

आवक क्र. 320-5  
दिनांक 25/9/15

M.Sc.(Food and Nutrition)

MARKING SCHEME

M.Sc.Previous Ist Semester

Theory

Part A

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Research Methodology	80	10	10	100
Paper II	Nutritional Biochemistry	80	10	10	100
Paper III	Clinical Nutrition	80	10	10	100
Paper IV	Food Science	80	10	10	100

Part B

Practical

	Practical	Marks
Practical I	Food Science and Therapeutic Nutrition	100

M.Sc.Previous IInd Semester

Theory

Part A

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Statistics and Computer Application	80	10	10	100
Paper II	Methods of Investigation	80	10	10	100
Paper III	Problems in Human Nutrition	80	10	10	100
Paper IV	Food Chemistry	80	10	10	100

Part B

Practical

	Practical	Marks
Practical I	Food Science and Therapeutic Nutrition	100

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Registrar  
Shahood Mahendra Karna Vaidya Vidyalaya, Bastar  
Jagdalpur, Dist. Bastar, Chhattisgarh

M.Sc. Food and NutritionMARKING SCHEME(M.Sc.II<sup>nd</sup> Semester)TheoryPart I

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Food microbiology	80	10	10	100
Paper II	Nutrition and Health of women and Children	80	10	10	100
Paper III	Nutrition for Health and Fitness	80	10	10	100
Paper IV	Advanced Nutrition	80	10	10	100

Unit II

Practical		Marks
Practical	Nutrition and Food Microbiology	100

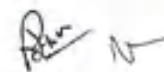
(M.Sc.IV<sup>th</sup> Semester)TheoryPart I

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Physiology	80	10	10	100
Paper II	Public Nutrition	80	10	10	100
Paper III	Geriatric Nutrition	80	10	10	100
Paper IV	Research Methods in Food and Nutrition	80	10	10	100

Part IIPractical

Practical		Marks
Practical	Dissertation and current trends in food and nutrition	75+75

100




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M.Sc.(Food and Nutrition)

M.Sc.Previous Ist Semester

Theory

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Paper III	Clinical Nutrition	80	10	10	100
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Part B

Practical

	Practical	Marks
Practical I	Food Science and Therapeutic Nutrition	100

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M.Sc.(Food and Nutrition)

M.Sc.Previous 1st Semester

Paper I

Research Methodology

Max. marks : 80

Unit I

1. Science, Scientific methods and approach.
2. Social research and survey : Meaning, definition, nature, scope, objects, types.  
Distinction between social survey and research
3. Pretest ion and pilot survey.

Unit II

4. Fact, theory and concept.
5. Hypothesis : Definition, Sources, characteristics, Importance, Main difficulties  
in the formation of hypothesis, disadvantage.
6. Sources of data : Primary and secondary sources.

Unit III

7. Methods or techniques of data collection.  
Observation  
Interview  
Schedule  
Questionnaire  
Case-study

Unit IV

8. Sampling : Meaning, characteristics, advantages and disadvantages.  
Types :
  - Random sampling
  - Purposive sampling
  - Stratified sampling
  - Other sampling method
9. Classification and tabulation of data.

Unit V

10. Analysis and interpretation of data.
11. Preparation of the report.
12. Diagrammatic presentation of data.

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M.Sc.(Food and Nutrition)

M.Sc.Previous 1st Semester

Paper II

Nutritional Biochemistry

Max. marks : 80

Unit I

1. Heteropolysaccharides - Definition, classification, Structure and properties of glycoprotein's and proteoglycans.
2. Plasma proteins - Nature Properties and functions.
3. Intermediately metabolism - Reactions, standard for energy changes and regulation. carbohydrates - glycol sis, glyconeogenesis, citric acid cycle. hexose-mono-phosphate pathway.

Unit II

4. Lipids - Beta-oxidation, denovo synthesis of fatty acids synthesis and break down of unsaturated fatty acids, cholesterol, phospholipids and triglycerol.
5. Purines and pyrimidines - Synthesis and breakdown. Source of various atoms of the purine base. Salvage reaction. Biosynthesis of purines and pyrimidines.

Unit III

6. Nucleic acids - DNA replication and transcription. Method of replication replication fork; Okazaki segment role of sigma factor and core enzyme. DNA transcription, DNA recombinant - Bio medical importance, restriction enzymes. cloning, libraries and library construction.
  - Protein Definition Sources of Protein Classification of Prot. Digestion & Absorption of Protein. Denaturation of Protein Prot. synthesis
  - Properties of Protein Metabolism of Prot. urea cycle.

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#### Unit IV

7. ✓ Hormones - General characteristics of hormones. Classification of hormones. Mechanism of action, assay of hormones. Chemistry and functions of different hormones - Thyroxin, TSH LH, ACTH and Insulin.
8. ✓ Minerals - Trace elements, their physiological functions, sources, absorption, excretion and deficiency of iron, copper, iodine, zinc and selenium.

#### Unit V

9. ✓ Detoxification in the body - Metabolism of foreign compounds, oxidation, conjugation, reduction, hydrolysis.
10. ✓ Major alteration in carbohydrates, protein and fat metabolism in chronic nutrition related degenerative diseases. (Diabetes, heart diseases).

#### REFERENCES :

1. Deb, T.C. - Principles of Biochemistry.
2. Harper - Physiological Biochemistry.
3. West and Todd - Text Book of Biochemistry.
4. Lubert/Stryer - Text Book of Biochemistry.

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M.Sc.(Food and Nutrition)

M.Sc.Previous 1st Semester

Paper III

Clinical Nutrition


Max. marks : 80

Unit I

1. Etiopathophysiology, metabolism and clinical aberrations, complications prevention and recent advances in nutritional management of -  
GIT Disorders
- (i) Gastritis - Types, dietary modification.
  - (ii) Peptic ulcer - A etiology, symptoms, dietary modification.  
Intervals of feeding, bland diet, four stage diet therapy, prevention of recurrence.
  - (iii) Diarrhea - Classification, modification of diet with special emphasis to fibre and fluids.
  - (iv) Constipation - Classification, dietary consideration.
  - (v) Ulcerative colitis - Symptoms, dietary treatment
  - (vi) Sprue - Types, dietary consideration.

