UNIVERSITY OF RAJASTHAN

JAIPUR

SYLLABUS

M.SC. HOME SCIENCE

FOODS AND HUMAN NUTRITION

FIRST SEMESTER

2018-19

M.Sc. Home Science
FOODS AND HUMAN NUTRITION

2018-19
First Semester Examination, ~~2018~~

Scheme of Examination:

1. Each theory paper EoSE shall carry 100 marks. The EoSE will be of 3 hours duration. Part 'A' of the theory paper shall contain 10 Short Answer Questions of 20 marks, based on knowledge, understanding and applications of the topics/texts covered in the syllabus. Each question will carry two marks for correct answer.
2. Part "B" of paper will consist of four questions as suggested below except in cases where a different scheme is specified in the syllabus.
    - First question will contain 6 parts out of which 4 to be answered carrying weightage of 5 marks each. Word limit for each answer will be 50-70 words.
    - There shall be 3 questions (with internal choice) of 20 marks each. The word limit for each answer will be 1000 words.
3. Each laboratory EoSE will be of 100 marks and of four/six hours duration and involve laboratory experiments/exercises, and viva-voce examination with weight-age of marks in ratio of 75:25.

Course Structure:
The details of the courses with code, title and the credits assigned are as given below.

Abbreviations used:

Subject Code: FHN

Course category:
CCC: Compulsory Core Course
ECC: Elective Core Course
SSECC: Self Study Elective Core Course
SSCCC: Self Study Compulsory Core Course
DIS: Dissertation

Contact hours
L: Lecture
T: Tutorial
P: Practical

Dy. Registrar
(Academic)
University of Rajast...
JODHPUR

M.Sc. Home Science
FOODS AND HUMAN NUTRITION

First Semester

S. No.	Subject Code	Course Title	Course Category	Credit	Contact Hours Per Week			EoSE Duration (Hrs)	
					L	T	P	Th	P
1.	FHN 701	Nutritional Biochemistry-I	CCC	4	4	0	0	3	0
2.	FHN 702	Food Science and Quality Control	CCC	4	4	0	0	3	0
3.	FHN 703	Human Nutritional Requirements	CCC	4	4	0	0	3	0
4	FHN 711	Human Nutritional Requirements	CCC	6	0	0	9	0	4
5	FHN A01	Research Methodology	ECC	4	4	0	0	3	0
6	FHN A02	Human Physiology	ECC	4	4	0	0	3	0
7	FHN A11	Nutritional Biochemistry-I	ECC	4	0	0	6	0	6
8	FHN A12	Food Science and Quality Control	ECC	4	0	0	6	0	6
9	FHN A13	Human Physiology	ECC	2	0	0	3	0	4
				36					

CCC = 18, ECC = 18
Total = 36 credits

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

SEMESTER I

NUTRITIONAL BIOCHEMISTRY– I (THEORY)

Paper Code : FHN 701
Credits: 4
Max. Marks : 100
Teaching Hours : 4 Hours / Week
Total Teaching Workload: 60 Hours/ Semester

Objectives :

1. To augment the biochemistry knowledge acquired at the undergraduate level.
2. To understand the basic nature of bio molecules.
3. To become proficient for specialization in nutrition.
4. To understand the mode of action of hormones in the human body.

Contents:

UNIT- I

1. **Carbohydrates:** classification, isomers, rings structure , proof of ring structure , reaction due to CHO group , sugar derivatives of biological importance , polysaccharides (homoglucans and heteroglucans), detailed structure of starch.
2. **Lipids** :Classification , Structure and chemical properties and characterization of
   - Saturated and unsaturated, Fatty acids, essential Fatty acids and their importance
   - Steroids
   - Fat
   - Phospholipids: Rancidity – Definition, types, mechanism, prevention

UNIT- II

3. **Proteins:** Importance, classification of amino acids (Essential and Non Essential Amino Acids), reactions of amino acids, structure of proteins, properties, proof of peptides bond, methods of separation and determination of amino acids and peptides, estimation of amino acid sequence.
4. **Nucleic Acids :** Structure , importance and role of
   - Bases
   - Nucleotides
   - Nucleosides
   - DNA
   - RNA

UNIT- III

5. **Hormones:** mode of action and biochemical role of
   - Interstitial Cell Stimulation Hormones
   - Adreno Cortico Tropic Hormone
   - Follicle Stimulating Hormone
   - Growth Hormone
   - Thyroid Stimulating Hormone
   - Steroidal Hormone (Adrenal Cortex, Sex Hormones)
6. **Blood Chemistry** Composition, haemoglobin, erythropoeisis, plasma proteins (Types, properties and methods of separation of plasma proteins), coagulation of blood.

