FACULTY OF SCIENCE

SYLLABI

FOR

M.Sc. Home Science (Food & Nutrition)
(Semester System)
Examinations, 2011-2012
PANJAB UNIVERSITY, CHANDIGARH

Outlines of tests, syllabi and courses of reading for M.Sc. Home Science (Food & Nutrition)
1st & 2nd Semester System Examination, 2011-2012

SCHEME OF STUDIES

<table>
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<tr>
<th>Course No.</th>
<th>Subject</th>
<th>Credit</th>
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<th>Pr.</th>
<th>Paper</th>
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1st SEMESTER Exam. Nov./Dec., 2011

Total : 13 4 425

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2nd SEMESTER Exam. April/May, 2012

Total : 13 4 425

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Total: 11 7 400

4th SEMESTER Exam. April/May, 2012

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Total: 8 4 350

Grand Total: 64 1600

* Marks will be awarded at the end of Semester-IV

** There will be no University exam. of this practical 3rd Semester.
Guidelines for Continuous Internal Assessment

I
(a) Written Test : 25 (reduced to 5)
(b) Snap Test : 25 (reduced to 5)
(c) Participation in Class Discussion : 15 (reduced to 3)
(d) Term Paper : 25 (reduced to 5)
(e) Attendance : 10 (reduced to 2)

Total : 100 (reduced to 20 and further reduced to 10)

II Weightage of 2 marks for attendance component out of 20 marks for Continuous Assessment shall be available only to those students who attend 75% and more of classroom lectures/seminars/workshops. The break-up of marks for attendance component for theory paper shall be as under :

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<th>Attendance Component</th>
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<td>a) 75% and above upto 85%</td>
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<td>b) Above 85%</td>
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III Continuous Internal Assessment Awards must be sent to the Controller of Examinations, by name, two weeks before the commencement of the particular examination on the pro forma obtainable from the examination branch.
1st SEMESTER

COURSE NO. 101 : NUTRITIONAL BIOCHEMISTRY-I (Th.)

Marks : 75  
Paper : 60  
Int. Ass. : 15

Credits/week : 3

Instructions to Paper Setters and the Students:
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:
1. To augment the biochemistry knowledge acquired at the undergraduate level.
2. To understand the mechanism adopted by the human body for various metabolic pathways.

Detail of Syllabus

Unit-I

   High energy compounds. Concept of metabolism and involvement of enzymes in metabolic pathways.

2. Biochemical Techniques:
   Principles and applications of
   (i) Homogenization and methods of disrupting cells and tissues
   (ii) Colorimetry

Unit-II

3. Carbohydrates:
   (a) Structure and properties of glycogen, starch and cellulose.
   (b) Metabolism: Glycolysis, Tricarboxylic Acid cycle, Gluconeogenesis, Cori cycle, Glyoxylate cycle, Hexose Monophosphate pathway, Glycogenolysis, Glycogenesis.
Unit-III

4. Proteins:
   (a) Classification, structure (primary, secondary, tertiary and quaternary structure), properties and denaturation of proteins.
   (b) Metabolism:
      (i) Review of general reaction of amino acid catabolism and urea cycle.
      (ii) Biosynthesis of proteins. Regulation of protein biosynthesis by genetic control.

5. Fats:
   (a) Structure and properties of fatty acids and triglycerides.
   (b) Metabolism:
      (i) Fat storage, lipid transport and mobilization.
      (ii) Oxidation of saturated and unsaturated fatty acids.
      (iii) Biosynthesis of saturated and unsaturated fatty acids.
      (iv) Biosynthesis of triglycerides.
      (v) Formation and utilization of ketone bodies.

Unit-IV

6. Nucleic acids:
   (a) Classification, composition and functions of nucleic acids.
   (b) Structure and properties of nucleosides, nucleotides, DNA and RNA (mRNA, tRNA, rRNA)
   (c) Metabolism:
      (i) Biosynthesis and Catabolism of purines and pyrimidines (regulation not required).
      (ii) Replication and transcription of nucleic acids.
      (iii) Genetic codes.

Books Recommended:


Course No. 102 : NUTRITIONAL BIOCHEMISTRY-I (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Credits/week : 2

Note :-
1. Practical will be of 4 hrs. duration.
2. Practical paper will be set by the external examiner in advance.