Unit II

2. Diseases of liver and gall bladder :
- (i) Jaundice - Classification, dietary treatment.
  - (ii) Hepatitis - Types and dietetic management.
  - (iii) Cirrhosis - Types and dietary management.
  - (iv) Hepatic coma - Causes and dietetic management.
  - (v) Cholecystitis - Types and dietetic management.
  - (vi) Cholelithiasis - Causes and dietetic management.

  
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3. Pancreatic disorders - Etiology, pathogenesis and nutritional care.

**Unit III**

4. Renal diseases :

Basic renal functions, classification of renal diseases.

- (i) Glomerulonephritis - Acute and chronic - Symptoms and dietetic treatment
- (ii) Nephrosis - Symptoms and principles of nutritional care.
- (iii) Renal failure - Acute and chronic renal failure, dialysis.
- (iv) Renal calculi - Etiology, types of stones and nutritional care. Acid and alkaline ash diet.

5. Fevers and infections -  
Types of fever  
Tuberculosis, typhoid and malaria  
Dietetic management

**Unit IV**

6. Cardio vascular diseases - Classification

- (i) Hyperlipidemia - Classification and nutritional care.
- (ii) Atherosclerosis - Etiological factors, pathogenesis, dietetic management.
- (iii) Hypertension - Classification, etiology, nutritional care.

7. Weight imbalance - Regulation of energy intake.

- (i) Obesity - Types, a etiology, treatment, diet and other measures.  
Complications obesity.
- (ii) Underweight ness - Causes, dietetic management

**Unit V**

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8. Historical background, prevalence, etiology, biochemical and clinical manifestations, preventive and therapeutic measures for metabolic disorders.  
Diabetic mellitus
- A. Incidence and predisposing factors.
  - B. Symptoms, types and diagnosis
  - C. Metabolism in diabetes
  - D. Dietary management and meal management
  - E. Hypoglycemic agents and insulin
  - F. Complications of diabetes.
9. Disorders of thyroid gland:  
Normal thyroid function
- (i) Hyperthyroidism - Symptoms and treatment.
  - (ii) Hypothyroidism - Symptoms and treatment.

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M.Sc.(Food and Nutrition)

M.Sc.Previous Ist Semester

Paper IV

Food Science

Max. marks : 80

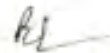
Unit I

1. Water - Physical properties of water and ice, chemical nature, structure of the water molecules and ice.
  - Sorption phenomena, types of water solution and colligative properties.
  - Free and bound water.
  - Water activity and food spoilage.
2. Food dispersions - Colloidal sol, stabilization of colloidal systems, Rheology of food dispersion.
  - Gels : Structure, formation, strength, types and permance.
  - Emulsions : Formation, stability, surfactants and emulsifiers.
  - Foams : Structure, formation and stabilization..

Unit II

Polysaccharides, sugars and sweeteners :

3. Starch : Structure, gelatinization, characteristics of some food starches, modified food starches.
  - Non starch polysaccharides : Cellulose, hemicelluloses, pectin's, gums, animal polysaccharides.
4. Sugars and sweeteners : Sugars, syrups, potent sweeteners: sugar product.
  - Sweetener chemistry related to usage in food products : Structural relationships to sweetness peception, hydrolytic reactions, solubility and crystallization, hygroscopicity, fermentation, non-enzymatic browning



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### Unit III

5. Cereals and cereals products :
  - Cereals grains : Structure and composition
  - Flours and flour quality
  - Extruded foods, breakfast cereals,
6. Fats, oils and related products :  
Sources, composition, effect of composition on fat properties. Functional properties of fat and uses in food preparation. Fat substitutes, fat deterioration (Rancidity) and antioxidants.

### Unit IV

7. Proteins : Classification, composition denaturation, non enzymatic browning and other chemical changes.
8. Enzymes : Nature of enzymes, stability and action. Proteolytic enzymes, oxidase, lipases. enzymes decomposing carbohydrates, immobilised enzymes.

### Unit V

9. Milk and milk products : Composition, physical and functional properties. Denaturation effects of processing and storage.
10. Dairy products : Cultured milk, yogurt, butter, whey, cheese, concentrated and dried products, frozen desserts, dairy product substitutes.

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M.Sc.(Food and Nutrition)  
M.Sc.Previous Ist Semester  
Practical I  
Food Science and Therapeutic Nutrition

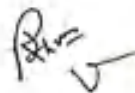
Max. marks : 100

Part - A

1. Market survey of commercial nutritional supplements and nutritional support substrates.
2. Interpretation of patient data and diagnostic tests and drawing up of patient diet prescription, using a case study approach.
3. Follow up - Acceptability of diet prescription, compliance, discharge diet plan.
4. Planning and preparation of diets for patients with common multiple disorders and complications and discharge diet plans. Hypertension, atherosclerosis, liver disease, kidney diseases.

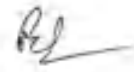
Part - B

5. Effect of solutes on boiling point and freezing of water.
6. Effect of types of water on characteristics of cooked vegetables, pulses and cereals.
7. Sugar and jaggery cookery : Relative sweetness, solubility and sizes of sugars, stages of sugar cookery, caramelization, crystallization, factor affecting crystal formation.
8. Starches, vegetable gums and cereals : Dextrinization, Gelatinization, retro gradation, thickening power, Factors affecting gels and gluten formation,
9. Jams and jellies : Pectin content of fruits, role of acid, Pectin and sugar in jam and jelly formation. Use of gum as emulsifiers/stabilizers.
10. Fats and oils : Flash point, melting point and smoking point. Role of fats and oils in cookery as shortening agent, frying medium. Factors affecting fat absorption, Fat crystals, plasticity of fats, permanent and semi-permanent emulsions.



