Vol. 2. Van Nostrand Reinhold (New York), Van Nostrand Reinhold (New York).
5. Kroemer, K.H.E. and Grandjean, E. (1997) (5<sup>th</sup> edition): Fitting the Task to the Human, Taylor and Francis (London, New York); published by Taylor and Francis, C., London
6. Lee, G. C.H. (1999): Advances in Occupational Ergonomics and Safety, IOS Press, Amsterdam, Berlin, Oxford, Tokyo, Washington) Amsterdam IOS Press C.
7. Mital A. (1988): Trends in Ergonomics/Human Factors I, Butterworths, London, Butterworths, C.
8. Nag, P.K. (1996): Ergonomics and Work Design: Emerging Issues in Organisational Science, New Age International, Bombay: New Age International C.
9. Nicholson, A. and Ridd, J.E. (1988): Health Safety and Ergonomics, Butterworths, London, Butterworths, C.
10. Osborne, D.J. (1982) (2<sup>nd</sup> edition): Ergonomics at Work, (Chichester, New York, Toronto); Chichester: John Wiley& Sons.
11. Pleasant, S. (1991): Ergonomics, Work and Health, Mac Millan Press, London
12. Woodside, G. and Kocurek, D. (1997): Environmental, Safety and Health Engineering, John Wiley, New York

**SEMESTER-III****Name of Course :Job Analysis and Optimization ( Practical)      Credit:4****Objectives:**

The Student:

1. Develops skill in assessing working environment conditions and its impact on human body
2. Learns the impact of work-related issues on work output
3. Develops skill in assessing job content, types of job and its impact on human performance

**Contents:**

<b>Module. No.</b>	<b>Topic and Details</b>	<b>Marks</b>
<b>1</b>	<b>Undertaking an Ergonomics study in Industry-</b> Introduction, Defining objective, Review, Methodology, Data collection, Analysis, Conclusion, Recommendation- Advertisement collections	<b>10</b>
<b>2</b>	<b>Methods of Direct Observation of performance-</b> Job Analysis using Time and Motion Techniques (Macro/Micro motion),	<b>15</b>
<b>3</b>	<b>Task Analysis-</b> Analysis of skilled and unskilled work, monotonous and repetition work; night work, shift work.	<b>10</b>
<b>4</b>	<b>Identify and measure work stress of different occupations-</b> analysis and Evaluation of Work Systems	<b>25</b>
<b>5</b>	<b>Accident reporting and Analysis-- Case studies:</b>  (a) People working in different work environment (b) Accidents in industries and its analysis	<b>15</b>
<b>6</b>	<b>Information analysis and structuring and sequencing-</b> Introduction and Implementation of System	<b>25</b>
	<b>Report &amp; presentation of case study/ industry</b>	

**References:**

- 1.Pleasant, S. (2001): Body Space, Taylor and Francis (Great Britain); published by Taylor and Francis, C., London
- 2.Wilson&Corlett.E.N (2001): Evaluation of Human Work, A practical Ergonomics Methodology Taylor and Francis (Great Britain); published by Taylor and Francis, C., London

## Semester III

## RESEARCH AND STATISTICAL APPLICATIONS

4 credits (Pr)

## Objectives

This course will enable students to:

1. Discriminate between parametric and non-parametric tests
2. Learn to apply statistical tests for data analysis for both large and small samples
3. Know how to interpret the results of statistical analysis of data
4. Be able to summarize data and present it using tables and graphs
5. Develop skills for preparation of research proposals
6. Understand the components of a research report

Module No	Topics	Weightage (%)
1	<p><b>Introduction to Statistics</b> Definition, conceptual understanding of statistical measures, popular concepts and misuse of statistics</p> <p><b>Normal Distribution and its Properties</b> a. Normal distribution b. Binomial distribution c. Probability, use of normal probability tables, area under normal distribution curve d. Parametric and non-parametric tests</p> <p><b>Data Management</b> Planning for data analysis – coding of responses, preparation of code book Coding of data Use of statistical programs - MS Excel - SPSS</p>	25
2	<p><b>Data Analysis</b> a. Quantitative analysis, descriptive statistics, inferential statistics : Uses and limitations, Summation sign and its properties b. Proportions, percentages, ratios c. Measures of central tendency-mean, median, mode-arithmetic mean and its uses, mid – range, geometric mean, weighted mean</p>	25