References :

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

1. Martin DW, Mayes PA and Rodwell VW. Harper's Review of Biochemistry. 19th Edition. LANGE Medical Publications, MARUZEN Asia, 1983.
2. Pike RL and Brown ML. NUTRITION an Integrated approach. 3rd Edition, John Wiley and Sons, New York, 1984.
3. Oser BL. Hawk's Physiological Chemistry. 14th Edition. McGraw Hill Book co. New York, 1965.
4. Nelson DM and Core MM. Principles of Biochemistry 4th ed. Freeman & Co., 2005.
5. Devlin TM. Text Book of Biochemistry with clinical Correction, 5th ed. Wiley & Sons, 2002.
6. Chatterjee MN, Shinde R. Textbook of Medical Biochemistry. 4th Edition, Jaypee Brothers Medical Publishers (P) Ltd. New Delhi, 2000.
7. West ES, Todd WR, Mason HS and Van Bruggen JT. Textbook of Biochemistry. 4th Edition. MacMillan Co. Collier Ltd. London, 1974.
8. Murray RK, Granner DK, Meyer PA and Rodwell VW. Harper's Illustrated Biochemistry. 26th edition. McGraw Hill Asia, 2003.
9. Robinson CH and Lawler MR. Normal and Therapeutic Nutrition, Macmillon, NewYork, 1986.
10. Lehninger AR. Biochemistry. 2nd Edition. Kalyani Publishers, 1975.
11. White A, Handler P and Smith EL. Principles of Biochemistry. McGraw Hill Book Co., New York, 1959.

FOOD SCIENCE AND QUALITY CONTROL (THEORY)

Paper Code : FHN 702
Credits: 4
Max. Marks : 100
Teaching Hours : 4 Hours / Week
Total Teaching Workload: 60 Hours/ Semester

Objectives :

1. To enable students to understand the physico-chemical properties of foods.
2. To make the students aware about effects of common food processing techniques on food.
3. Understand and know various aspects of food product development.

Contents :

UNIT- I

1. Physical, chemical and functional properties of protein, carbohydrates, lipids, water, pigment and flavours.
2. Physical Properties of Food -Hydrogen - ion concentration, oxidation - reduction potentials, surface tension, adsorption, viscosity, plasticity, iso-electric points or proteins, colloidal chemistry of foods - sols, gels, foams and emulsions.

UNIT- II

3. Food Processing Technique: freezing, thermal processing, dehydration, irradiation
4. Chemical, physical nutritional alteration occurring in food products during food processes: freezing, thermal processing: dehydration, irradiation and environmental control.
5. Quality control and management.

UNIT- III

6. Important food quality attributes
   - Sensory quality - colour, texture, flavor and taste
   - Microbiological quality nutritional quality evaluation for food products.
   - Food Adulteration
   - Self life studies
7. New Product Development

- Market Research
- Consumer dynamics
- Process of development and standardization
- Labeling
- Marketing
- Quality Evaluation
- Entrepreneurship

References :

1. Manay NS and Sheela Krishnaswamy M. Foods Facts and Principles. 3rd edition, New Age International (P) Limited, publishers, New Delhi, 2008.
2. Potter NM. Food Science, The AVI Publishing Co., Inc., Connecticut, 1995.
3. Fennema OR. Food Chemistry. Marcell Dekker, Inc., New york,1996.
4. Charley H. Food Science, John Wiley and Sons, Inc., New York,1982.
5. Lowe B. Experimental Cookery. John Wiley and Sons, Inc. New York, 1955.
6. Meyer LH. Food Chemistry, CBS Publishers and Distributors, New Delhi,2004.
7. Kramer A and Twig B. Quality Control for the Food Industry. Vol. I and II, AVI Publishing Co., London, 1984.
8. Hubbard MR. Statistical quality control for the food industry. Van Nostrand Reinhold, New York, 1990.
9. Fuller GW. New Food Product Development from Concept to Market Place, CRC Press, New York, 1999.
10. Winbond W. Techniques of Food Analysis, Allied Scientific Publishers, 1999.
11. Chandrashekhar U. Food Science and Applications in Indian Cookery, Phoenix Publishing House, 2002.