  
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7. Milk and milk products : Scalding, denaturation, Effects of acid, salt, alkali, sugar, heat, enzymes, polyphenols on milk. Khoa, curd, paneer, cheese (ripened and unripened).
8. Egg : Structure assessing egg quality. Use of egg in cookery-emulsion, air incorporation, thickening, binding, gelling-method of egg cookery and effect of heat, white foams and factors affecting foam.
9. Pulses: Effect of various cooking and processing methods on various functional properties of pulses and their products.
10. Gelatin : Gelatin gel, strength and factors affecting gelation.
11. Fruits and vegetables : Pigments - Effects of cooking, metal ions, pH, effect of various cooking processes on different characteristics of vegetables, prevention of enzymatic browning.
12. Leavened products : Fermentation - Use of microorganisms (lactic acid, yeast), steam as an agent, chemical agents.
13. Frozen Desserts : factors affecting ice crystal formation. Quality characteristics of frozen desserts.



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**M.Sc.(Food and Nutrition)**  
**M.Sc.Previous IInd Semester**  
**Theory**

**Part A**

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper V	Statistics and Computer Application	80	10	10	100
Paper VI	Methods of Investigation	80	10	10	100
Paper VII	Problems in Human Nutrition	80	10	10	100
Paper VIII	Food chemistry	80	10	10	100

**Part B**

**Practical**

	Practical	Marks
Practical II	Nutritional Biochemistry	100

**Part C : On Job Summer Training/Internship Training**

The Students will be required to undergo an internship/on job summer training after their IInd semester examination for a period of six weeks. The areas of training will include hospitals, state run NGO, food industry etc. The students are required to submit a report after completion of their training.

  
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M.Sc.(Food and Nutrition)  
M.Sc.Previous 11st Semester  
Paper V  
Statistics and Computer Application

Max. marks : 80

Unit I

- ✓ 1. Statistics : Meaning, definition, scope, importance, characteristics, distrust of statistics.
- ✓ 2. Measurement of central tendency :
- Mean
  - Median
  - Mode

Unit II

3. Graphic presentation of data : Importance, types
- Histogram
  - Frequency polygon
  - Frequency curve
  - Correlation : Definition, meaning and types.
  - Methods of determining coefficient of correlation
    - Product moment method
    - Rank correlation.

Unit III

- ✓ 4. Introduction to computers :
- What is computer ? Characteristics, components of computer system, block diagram of computer, CPU, I/O devices and memory (RAM and ROM), secondary storage devices (Hard disk, floppy disk, magnetic tape etc.)
5. Analysis of variance
- One way method : Direct and short-cut.

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#### Unit IV

6. ✓ Computer generations.
7. ✓ Classification of computer : Analog, digital, hybrid, general and special purpose computers.
8. Types of computer : Micro, mini, mainframe and super computer.
9. Chi-square test and goodness to fit.
10. Application of student 't' test for small samples.

#### Unit V

11. ✓ working with MS-Word :  
Getting started with word, formatting text and paragraph. Applying text and language tools. Designing pages with columns and tables, using graphics.
12. Methods of dispersion and variation :
  - Mean deviation
  - Standard deviation
  - Quartile deviation

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M.Sc.(Food and Nutrition)  
M.Sc.Previous Ist Semester  
Paper VI  
Methods of Investigation

Max. marks : 80

Unit I


1. Electrolytic dissociation : Principle, technique and theory of electrolytic dissociation.
2. Hydrogen ion concentration : Principle and measurement of pH, indicators, buffers.
3. Physicochemical techniques : Principles and methodology of the following.
  - (a) Diffusion
  - (b) Osmosis
  - (c) Filtration
  - (d) Surface tension
  - (e) Adsorption
  - (f) Centrifugation

Unit II

4. Chromatography : Principles, techniques and application of the following -
  - (a) Paper chromatography - Circular, ascending and descending.
  - (b) Ion exchange chromatography
  - (c) column chromatography
  - (d) Thin layer chromatography
  - (e) Gas liquid chromatography
  - (f) High performance liquid chromatography

Unit III

5. Electrophoresis : Principles and techniques of paper and gel electrophoresis.
6. Microbiological assay : Principle and methodology of the following -
  - (a) Vitamins

  
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(b) Am the acids

Unit IV

7. Colorimetry : Principle, colorimeter applications.
8. Radioactive isotopes : Properties of radioactive isotopes, detection of radiations  
Uses of radioactive isotopes in medical science.

Unit V

9. Immunological methods : Principle and technique of the following -  
(a) Radio Immuno Assay (RIA)  
(b) Enzyme Linked Immunosorbent Assay (ELISA)
10. Collection of biological samples.

References :

1. Hawk, P.B., Oser, B.K. and Summerson, W.H. : Practical Physiological Chemistry. Tata McGraw Hill.
2. Varley, H.: Practical Clinical Biochemistry. The English language Book Society.
3. Das, Debjyoti : Biophysics and Biophysical Chemistry. Academic Publisher, Calcutta.
4. Okotore, R.O. : Basic Separation Techniques in Biochemistry. New Age International (P) Ltd. Publishers.
5. Manual of Laboratory Techniques. National Institute of Nutrition, Hyderabad.

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M.Sc.(Food and Nutrition)

M.Sc.Previous 11st Semester

Paper VII

Problems in Human Nutrition

Max. marks : 80

Unit I

1. Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients. Identification of high risk patients. Assessment of patient needs based on interpretation of patient data (Clinical, biochemical, biophysical, personal etc.)
2. Nutritional support : Recent advances in techniques and feeding substrates.
3. Stress and trauma : Diet in surgery burns, fracture.
4. Diet and drug interaction :


Unit II

Effect of drugs on ingestion, digestion and metabolism of nutrients.

5. Neurological disorders:
  - Neuritis - Etiology, nutritional care.
  - Migraine - Diet management
  - Anorexia Nervosa - Etiology, treatment.
6. Childhood problems : Inborn errors of metabolism and their nutritional management.  
Maple syrup urine disease - Tyrosinemia, Galactosemia, Phenylketonuria.
7. Musculoskeletal disorders :

Unit III

- (a) Arthritis - Nutritional care
- (b) Gout - Characteristics, care
8. Cancer :

  
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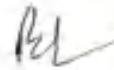
- Types of cancer, Nutritional effect of cancer, Nutritional disorders related to treatment, diet in cancer.