1. Preparation of standards solutions, buffers and measurement of pH.
2. Isolation and quantitative estimation of sugars in blood and foodstuff.
3. Isolation of lipids from liver and foodstuff and their detection and estimation.
4. Estimation of cholesterol, total lipids and phospholipids.
6. Isolation and estimation of Casein from milk.
8. Extraction and quantitative estimation of ascorbic acid.
10. Separation of proteins by gel electrophoresis.
COURSE NO. 103 : INTRODUCTION TO MICROBIOLOGY (Th.)

 Marks : 75
 Paper : 60
 Int. Ass. : 15

Credits/week: 3

Instructions to Paper Setters and the Students:
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:
1. To study the origin of micro-organisms, their structure and procedures to study it.
2. To understand the growth and activities of bacteria.
3. To gain knowledge of the metabolic activities and genetic studies related to bacteria.

Detail of Syllabus

Unit-I
1. (a) Micro-organisms as cells: discovery and history of microbiology, sub-disciplines of microbiology.
2. The prokaryotic cell: Cell wall, cell membrane, ribosome and other parts.

Unit-II

Unit-III
4. Antimicrobial agents such as antibiotics, germicides, disinfectants, antiseptics. Quantification of antimicrobial action.
5. Nutrition of micro-organisms; transformation of energy by fermentation, respiration and anaerobic respiration.

Unit-IV
6. Genetics: Mutants, mechanism of mutation; Genetic recombination by transformation, transduction and conjugation in prokaryotic cells.
Books Recommended


COURSE NO. 104 : INTRODUCTION TO MICROBIOLOGY (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Credits/week : 2

Note :-

1. Practical will be of 4 hrs. duration.
2. Practical paper will be set by the external examiner in advance.
3. Paper setter will also be an examiner.

1. Culture media preparation and its sterilization:
   Nutrient Broth, Nutrient Agar, MacConkey’s agar, EMB agar.

2. Microscopic examination of Bacteria: Morphological studies:
   • Simple staining
   • Gram staining
   • Negative staining
   • Cell wall staining
   • Capsule staining

3. Aseptic transfer techniques:
   Inoculation in nutrient broth, on solid surface.

4. Isolation of pure culture of bacteria:
   • Streak plate technique
   • Pour plate technique

5. Determination of size of bacteria using ocular eye piece.
6. Determination of viable count of given culture by standard plate count method.
COURSE NO. 105 : ADVANCE NUTRITION-I (Th.)

Marks : 100  
Paper : 80  
Int. Ass. : 20

Credits/week: 4

Instructions to Paper Setters and the Students:
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:
1. To understand historical perspective of nutrition and nutritional requirements.
2. To understand nutritional management in special conditions.

Detail of syllabus

Unit-I
1. Body Composition - Methods of assessment of body composition:
   (a) Change in body composition throughout the life cycle.
   (b) Alteration in body composition and their consequences.
2. Brief over-view of hunger and satiety.

Unit-II
3. Energy:
   (a) Energy content of food stuff and share of 3 main energy nutrients.
   (b) Energy measurement - Direct and indirect calorimetry.
   (c) Energy utilization in cells.
   (d) Energy expenditure - Factors affecting RMR/ maintenance, requirement & activity.
   (e) Exchange list - For energy & Nutrient calculations.

4. Carbohydrates:
   (a) Review of digestion, absorption and utilization of CHO.
   (b) Types and sources of CHO, requirement and recommended allowances.
   (c) Disaccharides Deficiencies - Causes, types, symptoms and treatment.
(d) Importance of various CHO - Lactose, starch, unavailable carbohydrates– types of fibre and resistance starch.

(e) Dietary CHO and coronary heart disease & diabetics.

Unit-III

5. **Proteins and Amino acids :**
   (a) Review of digestion, absorption and utilization of proteins.
   (b) Source of protein - Complete and incomplete proteins.
   (c) Protein as a source of energy.
   (d) Protein requirement & factors affecting the same.
   (e) Study of Nitrogen balance through balance study.
   (f) Protein quality and methods of determining the same - i.e. BV, NPU, PER, Chemical scale, NDP calorie percent.

Unit-IV

6. **Lipids :**
   (a) Review of digestion and absorption of fats.
   (b) Sources of fat in diet.
   (c) Saturated and unsaturated fatty acids, essential fatty acids (requirement, sources and functions, symptoms of deficiency).
   (d) Lipid composition of blood and factors effecting the same (Diet and other factors).
   (e) Storage of fat-factors associated with normal and abnormal storage.
   (f) Role of fat in the etiology of atherosclerosis and coronary heart disease.