HUMAN NUTRITIONAL REQUIREMENTS (THEORY)

Paper Code :FHN 703
Credits: 4
Max. Marks :100
Teaching Hours :4 Hours/Week
Total Teaching Workload :60 Hours/Semester

Objectives :

1. To understand the basis of human nutritional requirements and recommendations through life cycle.
2. To understand the methods of evaluating protein quality and improving the same.
3. To understand the nutritional requirements in special conditions.

Contents :

UNIT- I

1. Nutritional requirements and recommended allowances for macro and micro nutrients for the entire life span (infancy to old age).
2. A critical review of the following:
   - Methods of determining requirements and allowances and body weights
   - Energy requirements- units, definition, assessment, methods for determining requirements, energy requirements for infants, children, adolescents, adults, pregnancy, lactation.
   - Protein requirements – protein quality and protein requirements, human amino acid requirements, quality of protein, methods for arriving at RDAs for Indians, protein

M. Agrawal

FHN Sem-I

- Market Research
- Consumer dynamics
- Process of development and standardization
- Labeling
- Marketing
- Quality Evaluation
- Entrepreneurship

References :

1. Manay NS and Sheela Krishnaswamy M. Foods Facts and Principles. 3rd edition, New Age International (P) Limited, publishers, New Delhi, 2008.
2. Potter NM. Food Science. The AVI Publishing Co., Inc., Connecticut, 1995.
3. Fennema OR. Food Chemistry. Marcell Dekker, Inc., New york,1996.
4. Charley H. Food Science, John Wiley and Sons, Inc., New York,1982.
5. Lowe B. Experimental Cookery. John Wiley and Sons, Inc. New York, 1955.
6. Meyer LH. Food Chemistry, CBS Publishers and Distributors, New Delhi,2004.
7. Kramer A and Twig B. Quality Control for the Food Industry. Vol. I and II, AVI Publishing Co., London, 1984.
8. Hubbard MR. Statistical quality control for the food industry. Van Nostrand Reinhold, New York, 1990.
9. Fuller GW. New Food Product Development from Concept to Market Place, CRC Press, New York, 1999.
10. Winbond W. Techniques of Food Analysis, Allied Scientific Publishers, 1999.
11. Chandrashekhar U. Food Science and Applications in Indian Cookery, Phoenix Publishing House, 2002.

HUMAN NUTRITIONAL REQUIREMENTS (THEORY)

Paper Code :FHN 703
Credits: 4
Max. Marks :100
Teaching Hours :4 Hours/Week
Total Teaching Workload :60 Hours/Semester

Objectives :

1. To understand the basis of human nutritional requirements and recommendations through life cycle.
2. To understand the methods of evaluating protein quality and improving the same.
3. To understand the nutritional requirements in special conditions.

Contents :

UNIT- I

1. Nutritional requirements and recommended allowances for macro and micro nutrients for the entire life span (infancy to old age).
2. A critical review of the following:
   - Methods of determining requirements and allowances and body weights
   - Energy requirements- units, definition, assessment, methods for determining requirements, energy requirements for infants, children, adolescents, adults, pregnancy, lactation.
   - Protein requirements – protein quality and protein requirements, human amino acid requirements, quality of protein, methods for arriving at RDAs for Indians, protein

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

requirements during pregnancy, lactation, growth – infants, children and adolescents, adults, protein energy ratio

- Lipid requirements –functions of fatty acids, recommendations of dietary fat, RDAs for Indians, sources of fat, recommended intakes, quality of fat.
- Dietary fibre – nutritional and health significance, requirements
- Mineral requirements -calcium, phosphorus, magnesium ,sodium, potassium, iron and zinc-Dietary requirements for different physiological ages and states. Methods for estimating requirements, dietary deficiency, biochemical functions, stores, sources,
- Trace elements requirements – iodine requirements, deficiency, losses, RDAs