Unit IV

9. Historical background, prevalence, etiology, biochemical and clinical manifestation, preventive and therapeutic measures for the following -
  - (i) PEM
  - (ii) Nutritional anaemia
  - (iii) Vitamin A deficiency
  - (iv) IDD

Unit V

10. Osteomalacia and osteoporosis : Etiology, symptoms and nutritional care.
11. Rickets
12. Dental carries : Etiology, nursing bottle carries.
13. Nutrition AIDS.



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M.Sc.(Food and Nutrition)

M.Sc.Previous Ist Semester

Paper VIII

Food Chemistry

Max. marks : 80

Unit I

1. ✓ Meat and Poultry : Muscle composition, characteristics and structure. Post Mortem changes processing, preservation and their effects. Heat induced changes in meat variables in meat preparation, Tenderizing treatments, meat products.
2. ✓ Eggs : Structure and composition, changes during storage. Functional properties of eggs. use in cookery. Egg processing, low cholesterol egg substitutes.

Unit II

3. ✓ Fish and sea foods : Types and composition, storage and changes during storage, changes during processing, by-product and newer products.
4. ✓ Pulses and Legumes : Structure, composition, processing, toxic constituents.
5. ✓ Nuts and oil seeds : Composition, oil extraction and by-products.
6. ✓ Protein concentrates : Hydrolysates and textured vegetable proteins, milk substitutes.

Unit III

7. ✓ Fruits and vegetables : Plant, anatomy, gross composition, structural features and activities of living systems. Enzymes in fruits and vegetables. Flavour constituents, plant phenolics, pigments, post harvest changes. Texture of fruits and vegetables. Effects of storage, processing and preservation.
8. ✓ Spices and condiments : Composition, flavouring extracts - Natural and synthetic.

Unit IV

9. ✓ Processed foods : Jams, jellies, squashes, pickles, dehydrated products.
10. ✓ Beverages : Synthetic and natural, alcoholic and non-alcoholic, carbonated and non-carbonated, coffee, tea, cocoa, malted drinks.

Unit V

11. ✓ Traditional processed products : Fermented food - Cereal based, pulse based, fruit/vegetables based like vinegar, pickle and alcoholic beverages.
12. ✗ Leavened products : Leavened agents, biologically leavened and chemically leavened products. Batters and dough, bakery products.
13. ✓ Salt and salt substitutes.

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M.Sc.(Food and Nutrition)  
M.Sc.Previous Ist Semester  
Practical II  
Nutritional Biochemistry

Max. marks : 80

Objectives :

This course will enable the students to

- Understand the principles of biochemical methods used for analysis of food and biological samples.
- Perform biological analysis with accuracy and reproducibility

Note : Any ten practical.

Part -A

1. Calcium : Estimation of calcium in foods and serum.
2. Phosphorous : Estimation of inorganic phosphorous in foods and serum.
3. Ascorbic acid : Estimation of ascorbic acids in foods.
4. Plantains :
  - (a) Estimation of proteins in foods.
  - (b) Estimation of albumin, globulin and albumin/globulin ratio in serum and
  - (c) Estimation of hemoglobin.
5. Glucose : Estimation of glucose in blood and urine.
6. Cholesterol : Estimation of cholesterol in blood.
7. Enzyme assay : Estimation of activity of serum alkaline phosphates and trans aminase.
8. Urea and creatinine : Estimation of uvea and creatinine in serum and urine.
9. Survey o pathological laboratories.

Part - B

10. Acids and alkalis : Preparation of dilute solutions of common acids and alkalis and determining their exact normalities.

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**M.Sc. Food and Nutrition**  
**(M.Sc.II<sup>nd</sup> Semester)**

**Theory**

**Part I**

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Food microbiology	80	10	10	100
Paper II	Nutrition and Health of women and Children	80	10	10	100
Paper III	Nutrition for Health and Fitness	80	10	10	100
Paper IV	Advanced Nutrition	80	10	10	100

**Unit II**

Practical		Marks
Practical	Nutrition and Food Microbiology	100

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M.Sc. (Food and Nutrition)

IIIrd Semester

Paper I

Food Microbiology

Max. marks : 80

Unit I

1. Bacterial Morphology, structure, staining, culture media, culture method and identification of bacteria's.
2. Growth and Nutrition of Bacteria :  
Intrinsic and extrinsic parameters that affect microbial growth.

Unit II

3. Microorganism important in food microbiology - Mold, yeast, bacteria.
4. Spoilage of different groups of foods :
  - (i) Cereals and cereal products
  - (ii) Vegetables and fruits
  - (iii) Fish and meat products
  - (iv) Eggs and poultry
  - (v) Milk and milk products
  - (vi) Canned foods

Unit III

5. Contamination of foods.
6. Food Preservation :
  - (i) General principles of food preservation :  
Asepsis, removal of micro-organism, maintenance of anaerobic conditions.
  - (ii) Preservation by use of high temperature.
  - (iii) Preservation by use of low temperature.
  - (iv) Preservation by drying.
  - (v) Preservation by food additives
  - (vi) preservation by radiation.

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#### Unit IV

7. Foods in relation to disease :

- (i) Food borne illness : Bacterial and viral food borne disorders. Food borne important animal parasites, mycotoxins.

8. Fermented Foods :

- (i) Fermented dairy products
- (ii) Fermented vegetables
- (iii) Fermented meat
- (iv) Fermented fish
- (v) Beverage and distilled products.

#### Unit V

9. Indices of Food Sanitary Quality :

- (i) Microbial criteria of food.
- (ii) Microbial standards and food safety

10. Controlling the microbial quality of foods -

- (i) Quality control using microbial criteria.
- (ii) The HACCP (Hazard Analysis and Critical Control Point) system

11. Anti microbial therapy

12. Food Laws

#### References :

1. Frazier, W.C. and West off, D.C. (1998) : Food Microbiology. Tata McGraw Hill Book Company, New Delhi, 4th Edition.
2. James, M.I. (1987) : Modern Food Microbiology, CBS Publishers, New Delhi, 3rd edition.
3. Pelczar, M.I. and Reid, R.D. (1993) : Microbiology, McGraw Hill Book Company, New York, 5th edition.
4. Adams, M.R., Moss, M.O. (1995) : Food Microbiology, New Age International (P.) Ltd., Delhi.
5. Ban wart G.J. (1987) : Basic Food Microbiology, CBS Publishers and Distributors, Delhi.