7. **Nutritional requirement, RDA and nutritional care for :**
   (a) Infancy.
   (b) Childhood.
   (c) Adolescence.
   (d) Adult and old age.
   (e) Physiological conditions: Pregnancy and lactation.
Books Recommended


COURSE NO. 106 : RESEARCH METHODS

Marks : 75
Paper : 60
Int. Ass. : 15

Credits/week: 3

Instructions to Paper Setters and the Students:
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:

1. To understand the significance of statistics and research methodology in Home Science research.
2. To understand the types, tools, and methods of research and develop the ability to construct data gathering instruments appropriate to the research design.
3. To understand and apply the appropriate statistical technique for the measurement scales and design.

Detail of Syllabus

UNIT-I

1. Science, scientific methods, scientific approach.
2. Role of research and statistics in Home Science discipline.
Objectives of Research: Explanation, control, and prediction.

3. Types of Research: Historical, survey, experimental, case study, social research, participative research.

UNIT-II

4. Definition and identification of a research problem.
   - Selection of research problem.
   - Justification.
   - Theory, hypothesis, basic assumptions, limitations and delimitations of the problem.

5. Types of variables.

   - Population and sample
   - Probability sampling: Systematic random sampling, two stage and multi stage sampling, cluster sampling. Non-probability sampling: Purposive, quota, and volunteer sampling/snowball sampling.

UNIT-III

7. **Basic principles of research.**

   Purposes of research design: Fundamental, applied, and action exploratory, and descriptive experimental, survey and case study, ex-post facto.

   Longitudinal and cross-sectional.

8. **Qualitative research methods:**

   Theory and design in qualitative research
   Definitions and types of qualitative research
   Methods and techniques of data collection

   - Informal group discussions
   - Interviews: Key informant, in-depth interviews
   - Observations
   - Social mapping
   - Participatory rapid assessment
   - Participatory learning assessment
UNIT-IV

9. **Data gathering instruments:**
   Observation, questionnaires, interviews, scaling methods, case study, home visits, reliability and validity of measuring instruments.

10. **Conclusion and recommendations**

11. **Writing a research proposal:** American Psychological Association (APA) format, footnotes, bibliography, citations.

**Books Recommended:**


2nd SEMESTER

COURSE NO. 107: NUTRITIONAL BIOCHEMISTRY-II (Th.)

Marks: 75
Paper: 60
Int. Ass.: 15

Credits/week: 3

Instructions to Paper Setters and the Students:
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:
1. To augment the biochemistry knowledge acquired at the undergraduate level.
2. To understand the mechanism adopted by the human body for various metabolic pathways.
3. To get an insight into interrelationships between various metabolic pathways.

Detail of Syllabus

Unit-I

1. Enzymes:
   (a) Review of chemistry of enzymes (classification and enzyme specificity).
   (b) Factors affecting enzyme activity, Derivation of Michaelis - Menten equation, Lineweaver-Burk equation.
   (c) Enzyme inhibition: Competitive, non–competitive, uncompetitive, product and feed back inhibition.
   (d) Regulatory enzymes: Covalently and non-covalently modulated enzymes.
   (e) Use of enzymes in food.

Unit-II

3. Biochemical role of inorganic elements (Ca, Mg, P, Fe, Cu, Co, Zn, Se).
4. Inter–relationship of nutrients.
Unit-III

5. Biochemical mode of action of hormones of the thyroid, parathyroid, adrenal medulla, adrenal cortex and pancreas.
Regulation of blood sugar level. Regulation of body water and salt level.

Respiratory chain. Oxidative and non-oxidative phosphorylation.

Unit-IV

7. **Biochemical Techniques** :
Principle and applications of :
(i) Centrifugation (Preliminary introduction of various types of centrifuges), cell fractionation.
(ii) Chromatography: Adsorption (Column and thin layer) and paper Chromatography.
(iii) Electrophoresis.

Books Recommended

COURSE NO. 108 : NUTRITIONAL BIOCHEMISTRY-II (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Credits/week : 2

Note :
1. Practical will be of 4 hrs. duration.
2. Practical paper will be set by the external examiner in advance.
3. Paper setter will also be an examiner.