UNIT- II

3. A critical review of the following:
   - Vitamin requirements – Water soluble vitamins – thiamine, riboflavin, niacin, pyridoxine, folic acid, Vitamin B12, ascorbic acid-Functions , sources, requirements, deficiency, stability during processing
   - Fat soluble vitamins – vitamin A and vitamin D– significance, deficiency, dietary sources, requirements, role.
4. Dietary guidelines for Indians
5. Critical evaluation of International recommended dietary allowances – American, Canadian, FAO/WHO/UNU.
6. Nutrition requirements for special conditions
   - Natural calamities and emergencies –floods, earthquakes, famine/drought
   - Gastronautics
   - High altitude
   - Extreme environmental temperatures-hot and cold

UNIT- IIII

7. Evaluation of protein quality
   - Analytical methods for the determination of nitrogen and amino acids in foods.
   - Evaluation of protein quality of foods from their amino acids content
   - Biological methods
   - Clinical methods
   - Biochemical methods
   - Relationship of stress and physiological state to the biological evaluation of protein quality.

References :

1. Evaluation of protein quality. Publication 1100, National Academy of Sciences, National Research Council, Washington, DC, 1963.
2. Nutritional evaluation of protein foods. PL Pellet and VR Young, The United Nations University, 1980.
3. Raghuramulu N, Madhvan Nair K and Kalyansundaram S. A laboratory of manual techniques, NIN & ICMR Hyderabad, 2003.
4. Swaminathan M. Essentials of Foods and Nutrition, The Bangalore Printing & Publishing Co. Ltd. II ed., 2008.
5. Goodhart and Shills ME. Modern Nutrition in Health and Disease, Henry Kimpton Publishers, USA, 1974.
6. Pike RL and Brown ML. Nutrition an Integrated Approach, John Wily and Sons, NewYork, 1984.
7. Energy and protein requirements. Report of Joint FAO/WHO/UNU Experts Consultation,

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Technical Report Series of No. 724, WHO, Geneva, 1985.
8. Anonymous. Nutrient Requirements and Recommended Dietary Allowances for Indians, ICMR, Hyderabad, 2010.
9. Human energy requirements. Report of Joint FAO/WHO/UNU Expert Consultation, FAO Technical Report Series No. 1, WHO, Geneva, 2004.
10. Protein and amino acid requirements in human nutrition. Report of Joint FAO/WHO/UNU Expert Consultation, Technical Report Series No. 935, WHO, Geneva, 2007.
11. Word Review of Nutrition and Dietetics, Vol. 32, Kargel, Basel, 1978.
12. Vitamin and Mineral Requirements in Human Nutrition, Report of Joint FAO/WHO Expert Consultation on Human vitamin and mineral requirements. WHO, Geneva, 2004.
13. Indicators for Assessing Vitamin A Deficiency and their Application in Monitoring and Evaluating Intervention Programme. Micronutrient series. WHO/NUT/96.10. WHO, Geneva, 1996.

HUMAN NUTRITIONAL REQUIREMENTS (PRACTICAL)

Paper Code : FHN 711

Credits: 6

Max. Marks:100

Teaching Hours :3 Practicals/Week (3 Hours/ Practical)

Total Teaching Workload : 45 Practicals/Semester

Objectives :

1. To calculate requirements of energy, protein, minerals and vitamins for different age groups
2. To compare intakes with the RDAs
3. To evaluate protein quality by using different methods

Contents:

Practicals

1. **Energy requirements**
   - Calculation of BMR using different methods- 3 sets of data
   - Calculation of energy requirement for
     - Reference adult man and woman
     - Adults of different body weights and age categories
     - Infants
     - Children of 2-3 ages
     - Adolescents of 2-3 ages
     - Pregnant woman
     - lactating woman
   - Energy balance study for one week.
   - Calculation of energy requirement by indirect calorimetry
2. **Protein requirements**
   - Calculation of protein allowances for
     - Reference adult man and woman
     - Infants, and children of 2-3 ages
     - Adolescents of 2-3 ages
     - Pregnant woman
     - lactating woman
   - Protein energy ratio for different age groups
3. Lipids

Dy. Registrar
(Academic)
University of R...
JAIPUR

- Comparison of fatty acid composition profile of various edible fats and oils available in the market.
- Critical analysis of labelling of processed foods for fatty acid composition profile.
- Determination of the types of fat and fat composition of the diets through 24 hour recall of a subject and compare it with suggested values for SFA, PUFA, MUFA and Essential fatty acids.
- Calculation of dietary fatty acids according to FAO/WHO recommendations for
  - Adult man and woman
  - Pregnant and lactating woman
  - Children of different ages
  - Adolescents of different ages