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M.Sc.(Food and Nutrition)  
IIIrd Semester  
Paper II  
Nutrition and Health of Women and Children

Max. marks : 80

Unit I

1. Role of women in national development.
2. Women in family and community :  
Demographic changes, menarche, marriage, fertility, morbidity, mortality, life expectancy, sex ratio, ageing, widowhood.
3. Women and Society :  
Women' role, their resources and contribution to family and effect of nutritional status.

Unit II

4. Women and Health :  
Health facilities. Disease pattern and reproductive health
5. Policies and programs for promoting maternal and child nutrition and health.
6. Concept of small family. Methods of family planning - merits and demerits.

Unit III

Importance of maternal Nutrition

7. Importance of nutrition prior to and during pregnancy - prerequisites for successful outcome. Effect of under nutrition on mother and child including pregnancy outcome and maternal and child health - Short term and long term effect.
8. Physiology and endocrinology of pregnancy and embryonic and foetal growth and development.
9. Nutritional requirements during pregnancy :  
Adolescent pregnancy, Pregnancy and T.B., IUGR, gestational diabetes.

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#### Unit IV

10. Lactation :

- Development of mammary tissue and role of hormones.
- Physiology and endocrinology of lactation - Synthesis of milk components- Let down reflex, role of hormones, lactational amenorrhoea, effect of breast feeding on maternal health.

✓ 11. Human milk composition and factors effecting breast feeding. Human milk banking.

12. Management of Lactation :

Prenatal breast feeding, skill education. Rooming in problems - Sore nipples, engorged breast, inverted breast.

✓ 13. Exclusive breast feeding

#### Unit V

✓ 14. Infant Physiology :

Pre-term and low birth weight infant - Implication for feeding and management

15. Growth and development during infancy, childhood and adolescents.

✓ 16. Feeding of infants and children and dietary management.

17. Malnutrition - Etiology and management.

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M.Sc.(Food and Nutrition)

IIIrd Semester

Paper IIIrd

Nutrition for Health and Fitness

Max. marks : 80

**Objectives :**

This course will prepare the students to -

- Understand the components of health and fitness and the role of nutrition.
- Make nutritional, dietary and physical activity recommendations to achieve fitness and well-being.
- Develop ability to evaluate fitness and well-being.

Unit I

✓ Definition, components of fitness.

- (a) Anatomical fitness
- (b) Physiological fitness
- (c) Psychological fitness

- ✓ Physiological fitness :

- ✓ (a) Growth and development, (b) Strength, (c) Speed, (d) Skill, (e) Stamina or endurance, specific fitness, general fitness and health status.

✓ 2. Holistic approach to the management of fitness and health : -

✓ Energy input and output, effect of specific nutrients on work performance and physical fitness, physical fitness and health inter-relationship.

Unit II

3. Review of different energy systems for endurance and power activity :

(a) Endurance : Definition, classification of endurance, factors affecting endurance.

✓ (b) fuels and nutrients to support physical activity : shifts in carbohydrates and fat metabolism, mobilization of fat stores during exercise.

✓ 4. Nutrition in Sports : Sports specific requirement.

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Unit III

5. Pregelime and post game meals. Assessment of different nutrigenic aids. Commercial supplements.
6. Diets for persons with high energy requirements, stress, fracture and injury.
7. Water and electrolyte balance : Losses and their replenishment during exercise and sports. Effect of dehydration.

Unit IV

8. (A) Significance of physical fitness in the prevention and management of :  
(i) Diabetes mellitus, (ii) Cardiovascular disorders, (iii) Bone health and obesity.
9. Nutrition and exercise regimes for pre and post natal fitness.

Unit V

10. A. Defining nutritional goals/ guidelines appropriate to health and prevention and management of the chronic degenerative -  
(a) Cardiovascular disorders, (b) diabetic mellitus  
(c) Cancer, (d) Bone health and obesity
- B. Various dietary regimes for weight reduction.
11. Alternative systems for health and fitness like ayurveda, yoga, meditation, vegetarianism and traditional diets.

References :

- Mahan, L.K. and Ecott-Stump, S. (2000) : Krause's Food, Nutrition and Diet Therapy, 10th Edition, W.B.Saunders Ltd.
- Sizer, F. and Whitney, E. (2000) : Nutrition - Concepts and Controversies, 8th Edition, Wadsworth Thomson Learning.
- Whitney, E.N. and Rolfes, S.R. (1999) : Understanding Nutrition, 8th Edition, West/Wadsworth, An International Thomson Publishing Co.
- Ira Wolinsky (Ed) (1998) : Nutrition in Exercise and Sports, 3rd Edition, CRC Press.
- Parizkova, J. Nutrition, physical activity and health in early life, Ed. Wolinsky, I., CRC Press.

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6. Shils, M.E., Olson, J.A., Shike, N and Ross, A.C. (Ed) (1999) : Modern Nutrition in Health and Disease, 9th Edition, Williams and Wilkins.
7. McArdle, W.Katch, F. and Katch, V. (1996) : Exercise Physiology, Energy, Nutrition and Human Performance, 4th Edition, Williams and Wilkins, Philadelphia.

**Journals :**

1. Medicine and Science in sports and Exercise
2. International Journal of Sports Nutrition

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M.Sc.(Food and Nutrition)  
IIIrd Semester  
Paper IVrth  
Advanced Nutrition

Objectives :

Max. marks : 100

This course will prepare the students to -

- Provide in depth knowledge of the physiological and metabolic role of various nutrients and their interactions in human nutrition.
- Enable students to understand and the basis of human nutrition requirement and recommendations through the life cycle.
- Familiarize students with recent advances.