	<p>d. Measures of dispersion /variability- range, variance, standard deviation, standard error, coefficient of variation, Kurtosis, skewness Grouped data-frequency distribution, histogram, frequency polygons, percentiles, quartiles, tertiles, ogive</p> <p>e. Large and Small Sample tests and interpretation</p> <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>	
3	<p><b>Chi square test and its interpretation</b></p> <p>a. General features, goodness of fit b. Independence of Attributes</p> <p><b>Correlation and Regression and its interpretation</b></p> <p>a. Basic concepts b Linear regression and correlation coefficient Regression and prediction c. Rank correlation, Product-moment method</p> <p><b>Analysis of Variance and its interpretation</b></p> <p>a. One-factor analysis of variance b. Two-factor analysis of variance</p> <p><b>Design of Experiments</b></p> <p>a. Completely randomized design b. Randomized block design c. Latin square design d. Factorial design</p>	25
4	<p><b>Presentation of Data</b></p> <p>a. Tabulation and Organization of data- frequency distributions, cumulative frequency distribution, contingency tables b. Graphical presentation of data- histogram, frequency polygon, ogive, stem and leaf plot, box and whiskers plot, Graphs for nominal and ordinal data- pie diagram, bar graphs of different types, graphs for relation between two variables, line diagram. Use of illustrations Cautions in visual display of data</p> <p><b>The Research Report</b> Basic components of a research report- prefatory material, introduction and Review of Related Literature, Methodology, Results, Discussion, Conclusion, Summary, Abstract, Bibliography and Appendices</p> <p><b>Students to design a research study on a topic-</b></p> <ul style="list-style-type: none"> <li>- specify type of research</li> <li>- sample selection</li> <li>- protocol/operationalization</li> <li>- tools</li> </ul>	25

	- tests for statistical analysis	
<b>Preparation of a Research Proposal</b>		

**SEMSTER-III**

**ELECTIVE -IV**

**Name of Course: Entrepreneurship Management**

**CREDITS- 4**

**Objectives:**

The Student is able to:

1. Understand the concept of entrepreneurship
2. Learns the process and procedures of setting up small enterprise
3. Develops entrepreneurial skills to manage an enterprises successfully

**Contents:**

Module. No.	Topic and Details	Weightage (%)
<b>1</b>	<b>Concept of Entrepreneurship-</b> Definition and concepts Need for entrepreneurship development Types of enterprises Entrepreneurs in a developing economy Entrepreneurship as a career option Barriers to entrepreneurship	<b>25</b>
	<b>Entrepreneurial values and attitudes</b> Entrepreneurial values Entrepreneurial attitudes Role demands and Requirements of entrepreneurs	
<b>2</b>	<b>Creativity and Entrepreneurial Motivation</b>	<b>25</b>
	<b>Entrepreneurial motivation</b> Definition and Types of Motivation Need for achievement motivation. Motivation process Internal and external factors affecting motivation	
	<b>Creativity, Innovation and Idea Generation</b> Creativity and idea generation Creativity process Components of creative Performance Creative enterprise Innovation and entrepreneurship linkages Searching and selecting entrepreneurial ideas Methods of generating new ideas Dynamics of project identification Matching project and enterprise	
<b>3</b>	<b>Starting an Enterprise</b>	<b>25</b>

	<p><b>Steps in starting an enterprise</b>                  Scanning the environment                  Product development and selection                  Project report preparation</p>	
	<p><b>Project Appraisal</b>                  Feasibility studies- market analysis, technical analysis and financial analysis                  Re-sourcing</p> <p><b>Market Analysis</b>                  Market survey                  Assessment of demand and supply</p>	
<b>4</b>	<b>Establishing and Financing an Enterprise</b>	<b>25</b>
	<p><b>Technical Analysis</b>                  Size and location of enterprise                  Layout planning                  Types of Manufacturing Processes                  Purchase and inventory Control                  Quality Control</p> <p><b>Financial Analysis</b>                  Financial Planning                  Long term and short term finance                  Balance sheet and operating statement                  Ratio analysis                  Funds flow analysis                  Financial Forecasting                  Cash Budgeting                  Assessment and Management of Working Capital                  Financing of working capital</p>	
	<p><b>Source of Finance</b>                  Need and sources of long term finance                  Leverage                  Capital structure [Features and factors affecting]                  Instruments of long-term finance                  Financial institutions</p>	

**References**

1. Akhauri, M.M.P. (1990): Entrepreneurship for women in India, New Delhi, NIESBUD.
2. Hisrich, R.D. & Brush, C.G. (1986): The Women Entrepreneurs, Toronto, D.C. health & Co.
3. Hisrich, R.D. and Peters, M.P. (1995): Entrepreneurship- Starting, developing and managing a New Enterprise, Richard, D. USA, Irwin, INC.
4. Meredith, G.G. et al (1892): Practice of entrepreneurship, Geneva, ILO.
5. Patel, V.C. (1987): Women Entrepreneurship- Developing New entrepreneurs, Ahmedabad.
6. Tanya, S. and Gupta, S.L. (2002): Entrepreneurship Development, New Venture Creation, Galgotia Publishing Company.