4. **Fibre**

Determination of dietary fibre through 24 hour recall and comparison with suggested values for fibre

5. **Minerals & Vitamins**

- Estimation of calcium requirement through factorial approach
- Visit to DEXA centre for observation of bone density measurement.
- Estimation of iron requirement during pregnancy
- Research design for calcium and iron balance
- Determination of Vitamin C requirement using load test
- Make a list of foods which fulfill one day's requirement of the following nutrients:
  - i) Calcium
  - ii) Sodium
  - iii) Iron
  - iv) Vitamin A
  - v) Potassium
  - vi) Folic acid

Dietary Guidelines

6.
- Power point presentation of Dietary Guidelines for Indians.

Nutritional requirements for Disaster Management.

7.
- Plan a day's menu and rations for a relief camp.

Evaluation of protein quality

8.
- Calculation of chemical score of different foods and food products.
- Calculation of NDP Cal% of
  - A snack/ meal
  - A mix for PDS system.

Research design for evaluation of protein quality by biological and clinical methods.

RESEARCH METHODOLOGY (THEORY)

Paper Code : FHN A01
Credits: 4
Max. Marks : 100
Teaching Hours : 4 Hours/Week
Total Teaching Workload: 60 Hours/Semester

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Total Teaching Workload: 60 Hours/Semester

Objectives :

1. To understand the basic concepts of research methodology.
2. To be able to understand the various steps of research methods.
3. To enable the students to understand various research designs, sampling techniques, methods of collecting data.
4. To enable the students to prepare and present report for dissertation purpose.

Contents:

UNIT- I

1.	Research purpose and objectives.
2.	Definition and Identification of research problem, selection of problem, hypotheses, basis assumption and limitation of problem.
3.	Review of literature: Importance, sources and writing review of literature.
4.	Research designs: Purpose and types.

UNIT-II

5.	Technique of sampling- Census and sampling methods, probability and non-probability sampling procedures, sample size.
6.	Data gathering instruments, measurements and scales, reliability and validity of measuring instruments- Questionnaire, Schedule, Score card, Checklist.
7.	Methods of collecting data: Questionnaire, interview technique, observation, case study, focus group discussion.

UNIT-III

8.	Planning, executing and analysis of large scale surveys with special emphasis of surveys in Home Science.
9.	Presentation and preparation of report for dissertation publication.
10.	Bibliography: Importance of method of writing references of book, journals, proceedings and websites.

References :

1. Simpson, George, Kafka, Fritz. Basic statistics: a textbook for the first course , Oxford and IBH Publishers, New Delhi, 1977.
2. Taro Y. Sampling Theory, Prentice-Hall Publishers, New Delhi, 1967.
3. Snedecor and Cocharan. Statistics Methods. Oxford and I.B.H. Publishers, Calcutta, 1968.
4. Gupta SP. Statistics Methods. Sultan Chand and Co., New Delhi, 2008.
5. Good CV and Carter DE. Methods of Research-Educational Psychological Application, Century Craft, New York, 1954.
6. Kerlinger FA. Foundation of Behavioral Research, Century Craft, New York, 1966.
7. Young PV and Schind CG. Scientific Social Survey and Research, Prentice Hall, New Delhi, 1968.
8. Philips BS. Social Research. Strategy and Tactics, MacMillan, New York, 1976.
9. Mussed P. Hand book of Research Methods in Child Development, John Wiley & Sons Inc, 1960.
10. Devdas RP and Kulandaivel. Hand Book of Research Methodology, Sri Ram Krishna mission Vidhyalaya, 1971.
11. Krishnaswamy RP. Methodology of Research in Social Sciences, 1st edition, Himalaya Publishing house, Mumbai, 1993.

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

HUMAN PHYSIOLOGY (THEORY)

Paper Code : FIIN A02
Credits: 4
Max. Marks : 100
Teaching Hours : 4 Hours/Week
Total Teaching workload: 60 Hours /Semester

Objectives :

1. To familiarize the students with the basic anatomy of human body.
2. To enable the students to understand the physiological processes.