1. Isolation of enzymes from animal as well as from plant tissues.
2. Effect of temperature, ph, enzyme concentration on enzymes activity.
3. Isolation and estimation of activity of :
   - Amylase
   - Protease
   - Alkaline phosphate
4. Isolation and estimation of phytase.
5. Isolation and estimation of phytic acid.
7. Isolation and estimation of calcium, phosphorous and iron.
8. Isolation and estimation of essential amino acid.
9. Isolation and quantitative estimation of B₁, B₂, vitamins in various foodstuffs.
10. Quantitative estimation of Vitamin C.
COURSE NO. 109 : STATISTICS AND COMPUTER APPLICATIONS

Marks : 50
Paper : 40
Int. Ass. : 10

Credits/week: 2

Instructions to Paper Setters and the Students :
The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives :
• To understand the role of statistics and computer applications in research.
• To apply statistical techniques to research data for analysing and interpreting data meaningfully.

Note : Students should be given hands on experiences to use appropriate software packages for selected statistical analysis.

Detail of Syllabus

UNIT-I
1. Conceptual understanding of statistical measures, classification and tabulation of data, measurement of central tendency, measures of variation.
2. Frequency distribution, histogram, frequency, polygon.

UNIT-II
5. Testing of hypothesis. Type I and Type II errors. Levels of significance.

UNIT-III
8. Correlation, coefficient of correlation, rank correlation.
9. Regression and prediction.
10. Analysis of variance – one way and two way classification.
UNIT-IV

11. Experimental designs.
12. Hands on experience of SPSS software along with data analysis.

Books Recommended


COURSE NO. 110 : ADVANCE NUTRITION-II (Th.)

Marks : 100
Paper : 80
Int. Ass. : 20

Credits/week: 4

Instructions to Paper Setters and the Students:

The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.

Objectives:

1. To understand the historical perspective of nutrition and nutritional requirements.
2. To understand nutritional management in special conditions.

Detail of syllabus

Unit-I

2. **Nutrition, infection and immunity – their inter-relationship:**
   (a) Host defense mechanism & nutrients essential in the development of immune system.
   (b) Infection affecting the nutritional status of an individual.
   (c) Nutrient deficiencies & excesses affecting the immune competence & susceptibility to infections.

**Unit-II**

3. **Nutrient Interaction and their inter-relationship.**

4. **Vitamins:**
   (a) Development of vitamins concept.
   (b) Fat soluble vitamins - A, D, E, K.
   (c) Water soluble vitamins-B\(_1\), B\(_2\), Niacin B\(_6\), B\(_12\), Biotin, Folic Acid, Vitamin C.

Physiological action, stages of development of deficiency, excess, dietary sources and therapeutic uses.

**Unit-III**

5. **Minerals** – Physiology, development of deficiency, intake and output, absorption and factors affecting the same, therapeutic uses and toxicity of the following:
   (a) Calcium
   (b) Phosphorus
   (c) Sulphur
   (d) Iron
   (e) Magnesium

**Unit-IV**

6. **Trace Elements - Physiology, Deficiency sources and toxicity of the following:**
   (a) Iodine
   (b) Fluorine
   (c) Zinc
   (d) Copper
   (e) Selenium
   (f) Magnesium
   (g) Cobalt
7. **Eating Disorders** :
   (a) Bulimia
   (b) Anorexia Versa
   (c) Binge Eating Disorders

8. **Nutritional Adaptation in the following**:
   (a) Low calorie.
   (b) Low Protein.
   (c) Low vitamin A.
   (d) Low calcium and iron.

**Books Recommended**


**COURSE NO. 111 : COMMUNICATION TECHNOLOGIES**

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**Credits/ week: 2**

**Instructions to Paper Setters and the Students** :

The syllabus of this paper has been divided into four units. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions will carry equal marks, unless specified.
Objectives:

- To develop understanding regarding the vital aspects of communication, various audio and visual media and their use.
- To develop understanding the new communication technologies and their use.
- To develop skills in developing and using different communication technologies for various presentations.

Detail of Syllabus

Unit-I

1. Concept of communication. Scope of communication, communication process, approaches to communication.
2. Different media, their characteristics, and use.

Unit-II

3. Introduction to new communication technologies:
   - Satellite distribution and broadcast networking.
   - Developing close circuit television package on relevant topics.
4. Presentation techniques:
   - Development and use of transparencies.
   - Use of video films.
   - Computer graphic designing.