**SEMESTER-IV****Name of the Subject: Dissertation****Credits-8****Objectives-****The students will**

1. Learn to select a thesis research topic and develop it in consultation with her supervisory
2. The research project should be designed for completion, together with other program requirements, within a year period.
3. The thesis should provide evidence of the student's ability to carry out independent investigations and to present the results in a clear and systematic form.

**Content:**

<b>Module No</b>	<b>Details topics</b>	<b>Weightage (%)</b>
<b>1</b>	A student is expected to submit a thesis proposal to their supervisory committee the- proposal provides evidence of the student's readiness to carry out the research, and also clarifies the expectations of both the student and committee as to the final content of the thesis	25
<b>2</b>	the proposal provides evidence of the student's readiness to carry out the research, and also clarifies the expectations of both the student and committee as to the final content of the thesis	25
<b>3</b>	<ul style="list-style-type: none"> <li>• <b>Introduction:</b> General background, importance of the subject area.</li> <li>• <b>Objective:</b> A concise statement of the purpose or objective of the project; this should flow logically from the introduction and be short and specific.</li> <li>• <b>Methods:</b> General plan, specific methods, sampling or experimental design, duration, and projected procedure for data analysis; these methods should be appropriate for directly addressing the purpose or objective.</li> <li>• <b>Results:</b> Results of theoretical investigations, experiments, field sampling, computer simulations, data analyses, etc. should be clearly stated.</li> <li>• <b>Interpretation:</b> How will the results be interpreted?</li> </ul>	<b>25</b>

	<p>There should be explicitly stated inferences that would be drawn from all outcomes; outcomes that cannot be interpreted imply imprecise objectives or inappropriate methods.</p> <ul style="list-style-type: none"> <li>• <b>Significance:</b> Why is this investigation justified? What is the scientific or practical contribution?</li> </ul> <p><b>Timeline/Workplan:</b> The timeline helps to assess whether the proposed research is feasible as planned and establishes milestones. Periods when there are activities which could slow progress should be highlighted when accounted for when selecting milestones. The timeline should also indicate when likely outputs (e.g., scientific paper and reports) will be produced</p>	
	<p><b>Final Examination- Presentation</b></p>	<p>25</p>
	<p><b>Paper for publication /conference etc</b></p>	

**SEMESTER IV**

**Name of Course: Consumer Ergonomics (Theory)**

**CREDIT: 4**

**Objectives:**

The Student:

1. Becomes aware of role of human factor and designing of consumer products
2. Application of ergonomics in consumer product design
3. Becomes aware of role of human factor in designing of product
4. Learn to apply knowledge of ergonomics in product assessment and product development

**Contents:**

<b>Module. No</b>	<b>Topic and Details</b>	<b>Marks</b>
1	<p><b>Creativity-</b></p> <p>.Definition, distinguishing between Creativity and Innovation, Measuring Creativity, Creativity in Various Contexts, Fostering Creativity, Enhancing Creativity .</p> <p>Creativity Techniques. Introduction, Philosophies ,Approches in Designing, Methods USED, Purpose of designing, Process, Bad Human Factors Design</p>	15
	<p><b>Product Design with People in Mind</b></p> <p>Human factors / Ergonomics in Product Design Consumer and consumer product design Usability in product design Standards for consumer products</p>	10
2	<p><b>Ergonomics Methods in Consumer Products Design and Assessment</b></p> <p>Ergonomic methods in consumer product design Criteria for product assessment using ergonomic techniques</p>	25
3	<p><b>Assessment of Product Safety using the 'Be safe' Method</b></p> <p>Techniques to assess product safety: Be safe method Legal requirements for evaluation of product safety User safety, product safety and environment safety Accidents – related to product design – related to human error</p>	25
	<p><b>A System Analysis of Consumer Products</b></p> <p>Predicting human error System approach</p>	