Contents :

UNIT- I

Hours	
1.	Cell structure and functions- levels of cellular organizations and functions-organelles, nucleus, cytoplasm, tissues and systems. Functions of lysosomes, endoplasmic reticulum, Golgi apparatus and mitochondria, Mitosis. Structure of cell membrane, active and passive transport of nutrients and metabolites, intercellular communications.
2.	Endocrine system: structure, function, storage, secretion, regulation of hormonal secretion.
3.	Digestive System: Structure and function of various organs of gastro-intestinal tract, secretory, digestive and absorptive functions. Role of liver, pancreas, gall bladder and their dysfunction. Motility and hormones of the GIT.

UNIT- II

4.	Respiratory System: Structure, function, mechanism of respiration-Pulmonary ventilation, Role of lungs in the exchange of gases. Transport of oxygen and CO_2 in the lungs, blood and tissues. Role of hemoglobin and buffer systems. Regulation of respiration.
5.	Circulatory System: Structure and function of the heart and blood vessels. Regulation of cardiac output, cardiac cycle, blood-pressure and factors affecting it.
6.	Excretory System: Anatomy and physiology of kidneys, structure and functions of nephron. Urine formation. Normal and abnormal constituents of urine. Role of kidney in maintaining pH of blood, water, electrolytes, acid-base balance, diuretics.

UNIT- III

7.	Physiological functions of Pituitary, Thyroid, Parathyroid, Adrenal and Reproductive Hormones.
8.	Regulation of body temperature: Thermo genesis, thermolysis, pyrexia, hypothermia, role of skin in maintaining body temperature.
9.	Musculo-skeletal system: structure and functions of bone, cartilage and connective tissue and muscle fibres. Disorder of the skeletal system. Types of muscles, structure and function.
10.	Changes in muscle and bone mass during ageing and disease. Major muscles used for voluntary and involuntary actions.
11.	Exercise physiology

References :

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

1. Guyton AC and Hall JB. Textbook of Medical Physiology 9th Edition, W.B. Saunders, Prime Books (Pvt.) Ltd Bangalore, 1996.
2. Wilson KJW and Waugh A. Ross and Wilson Anatomy and Physiology in Health and Illness 8th Edition, Churchill Livingstone, 1996.
3. Chatterjee CC. Human Physiology Volume I and II, 11th Edition, Medical Allied agency Calcutta, 1992.
4. Kale CA and Neil F Samean. Wright's Applied Physiology, 1974.
5. Griffith's M. An introduction to Human Physiology, MacMillian and Co., 1972.
6. Mc Ardle WD, Katch FI and Katch VL. Exercise physiology, energy nutrition and human performance 4th Edition, Williams and Williams, Baltimore, 1996.
7. Jain AK: Textbook of Physiology, Volume I and II, Avichal publisher Co., New Delhi, 2012.

NUTRITIONAL BIOCHEMISTRY – I (PRACTICAL)

Paper Code : FHN A11
Credits: 4
Max. Marks :100
Teaching Hours : 2 Practicals / Week(3 hours/Practical)
Total Teaching Workload : 24 Practicals/ Semester

Objectives :

1. To demonstrate the need for careful planning and organization of laboratory work and skilful execution of practical/experiments.
2. To develop an understanding of the principles of various biochemical techniques.
3. To develop competence in biochemical estimations.
4. To apply the knowledge acquired from the biochemical estimation to human nutrition.

Contents :

Practicals

1.	Principles in biochemistry – Introduction to working principles of : • Spectrophotometry • Chromatography • Electrophoresis • Acid base titration, redox titration	2
2.	Cleaning of glassware with soap, chromic acid and distilled water	2
3.	Titrimetric estimations • Determination of strength of acids and bases (single and double titration) • Oxidation reduction titration - by $KMnO_4$ • Estimation of vitamin C in lemon juice or any other fresh food stuff.	6
4.	Preparation of buffers and measurements of their pH with indicators and pH meter.	3
5.	Estimation of Protein by Kjeldahl's Method.	5
6.	Colorimetric estimations (in unknown solution) • Glucose • Cholesterol	6

FOOD SCIENCE AND QUALITY CONTROL (PRACTICAL)

Paper Code : FHN A12
Credits: 4
Max. Marks : 100
Teaching Hours : 2 Practicals / Week (3 Hours/Practical)
Total Teaching Workload : 24 Practicals/Week

Objectives:

1. To develop an understanding of the principles of various techniques of nutritional assessment.
2. To develop competence in recording and interpretation of anthropometric measurements.
3. To develop skills in conducting dietary surveys and data interpretation.
4. To develop understanding and skills in clinical observation.