Unit-III

5. Presentation of graphics for research reports/seminars/other presentations.
6. Presentations using power points.

Unit-IV

7. Designing – Leaflets, pamphlets, booklets, cover pages, and posters.

Books Recommended:

COURSE NO. 112 : FOOD MICROBIOLOGY (Th.)

Marks : 50
Paper : 40
Int. Ass. : 10

Credits/week: 2

Instructions to Paper Setters and the Students :
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Objectives :
1. To gain knowledge of the micro–organisms present in milk and milk products – their use and harmful effects in the dairy industry.
2. To understand the nature of microorganisms involved in food spoilage, food-infections and intoxications, and those used in food fermentation.
3. To gain knowledge of principles of various techniques used in the prevention and control of the micro-organisms in foods.

Detail of Syllabus

Unit-I

1. Milk and Milk Products: Sources of micro-organisms in milk and their control; number and type of microorganisms present in milk; Microbiological methods of examining dairy products.

Unit-II

2. Contamination of foods from natural sources, effect of preservation methods on micro-organisms of food; chemical changes caused by micro-organisms.
3. Contamination, preservation and spoilage of – Cereal and cereal products, sugars, vegetables and fruits, meat and meat products, milk and milk products, canned food.

Unit-III

4. Food poisoning and infections; investigation of food borne disease outbreaks.

Unit-IV

5. Production of alcohol, beer and wine, Lactic acid, Vitamin B\textsubscript{12}, Acetic acid, Citric acid.
Books Recommended


COURSE NO. 113 : FOOD MICROBIOLOGY (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10
Credits/week: 2

Note :-

1. Practical will be of 4 hrs. duration.
2. Practical paper will be set by the external examiner in advance.
3. Paper setter will also be an examiner.

1. Determination of microbial load of milk:
   - Direct microscopic count.
   - Dye reduction tests – Methylene blue, Rosazurin.
   - Standard plate count.

2. Effect of pasteurization on milk:
   Standard plate count of raw and pasteurized milk using Nutrient and MacConky’s agar.

4. Enumeration of Psychrophiles, Mesophiles and Thermophiles in food products.
5. Antibiotic sensitivity testing by disc diffusion method.

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3rd SEMESTER

Course No : 114 : PHYSIOLOGY

Marks : 75
Paper : 60
Int. Ass. : 15

Teaching periods: 3 hrs/week

Instructions to Paper Setters

Question paper will have four sections. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions may carry equal marks, unless specified.

Objectives:

1. To gain knowledge about various organs, their role and functioning.
2. To augment to the nutritional knowledge.
3. To understand causative factors of various diseases/disorders.

Detail of Syllabus

Unit-I

1. **Blood**: Composition of blood (only introduction), hemoglobin, erythropoiesis, plasma, proteins and co-agulation of blood.

2. **Cardio-vascular system**: Basic properties of the heart, cardiac output, cardiac cycle, blood pressure and affecting it and hypertension.

Unit-II

3. **Respiration**: Uptake and delivery of respiratory cases and regulation of breathing.

4. **Physiology of Kidneys**: Mechanism of urine formation and the role of the kidneys in water and electrolyte balance.

5. **Physiology of Digestive System**: Secretory and digestive functions of the salivary glands, the stomach, the pancreas, the liver and the intestines and mechanism of absorption of carbohydrates, proteins and fats.
Unit-III

6. **Nervous System** :
   Basic properties of nerve and receptor organs, spinal cord and brain steman introduction, hypothalamus cerebral cortex-structure and topographical representation, the introduction to automatic nervous system, the electroencephalogram, cerebrospinal fluid.

7. **Physiology of special senses** :
   Physiology of vision, hearing, taste and smell.

Unit-IV

8. **Endocrine**:
   Functions and the different syndromes resulting from medulla, hypo or hyperactivity of the following:
   Thyroid, Parathyroid, Adrenal Cortex, Adrenal Medulla, Endocrine Pancreas, Pituitary, Glands.

9. **Reproductive System**:
   Formation of gametes, the ovum and the sperm, spermatogenesis (reproductive cycle in male, hormonal control) and oogenesis (Review, reproductive cycle in female, hormonal control, ovarian and uterine cycle).
   Pregnancy and mammary glands.

Books Recommended :

5. Davidson, B., and Smith E., Text Book of Physiology and Biochemistry, 1972(8th Ed.)
Course No: 115 : INSTITUTIONAL MANAGEMENT (Th.)