Unit I

1. Energy :

- (a) Energy content of foods, physiological fuel values - Review.
- (b) Measurement of energy expenditure - BMR, RMR, Thermo effect of feeding and physical activity. Methods of measurement of basal metabolism.
- (c) Estimating energy requirements of individuals.
- (d) Regulation of energy metabolism - Control of food intake, digestion, absorption and body weight.

Unit II

2. Carbohydrates :

- (a) Types classification, digestion and transport - Review.
- (b) Dietary fibre, fructo-oligosaccharides, starch- chemical composition and physiological effects.
- (c) Glycemic index of foods, sweeteners - Nutritive and Non-nutritive.

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Unit III

3. Proteins :
- (a) Classification, digestion, absorption and transport - Review.
  - (b) Role of liver and gastro intestinal tract in protein metabolism.
  - (c) Protein quality - methods of evaluating protein quality.
  - (b) Protein and amino acid requirements, specific functions of amino acids.
4. Lipids :
- (a) Classification, digestion, absorption and transport - Review
  - (b) Functions of fat, EFA : Role of n-3, n-6 fatty acids in health and diseases.  
Requirement of total fat and fatty acid.
  - (c) Postage an dins, phospholipids. cholesterol.

Unit IV

5. water : water balance and its regulation.
6. Minerals :
- (For each nutrient sources, bioavailability, metabolism, function, requirements, RDI, Deficiency and toxicity to be discussed)
- (a) Macro minerals : Calcium, phosphorous, magnesium, sodium, potassium and chlorides.
  - (b) micro mineral : Iron, copper, zinc, manganese, iodine, fluoride.
  - (c) trace minerals : Selenium, cobalt, chromium, vanadium, boron, nickel.

Unit V

7. Vitamins :
- Structure, food sources, absorption and transport, metabolism, biochemical function, assessment of status physiological and therapeutic effect. The toxicity and deficiency with respect to the following :
- (a) Fat soluble : Vitamin A, D, E and k
  - (b) Water soluble : Thiamin, riborilavin, niacin, biotin, pyridoxine, folic acid, pantothenic acid, choline, cyanocobalamin, inositol, ascorbic acid.

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M.Sc.(Food and Nutrition)  
IVth Semester

Practical III

Nutrition and Food Microbiology

Part - A

Max. marks :100

Nutrition

1. Assessment of Nutritional status of community by using anthropometric and clinical techniques.
2. Development of low cost nutrition recipes suitable for various vulnerable section of the population.
3. Diet planning and preparation for P.E.M., vitamin A deficiency anemia and diarrhea.
4. Collection and Storage of biological samples for clinical investigation.
5. Physiological parameters like heart rate and blood pressure.
6. Assessment of coronary risk profile.
7. Planning diets and formulating dietary guidelines for -
  - (i) Fitness and health
  - (ii) Obesity management
  - (iii) Management of diabetes mellitus and CVD.
8. Planning and preparation of diet for elderly in health and sickness.
9. Visit to ongoing public health nutrition programme.

Part - B

Food Microbiology

1. Preparation of common laboratory media and special media for cultivation of bacteria, yeast and moulds.
2. Preparation of culture for yeast and moulds.
3. Preparation of bacterial smear.

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4. Simple staining of bacterial culture.
5. Gram staining of bacterial culture.
6. Morphological study of fungi by culture technique.
7. Microbiological study of water.
8. Microbiological analysis of food samples.
9. Determination of quality of milk sample by methylene blue reductase test.
10. Check the milk for the presence of proteins, urea, sugar, starch.
11. Visit to food processing unit or any other organisation dealing with advanced method in food microbiology.

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M.Sc. Food and Nutrition  
(M.Sc. I<sup>st</sup> Semester)

Theory

Part I

No.	Title	Marks			
		Theory	Test	Seminar	Total
Paper I	Physiology	80	10	10	100
Paper II	Public Nutrition	80	10	10	100
Paper III	Geriatric Nutrition	80	10	10	100
Paper IV	Research Methods in Food and Nutrition	80	10	10	100

Part I

Practical

Practical		Marks
Practical	Dissertation and current trends in food and nutrition	75+75

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M.Sc. (Food and Nutrition)

IIIrd Semester

Paper IX - I

Physiology

Max. marks : 80

1. Cell Structure and Functions :

Unit I

Levels of cellular organisations and function - Brief review. Cell membrane, transport across cell membrane and intercellular communication, Regulations of cell multiplication.

2. Nervous System :

- Review of structure and function of neuron. Conduction of nerve impulse, synapses, role of neurotransmitters.
- Organisation of central nervous system, structure and functions of brain and spinal cord, afferent and efferent nerves. Hypothalamus and its role in various body functions - Obesity, sleep, memory.

Unit II

3. Endocrine System :

- Endocrine glands - Structure, function, role of hormones, regulation of hormonal secretion. Disorders of endocrine glands.

4. Sense Organs :

- Review of structure and function. Role of skin, eye, ear, nose and tongue in perception of stimuli.

Unit III

5. Digestive System :

- Review of structure, secretory, digestive and absorptive functions. Role of liver, pancreas and gall bladder and their dysfunction.

6. Respiratory Function :

- Review of structure and function. Role of lungs in the exchange of gases. Transport of oxygen and carbon dioxide, respiratory quotient, hypoxia and asthma.

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7. **The Circulating System :** Unit IV  
Structure and function of heart and blood vessels. Regulation of cardiac output and blood pressure, heart failure, hypertension.
8. **Blood :**  
Formation and function of plasma protein and blood erythropoietin, blood clotting, blood group and histocompatibility, blood indices, use of blood for investigation and diagnosis of specific disorders, anemia.
9. **The musculo-Skeletal System :**
- Structure and function of bone, cartilage and connective tissue. Disorders of skeletal system.
  - Types of muscles, structure and function.

10. **The Excretory System :** Unit V  
Structure and function of nephron. Urine formation. water, electrolyte and acid base balance, diuretics.
11. **Immune System :**  
Humoral immunity. Development of lymphocytes. Role of inflammation and defense.
12. **Reproduction :**  
Menstrual cycle, spermatogenesis, physiological changes in pregnancy.