Contents :

Practicals

1.	Physical examination of various food grains.
2.	Detection of adulteration: Milk, turmeric powder, pure ghee, wheat flour, khoa.
3.	Determination of the Moisture content in two raw and two processed foods.
4.	Determination of the acid insoluble ash in two raw and two processed foods,
5.	Determination of the Crude fibre content in two raw and two processed foods.
6.	Determination of the Protein Content in two raw and two processed foods using kjeldahl method.
7.	Determination of fat content in two raw and two processed foods.
8.	Determination of the Taste Threshold for the Different Sensations – sweet, Salty, Sour.
9.	Survey of convenience and ready to eat foods available in markets food list with nutrition, composition and food label.
10.	Systematic development of a new food product and its standardization within the BIS stipulated food
11.	standards and regulation and evaluate quality parameters for acceptability, labelling and cost of the
12.	finished product.
	Visit to small scale food product unit

HUMAN PHYSIOLOGY (PRACTICAL)

Paper Code : FHN A13
Credits: 2
Max. Marks : 100
Teaching Hours : 1 Practical / Week (3 Hours/Practical)
Total Teaching Workload: 15 Practicals /Semester

Objectives:

1. To make students understand the various Biochemical techniques used in for diagnosis of disease..
2. To make students understand test of fitness.

Contents :

1.	Use of Respirometer to estimate respiratory quotient visit for demonstration Calculation of values for different age groups and ages • Adults • Children & adolescents
2.	Estimation of hemoglobin by two techniques to be used in • field • laboratory
3.	Estimation of Blood pH
4.	Measurement of blood pressure • Conditions required for measurement • Measurement of different age groups
5.	Tests to measure physical fitness- • Fitness test • Physical endurance test
6.	Urine Estimations

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

	• Albumin in urine • Glucose in urine • Acid base balance in urine
7.	Case study of endocrine disorder patient

Dy. Registrar
(Academic),
University of Rajasthan
JAIPUR

Department of Home Science

University of Rajasthan

Jaipur

SYLLABUS

M.Sc. HOME SCIENCE

FOODS AND HUMAN NUTRITION

SECOND SEMESTER

2017-18

Second Semester

S. No.	Subject Code	Course Title	Course Category	Credit	Contact Hours Per Week			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
1.	FHN 801	Nutritional Biochemistry-II	CCC	4	4	0	0	3	0
2.	FHN 802	Food Microbiology And Food Safety	CCC	4	4	0	0	3	0
3.	FHN 803	Human Nutritional Problems	CCC	4	4	0	0	3	0
4	FHN 811	Human Nutritional Problems	CCC	6	0	0	9	0	4
5	FHN B01	Biostatistics	ECC	4	4	0	0	3	0
6	FHN B02	Food processing	ECC	4	4	0	0	3	0
7	FHN B11	Nutritional Biochemistry – II	ECC	4	0	0	6	0	6
8	FHN B12	Food Microbiology	ECC	4	0	0	6	0	4
9	FHN B13	Food processing	ECC	2	0	0	3	0	4
				36					

CCC = 18,
ECC = 18
Total = 36 credits

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

SEMESTER II

NUTRITIONAL BIOCHEMISTRY– II (THEORY)

Paper Code : FHN 801
Max. Marks : 100
Credits: 4
Teaching Hours : 4 Hours / Week.
Total Teaching Workload: 60 Hours/ Semester

Objectives :

1. To understand the basic nature and role of bio molecules.
2. To understand the mechanisms adopted by the human body for regulation of metabolic pathways.
3. To get an insight into interrelationships between various metabolic pathways.
4. To link metabolic events occurring at the cellular level.
5. To become proficient for specialization in nutrition.

Contents:

UNIT- I

1. **Vitamins**

   Chemistry and biochemical role of

   - Water soluble vitamins: B-Complex and C
   - Fat soluble vitamins: A,D,E and K

2. **Minerals**

   - Biochemical role of minerals.