	Rewritable routine Task analysis for error identification	
4	Creativity & Designing process. Developing Assessment Criteria for Consumer Product, introduction to Checklists, User center product design- Identification of problem/s, Assessment of various Consumer Products through Case Studies, Presentation of Case Studies, Assess the developing user manual for consumer products.	25

**Reference-**

1. David Sherwiiven(2010) Create Workshop:80 challenges to Sharpen your design skills. Amazon
2. Donal A Horman(2002): The Design of Everyday things, Amazon
3. Thomas.P.Moran, John M Carroll (2004) Designing Usable Electronic Aspects of Human Information Usage.
4. Mark. R. Lehto, James.M.Miller (1986) Warning: Fundamentals Design and Evaluation Methodologies, Publication: Fuller Technical Publication
5. Waldemar Karwowski, Marcelo Marcio Soares (2011):Human Factors and Ergonomic in Consumer Product Design Methods and Techniques, CRC Press, ISBN 1420046284
6. Soares (2011):Human Factors and Ergonomic in Consumer Product Design Methods and Techniques, CRC Press, ISBN 1420046284

**SEMESTER IV****Name of Course: Internship****CREDITS- 8****Objectives:****The Student will-**

1. Learn to connect academic studies to practical applications and gain work experience
2. Prepare the student for professional training and understand the working in an organization.
3. Student records the practical work undertaken during the internship

**Content**

<b>Module No</b>	<b>Topic Details</b>	<b>Weightage (%)</b>
1	Identification of Organization for Internship- Formal communication, permission/ approval, identifying and planning the assignment to be undertaken during the internship programmer	<b>25</b>
2	Review of the assignment- Documentation of the different tasks/activities within the organization	<b>25</b>
3	Application of theoretical and practical inputs to real field situation	<b>25</b>
4	Compiling the report with – introduction, observation, remarks, conclusion with recommendation. Evaluation by External Supervisor and Internal staff	<b>25</b>

**SEMESTER-IV****ELECTIVE-V****Name of Course: Ergonomics in Everyday Life (Theory)****CREDIT: 4****Objectives****The student will be able:**

1. To know the role of ergonomics and work environment in our daily life.
2. To use the knowledge of impact of environment on workers to design better workplaces.
3. To apply standards of noise, lighting 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.

<b>Module</b>	<b>Content</b>	<b>Weightage</b>
<b>I</b>	<b>Introduction to Ergonomics</b> <ul style="list-style-type: none"> <li>• Brief history of Ergonomics, aims &amp; scope</li> <li>• Ergonomics and its areas of application</li> <li>• M-M-E Systems</li> </ul>	<b>25%</b>
<b>II</b>	<b>Anthropometric principles in workspace and equipment design</b> <ul style="list-style-type: none"> <li>• Anthropometry: definition and measurements</li> <li>• Application of anthropometry in design (Tool design/workplace design)</li> <li>• Design control relationship (Control design/keyboard design)</li> <li>• Postures adopted (MMH, ergonomics of sitting/standing)</li> <li>• Cost-effectiveness in design</li> </ul>	<b>25%</b>
<b>III</b>	<b>Practical Component-I: Environment Assessment</b> <ul style="list-style-type: none"> <li>• Impact of Light on work – Using Light meter</li> <li>• Impact of Noise – Using Noise level meter</li> <li>• Impact of working in Hot – Using Environmental Kit</li> </ul>	<b>25%</b>
<b>IV</b>	<b>Practical Component-II: Applications of Ergonomics Principles in Everyday Life</b> <ul style="list-style-type: none"> <li>• To assess the postures adopted in everyday life</li> <li>• To modify the workstation using Ergonomics principles</li> <li>• To identify general health related MSD in everyday life</li> <li>• Assess the design of the tool used every day- project</li> </ul>	<b>25%</b>

**Reference:**

1. Anshel, J. (1998): Visual Ergonomics in the Work Place. Taylor and Francis (UK, USA); published by Taylor and Francis, C., London.
2. Bridger RS. (2003). Introduction to Ergonomics. Taylor & Francis.
3. Dul, J. and Weerdmeestre, B. (2001): Ergonomics for Beginners: A Quick Reference Guide. 2<sup>nd</sup> edition, Taylor and Francis (London, New York).
4. Osborne, D.J. (1982): Ergonomics at Work. 2nd edition. John Wiley & Sons (Chichester, New York, Brisbane, Toronto, Singapore).