**References :**

1. Ganeng, W.J. (1985) : Review of medical Physiology, 12th edition, Lange Medical Publication.
2. Guyton, A.C. (1985) : 'Functions of the Human Body', 4th edition, W.B. Saunders Company, Philadelphia.
3. Guyton, A.C. and Hall, J.B. (1996) : Text book of Medical Physiology, 9th edition, W.B. Saunders Company, Philadelphia.
4. Jain, A.K. Text book of Physiology, Vol. I and Vol. II, Avichal Publishing Co., New Delhi.

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M.Sc.(Food and Nutrition)

IVrd Semester

Paper II

Public Nutrition

Max. marks : 80

Unit I

1. **Concept of Public Health Nutrition :**

- Relationship between health and nutrition. Role of public nutritionist in the health care delivery system.
- 2. sectors and public policies relevant to nutrition.
- 3. National health care delivery system.

Unit II

4. **Population Dynamics :**

Demography, demographic cycle, world population trend, birth rates, death rates, growth rates, demographic trends in India, age pyramid, sex ratio.

5. **Environment and Health :**

Water : Water pollution, surveillance of drinking water quality.  
Air : Air pollution.

Unit III

6. **Nutritional Status :**

Determinants of nutritional status of individual and populations. Factors affecting nutritional status.

7. **Major Nutritional Problems :**

Etiology, Prevalence, clinical manifestations. Preventive and therapeutic measures of -

- Macro and micro deficiencies - LBW, PEM, exophthalmia, nutritional anemia.
- Other nutritional problems like lathyrism, aflatoxicosis, alcoholism and fluorosis

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Unit IV

- 8. national Nutrition Policy
- 9. Approaches and strategies for improving nutritional status and health
- 10. Occupational health
- 11. Health Planning and management

Unit V

- 12. Communication for Health Education.
- 13. Health Planning in India.
- 14. Health Care of the Community : Concept of health system levels of health care.

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M.Sc.(Food and Nutrition)

IVrd Semester

Paper IIIrd

Geriatric Nutrition

Max. marks : 80

**Objectives :**

This course is designed to -

- Familiarize the students with the multifaceted aspects of ageing.
- Make the students competent for nutritional and health care of the elderly.

Unit I

1. Ageing : Definition :

(A) Molecular changes during ageing - (i) Changes in proteins, (ii) Chromatin, (iii) Cross linkers, (iv) Immune response, (v) Hormones, (vi) Ageing of cells in culture, (vii) age pigment.

2. Mechanism of Ageing -

- (A) Somatic mutation,
- (B) Errors in proteins
- (C) Gene regulation

3. Socio-psychological aspects of ageing-Especially problems of elderly women.

Unit II

4. Nutritional and food requirement during old age -

Progress of ageing, nutritional requirements, food requirements.

5. Nutrition related problems of old age -

(i) Osteoporosis, (ii) Obesity, (iii) Neurological dysfunction, (iv) Anemia, (v) Malnutrition, (vi) Constipation.

Unit III

6. Degenerative diseases in old age -

(i) Atherosclerosis, (ii) Hypertension, (iii) Cancer, (iv) Diabetes mellitus, (v) Arthritis.

7. Common complaints during old age.

8. Dietary guidelines

Unit IV

9. Drug - Food and nutrient reaction in elderly.

(a) Effect of drugs on food intake and absorption.

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- (b) Effect of various foods and beverages on drug action.
- (c) Drug nutritional interaction.
- 10. Ageing and immunity.
- 11. Ageing and nutrition, nutrition and longevity. food habits of elderly people. stress during old age.

#### Unit V

- 12. Exerciser, yoga, meditation in old age.
- 13. Policies and programmes of the government to the elderly.
- ✓ 14. Policies and programmes of the NGO sector pertaining to the elderly.

#### References :

1. Kumar V.(1996) : Ageing - Indian perspective and Global Scenario. Proceedings of International Symposium of Gerontology and Seventh Conference of the Association of Gerontology (India).
2. Bag chi, K. and Puri, S. (Ed) (1999) : Diet and Aging - Exploring Some Facets. Soc. for Gerontological Research, New Delhi and Help Age India, New Delhi.
3. chaudhary, A. (Ed) (2001) : Active Aging in the New Millennium, Pub. Anugraha, Delhi.
4. Shills, M.S., Olson, J.A., Shike, M. and Ross, A.C. (Ed) (1999) : 9th Edition, Williams and Wilkins.
5. Sharma, O.P. (Ed) (1999) : Geriatric Care in India - Geriatrics and Gerontology : A Text book, M/s, ANB Publishers.
6. Aiken, L.R. (1978) : The Psychology of Later Life, Philadelphia, WB Saunders Company.
7. Bergmann, Klaus (1972) : Aged : Their Understanding and Care, London, Wolfe Pub.
8. Bin stock, R.H. and E. Shanes (eds) (1986) : Handbook of Aging and Social Sciences, V.N. Reinhold Co., New York.

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M.Sc.(Food and Nutrition)

IVrd Semester

Paper IIIrd *12th*

Geriatric-Nutrition

*Research methods in Food & Nutrition*

Max. marks : 80

Unit I

1. Body Composition :-

- (a) Normal body composition
- (b) Changes through the life cycle
- (c) Methods of assessing body composition

2. Diet Surveys -

Factors to be considered in conducting diet surveys :-

- (a) Trained personnel
- (b) Population sampling
- (c) Methods of diet surveys
- (d) Calculation of the nutritive value of the diet in terms of adult consumption unit and interpretation.

3. Nutrition education :-

- (a) Training in nutrition
- (b) Channels of nutrition education of the community
- (c) Nutrition education methods

Unit II

4. Design Strategies in research Descriptive studies. :-

- (a) Brief overview Case study, cross sectional surveys.
- (b) Issues in the design and conduct of descriptive studies Defining the population, defining the disease, measurement of disease, comparing with known indices, formulation of hypothesis, uses of descriptive studies.