Teaching periods : 2Hrs/week

Marks : 50
Paper : 40
Int. Ass. : 10

Instructions to Paper Setters

Question paper will have four sections. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions may carry equal marks, unless specified.

Objectives :
1. To develop a knowledge base in key areas of institutional food management.
2. To impart necessary expertise to run a food service unit.
3. To provide practical level experience in managing food service management.
4. To critically evaluate the functioning of food service units.

Details of Syllabus

Unit-I

1. Institutional management with emphasis on catering. Review of different types of food service operations. Commercial, non-commercial food service institutions.

   a) Basic factors involved in successful institutional meal planning.
   b) Types of food service – formal and informal
   c) Procedures involved in construction of recipes in large scale cooking

3. Importance of food standards.
   Need for knowledge as to what constitutes good products, criteria for good quality products, hazards of poor quality, quality control, Specification for quality in food products.

Unit-II

4. Organisation- definition and types.

5. Management, definition, principles and functions.
   Tools of management

6. Physical plant- its location, floor plans, space allowance, kitchen units- storage, preparation, serving and dish washing units.
Unit-III

7. Cost control
   a) Food cost, Labour cost, Maintenance cost
   b) Budgets
   c) Records
   d) Portion control

8. Personnel Management
   1. Personnel and leadership qualities for food service administration.
   2. Types of labour, criteria for selection, employment conditions, role of union, welfare provisions.
   3. Labour and employees training.
   4. Labour laws and legal aspects- health & safety of employees, welfare policies.

Unit-IV

9. Hygiene and Sanitation
   i) Personal hygiene- Importance of personal cleanliness in handling and serving food. Health examination of personnel.
   ii) Sanitation in handling food and equipment-
   a. Preventing contamination of cooked food and handling of fresh foods like salads and fruits.
   b. Cleaning and hygienic handling of cooking and serving utensils.
   c. Insect and Rodent control
   d. Safety, general safety rules in food preparation and service area. Accident prevention

10. Equipment- Types of equipment- criteria for selection, operation and care.

Books Recommended :
1. West Wood A; Harper Food Service in Institution.
2. West, Bessin, Brooks; Food Service in Institutions
3. A.M. Home Economics Association; Hand Book of Food Preparations:
4. Sweetman, M.M. 4, Mac, Keller; Food Selection and Preparation:
5. Oliver B., Watson;School Lunch Room Service
6. Lender H. Katshever and Margret E. Terrel; Food Service Planning: Layout Equipment
7. Davidson and Passmore- Human Nutrition and Dietetics.
Course No. : 116 : INSTITUTIONAL MANAGEMENT (Pr.)

Teaching periods: 2/week

Marks : 75
(Only Internal)

Note : 1. The marks will be awarded at the end of the semester.
     2. The marks will be awarded by the Internal Examiner only.

1. Standardization of five selected quality recipes in relation to nutritive value, cost, time, equipment.
2. Practical training is running a canteen for 50 members or more.
3. Project :- To prepare a report - visits to different for service institutions, observation of organization, plant lay out, food preparation and Service Personnel Management.
Course No. 117 : SCIENTIFIC WRITING (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Teaching periods : 2hrs/week

Note :
• The external examiner will conduct the viva voce.
• Practical will be based on continuous internal assessment.

Instructions to Paper Setters

Note :
1. Each practical paper will be of three hours duration.
2. The question paper should cover the entire syllabus.

Objectives :
• To be able to appreciate and understand the importance of writing scientifically.
• To develop competence in writing and abstracting skills.

Contents

1. Scientific writing as means of communication
   Different forms of scientific writing (articles in journals, research notes and reports review articles, monographs, dissertations, bibliographies, book chapters, and articles in other publications).

2. How to formulate outlines
   The reason for preparing outlines as a guide for plan of writing and as a skeleton for the manuscript.
   Kinds of outlines (topic outlines, conceptual outline, sentence outline, combination of topic and sentence outline).

3. Drafting titles, subtitles, tables, and illustrations.
   Tables as systematic means of presenting data in rows and columns and lucid ways of indicating relationships and results.
   Formatting tables.
   Appendices: Use and guidelines.

4. The writing process
   Getting started.
   Using outline as a starting device.
Drafting.
Reflecting, rereading (checking organization, checking headings, checking content, checking clarity, checking grammar).
Brevity and precision in writing.
Drafting and re-drafting based on critical evaluation.