5. Principles of Epidemiology Definition, aims, uses, epidemiological approach.

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### Unit III

6. **Design Strategies in Research Analytical Studies :-**
  - (a) Brief overview Case control. clinical trials.
  - (b) Issues in the design and conduct of case control studies Selection of cases, selection of controls, matching, exposure status, analysis, advantages and disadvantages.
7. **Screening for Disease** Concept of screening, aims and objectives, uses of screening, types of screening.

### Unit IV

8. **Design Strategies in Research Analytical Studies :-**
  - (a) Overview of types of Cohort studies.
  - (b) Issues in the design of cohort studies Selection of exposed population, selection of comparison group, obtaining data on exposure, follow-up, analysis, advantages, disadvantages.
9. **Health Information** Component of health information system, uses of health information, sources of health information.

### Unit V

10. **Experimental Studies -**  
Randomized controlled trials (Clinical trials) protocol, selection of reference and experimental population, randomization, manipulation, follow-up, assessment.
11. **Qualitative Research -**  
PRA -
  - (a) Concept of PRA
  - (b) Tools and Techniques
  - (c) Evaluation

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M.Sc.(Food and Nutrition)

M.Sc. IVth Semester

Practical IVth

Dissertation and Current Trends in Food and Nutrition

Max. marks : 100

(a) **Dissertation :**

**In any field of food science, nutrition and systematic writing of report along with statistical analysis of data.**

(b) **Current trends in food and nutrition :**

**Acquaintance of the students with current trends in the field of food and nutrition. Collection and compilation of latest reviews.**



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28. Watson, R.R (ed) (1985) : CRC Handbook of vitamins in the Aged. CRC Press, Boca Raton, Florida.
29. Bock, G.R. and Whelen, J.(eds) The Childhood Environment and Adult Disease. Chichester, U.K. Wiley.
30. Berg, R.L. and Casells, J.S. (1990) : The Second Fifty Years : Promoting Health and Preventing Debility.
31. Talwar, G.P. : Textbook of Biochemistry and Human Biology.
32. B.Srilakshmi : Dietetics, New Age International (p.) Ltd. Publishers.

**Journals.**

1. American Journal of Clinical Nutrition
2. Gerontology
3. Journal of American Geriatric Society
4. Age Ageing
5. Journal of Applied Gerontology.
6. Age
7. Journal of Gerontology

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**SYLLABUS OF SEMESTER SYSTEM  
FOOD AND NUTRITION  
M.Sc. (HOME SCIENCE) PREVIOUS  
1st SEMESTER  
Marking Scheme  
PART I - THEORY**

UNIT-I

No.	Title	Marks			Total
		Theory	Test	Seminar	
Paper I	Research methodology	80	10	10	100
Paper II	Physiology	80	10	10	100
Paper III	Food Microbiology	80	10	10	100
Paper IV	Problems in Human Nutrition	80	10	10	100

UNIT-V

**PART II - PRACTICAL**

Practical	Marks
Practical I Nutrition & Food Microbiology	100

**HUMAN DEVELOPMENT  
M.Sc. (HOME SCIENCE) PREVIOUS  
1st SEMESTER  
Marking Scheme  
PART I - THEORY**

No.	Title	Marks			Total
		Theory	Test	Seminar	
Paper I	Research Methodology	80	10	10	100
Paper II	Theories of Human Development	80	10	10	100
Paper III	Early Childhood Education	80	10	10	100
Paper IV	Current trends and issues in Human Development	80	10	10	100

**PART II - PRACTICAL**

Practical	Marks
Practical I Early Childhood Education	100

**RESOURCE MANAGEMENT  
M.Sc. (HOME SCIENCE) PREVIOUS  
1st SEMESTER  
Marking Scheme  
PART I - THEORY**

No.	Title	Marks			Total
		Theory	Test	Seminar	
Paper I	Research Methodology	80	10	10	100
Paper II	Theory of Management	80	10	10	100
Paper III	Consumer Economics	80	10	10	100
Paper IV	Environment Management	80	10	10	100

**PART II - PRACTICAL**

Practical	Marks
Practical I Communication Technology	100

**TEXTILES AND CLOTHING  
M.Sc. (HOME SCIENCE) PREVIOUS  
1st SEMESTER  
Marking Scheme  
PART I - THEORY**

UNIT-IV

No.	Title	Marks			Total
		Theory	Test	Seminar	
Paper I	Research Methodology	80	10	10	100
Paper II	Textile Chemistry	80	10	10	100
Paper III	Fashion Retailing	80	10	10	100
Paper IV	Textile Designing	80	10	10	100

UNIT-V

**PART II - PRACTICAL**

Practical	Marks
Practical I Textile Chemistry	100

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studies  
biological  
Selection of  
analysis  
es. uses of  
population  
follow-up  
s of health

Marks 80

  
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PL. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)  
M.A. (HOME SCIENCE) I SEMESTER

DECEMBER - 2013

SCHEME OF MARKS FOR

CODE	PAPER	PAPER DESCRIPTION		THEORY		INTERNAL		TOTAL
				MAX	MIN	MAX	MIN	
101	PAP1	01- BASICS OF FOOD NUTRITION	TH	80	16	20	4	100
102	PAP2	02- CLINICAL & THERAPEUTIC NUTRITION	TH	80	16	20	4	100
103	PAP3	03- EXTENSION EDUCATION - I	TH	80	16	20	4	100
104	PAP4	04- RESEARCH METHODOLOGY	TH	80	16	20	4	100
105	PAP5	05- PRACTICAL (FOOD SCIENCE & NUTRITION)	PR	100	20	—	—	100

MAXIMUM MARKS TOTAL	PASS PER		DIVISION - PER			ATKT Y/N	GRACE/ NO OF SUB.	NO OF SUB. TO APPEAR
	TH.	PR.	I	II	III			
400	36	36	60	48	36	Y	1/1	4

CERTIFICATE  
CERTIFIED THAT THIS RESULT HAS BEEN CHECKED BY RESULT COMMITTEE AND FOUND CORRECT

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JAGDALPUR



Registrar  
Shaheed Mahendra Karma Vishwavidyalaya, Bastar  
Jagdalpur, Dist.-Bastar, Chhattisgarh