5. Parts of dissertation/research report/article
   Introduction
   Review of literature
   Methods
   Results and discussion
   Summary and abstract
   References

6. Writing for grants
   The question to be addressed
   Rationale and importance of the question being addressed
   Empirical and theoretical framework
   Presenting pilot study/data or background information
   Research proposal and time frame
   Specificity of methodology
   Organization of different phases of study
   Expected outcome of study and its implications
   Budgeting
   Available infra-structure and resources
   Executive summary

Books Recommended:


Course No. : 118:THERAPEUTIC NUTRITION (Th.)

Marks : 100
Paper : 80
Int. Ass. : 20

Teaching periods : 4hrs/week

Instructions to Paper Setters

Question paper will have four sections. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions may carry equal marks, unless specified.

Objectives :

1. To understand causative factors and metabolic changes in various diseases/ disorders
2. To learn principles of diet therapy.
3. To appreciate the significance of dietary counseling.
4. To understand principles of prevention of various diseases/disorders.
5. To learn dietetic food product development.

Detail of Syllabus

Unit-I

1. Therapeutic modification of the normal diet. Normal soft and liquid diets and parental feeding.

2. Etiology, clinical and bio-chemical manifestation and dietary counseling for the following diseases:
   Review of Gastro intestinal diseases.
   a. Peptic ulcer- aetric and duodenal ulcers.
   b. Diarrhoeas- acute and chronic.
   c. Constipation- atomic and spastic.
   d. Mal absorption syndromes- Carbohydrates and fat intolerance sprue, celiac diseases.

Unit-II

3. Liver Diseases:
   a. Infective Hepatitis, Cirrhosis.
   b. Gall bladder diseases.
4. Diabetes: Juvenile and adult onset types.
   Types of insulin and their action, Oral hypoglycemic drugs.

   **Unit-III**

5. Cardiovascular disorders:
   Hypertension, Atherosclerosis, coronary heart disease.

6. Febrile conditions, acute and chronic.

   **Unit-IV**

7. Renal Disorders:
   Glomerulonephritis, Nephrotic syndrome, acute and chronic renal failure


**Books Recommended:**

2. Williams and Wilkins Co, Diabetes Mellitus, U.S.A.
4. Beper, L.J., Nutrition and Physical Fitness:
9. Anita, F.P., Clinical Dietetics and Nutrition
10. Pyke, Maonus, Food Science and Technology:
Course No. : 119: THERAPEUTIC NUTRITION (Pr.)

Teaching periods: 3hrs/week

Note:
- Each practical paper will be of three hours duration.
- The question paper should cover the entire syllabus.

Contents

1. Planning, calculations, preparation, serving and evolution of general and therapeutic diets for diseases covered in theory.

2. Study of the management of food services in selected hospitals.

3. Visits to dietetic clinics in hospitals- case study of patients needing specific therapeutic diets.

4. Internship in a hospital for 6 weeks, after the semester examination is mandatory for the award of degree.
Course No. : 120 : DISSERTATION

Teaching periods: 2hrs/week  Total : 100 Marks

Objective :

• To undertake an independent piece of research work in a relevant area of Food and Nutrition

1. The research work should contribute to the advancement of knowledge in the field. The students must be guided and supervised by a member of the teaching faculty of the department. Each student must submit written dissertation at the end of 4th semester of M.Sc. Viva-Voce is organized for assessment. Dissertation should include introduction, methodology, results and discussion, summary and conclusions and references.

2. Marks will be awarded at the end of 4th semester, after the submission and evaluation of dissertation through a viva-voce examination.

3. The marks will be awarded jointly by the internal and external examiner.
4th SEMESTER

Course No. : 120: DISSERTATION

Teaching periods: 2hrs/week  Total : 100 Marks

Objective :

- To undertake an independent piece of research work in a relevant area of Food and Nutrition

1. The research work should contribute to the advancement of knowledge in the field. The students must be guided and supervised by a member of the teaching faculty of the department. Each student must submit written dissertation at the end of 4th semester of M.Sc. Viva-Voce is organized for assessment. Dissertation should include introduction, methodology. Results and discussion, summary and conclusions and references.

2. Marks will be awarded at the end of 4th semester, after the submission and evaluation of dissertation through a viva-voce examination.

3. The marks will be awarded jointly by the internal and external examiner.
Course No. 121: FOOD SCIENCE (Th.)

Marks: 75
Paper: 60
Int. Ass.: 15

Teaching periods: 3hrs/week

Instructions to Paper Setters

Question paper will have four sections. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions may carry equal marks, unless specified.

Objectives:

1. To have coherent and systematic knowledge and understanding of the physical, chemical, nutritional and other scientific changes occurring in foods as a result of various conditions.
2. To understand the importance of quality assurance in food industry and various tests and standards for quality assessment.
3. To appreciate the importance of basic concepts GMP, GHP, HACCP, TOM and risk assessment.
4. To understand the various aspects of food product development, labeling, marketing, consumer research and entrepreneurship.

Detail of Syllabus

Unit-I

1. Food acceptability- factors affecting it: Sensory evaluation of food using different methods.
2. Relation of cookery to colloidal chemistry: Definition of colloidal systems alerting degree of dispersion, Hydrophilic and Hydrophobic colloids, stabilization of colloidal systems, properties i.e. surface tension, absorption, foam, formation, Rheology, gel formation and emulsions.

Unit-II

4. Starch cookery:
   a. Sources and uses of starch, gelatinisation
   b. Flours Composition and baking qualities. Batters and doughs (Chapattis and puris).
c. Leavening-agents

d. Cooking and parboiling of rice.


**Unit-III**


8. **Grams and Dhals**: Composition, methods of processing and cooking. Effect of processing such as roasting, parching, soaking, germination and fermentation.

**Unit-IV**

9. **Vegetables and fruits**:
   
a. Structure, texture, pigments and acids in vegetables and fruits, Browning reaction.

b. Pectic substances: Characteristic, uses, theory of pectic-gel formation, testing of pectin, factors affecting jelly formation.


**Books Recommended**:

1. Low, Bells, Experimental Cookery.
2. Sweetman, M. D., Food Selection and Preparation.
3. A.N. Hime, E.C. Asso, Handbook of Food Preparation.
5. Swaminathan, Experimental Foods.
Course No. 122 : FOOD SCIENCE (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Teaching periods: 2hrs/week

Note :
  o Each practical paper will be of three hours duration.
  o The question paper should cover the entire syllabus

1. As related to theory.
2. Formulation, sensory evaluation and standardization of recipes from foods mentioned in the theory.
Course No. 123 : COMMUNITY NUTRITION (Th.)

Marks : 75
Paper : 60
Int. Ass. : 15

Teaching periods: 3hrs/week

Instructions to Paper Setters

Question paper will have four sections. Examiner will set a total of nine questions comprising two questions from each unit, and one compulsory question of short answer type covering the whole syllabus. Students will attempt one question from each unit and the compulsory question. All questions may carry equal marks, unless specified.

Objectives :

1. To understand the causes/determinants and distribution of nutrition problems in society.
2. To understand the consequences of nutritional problems.
3. To be familiar with various approaches to nutrition and health interventions programmes and policies.

Detail of Syllabus

Unit-I

1. Causes of Malnutrition- Agent, host and environment factors.

2. Combating some of the public health problems by:
   a. Immunisation
   b. Supplementary feeding programmes.
   c. Improving the quality of food produced by genetic approach and fortification.
   d. Supplementation.
   e. New improved foods.

Unit-II

3. Food Toxins:
   a) Natural
   b) Chemical
   c) Microbial
4. Effect of toxins on health and nutritive value of food.

**Unit-III**

5. Food preservation and Principles of Food Preservation

6. Methods of Food Preservation:
   a) Dehydration
   b) Use of Low Temperature
   c) Canning
   d) Irradiation
   e) Home Presentation.

**Unit-IV**

7. Communication media & methods in nutrition education - Administration of nutrition programme in India and assessment of existing programmes.


**Books Recommended:**

2. Winick, Nutrition and Development –1973, University of Colombia
5. Arvind, W., Nutrition in Community.
Course No. 124: COMMUNITY NUTRITION (Pr.)

Marks : 50
Paper : 40
Int. Ass. : 10

Teaching periods: 2hrs/week

Note:-
- Each practical paper will be of three hours duration.
- The question paper should cover the entire syllabus

1. Development of low cost recipes based on substitute food and better quality.
2. Assessment of Nutritional status of Community by using dietary, anthropometric measurement. (Reports to be submitted in the practical exam.)
3. Preparation and effective use of aids for nutrition education.

Published by: Prof. A.K. Bhandari, Registrar, Panjab University, Chandigarh.