UNIT- II

3. **Enzymes**

   Classification . co-enzymes . methods of isolation . purification and characterization . theories and mechanism of enzyme action . factors affecting reaction of enzyme – effect of time . temperature . pH substrate enzyme activator and inhibitor (types of inhibitors) . Km : it's derivation and significance elements of thermodynamics . - enthalpy . entropy and free energy . active site and specificity of enzymes.

4. **Intermediary metabolism and it's regulation**

   - Carbohydrates – Glycolysis, TCA cycle, respiratory chain, high energy link, biological redox potential, Gluconeogensis, hexose monophosphate shunt.
   - Lipids – α . β and ω oxidation of fatty acids . β oxidation of odd and even number

Dy. Registrar
(Academic)

fatty acids . synthesis of fatty acids , phosphatidic acid , ketosis , synthesis of cholesterol.

- Proteins – absorption and conversion of amino acids , nitrogen fixation , degradation of ammonia and removal of amino acids through deamination , transamination , decarboxylation and urea cycle.

UNIT- III

5. Nucleotides and Nucleic Acids

- Separation and determination of nucleotides and nucleic acids.
- Synthesis of DNA and RNA (in Brief)

6. Organ interrelationship in metabolism

- Transport between organs – blood.
- The liver and it's function in distribution of nutrients
- Adipose tissue

References :

1. Berg JM. Tymoczko JL and Strayer L. Biochemistry. 5th ed. NY: WH Freeman; 2002.
2. Burtis CA and Ashwood ER. Bruns DE and Sawyer BG. *Tietz Fundamentals of Clinical Chemistry*. 6th ed. PA: Saunders; 2008.
3. Clark. John M. and Switzer RL. *Experimental Biochemistry*. 7th ed. NY: WH Freeman; 1977.
4. Conn EE and Stumpf PK. *Outlines of Biochemistry*. 5th ed. NY: John Wiley & Sons Inc; 1987.
5. Devlin TM. *Text Book of Biochemistry with Clinical Correction*. 7th ed. John Wiley & Sons Inc; 2010.
6. Fruton JS and Simmonds S. *General Biochemistry*. 2nd ed. NY: John Wiley & Sons Inc: 1958.
7. Harper HA. Rodwell VW and Mayes PA *A Review of Physiological Chemistry*. 17th ed. Los Altos. CA: Lange Medical Library: 1979.
8. Harrow B and Mazoor A. *A Textbook of Bio-chemistry*. 7th ed. PA: Saunders; 1958.
9. Hawk PB and Oser BL and Summerson BH. *Practical Physiological Chemistry*. 12th ed. PA: The Blakiston Company: 1947.
10. McDevitt ME and Mudambi SR. *Human Nutrition: Principles and Applications in India*. 1st ed. ND: Prentice Hall Inc: 1973.
11. Nelson DL and Cox MM. *Lahninger: Principles of Biochemistry*. 4th ed. NY: WH Freeman; 2005.
12. Pike RL and Brown ML. *Nutrition: An Integrated Approach*. 3rd ed. NY: John Wiley & Sons Inc; 1984.
13. Robinson CH and Lawler M. *Normal and Therapeutic Nutrition*. 17th ed. USA: Macmillon; 1990.
14. Rodwell VW. Bender AD. Botham KA. Kennelly PJ and Weil PA. *Harpers Illustrated Biochemistry*. 30th ed. NY: McGraw Hill Education: 2015.

Dy. Registrar
(Academic)
University of [illegible]
[illegible]

15. White A, Handler P and Smith EL. *Principles of Biochemistry*. NY: McGraw Hill; 1973.

FOOD MICROBIOLOGY AND FOOD SAFETY (THEORY)

Paper code: FHN 802
Credits : 4
Max. Marks:100
Teaching Hours :4 Hours/Week
Total Teaching Workload :60 Hours/Semester

Objectives :

1. To understand the role of micro-organisms in food, food spoilage and to understand advanced techniques of food preservation.
2. To learn about food-borne infections and intoxication.
3. To understand the criteria for microbiological safety in various food operations to avoid public health hazards due to food contamination.
4. To be able to understand the food safety and criteria for microbiological safety in various food operations to avoid public health hazards due to food contamination.

Contents:

UNIT I

1. History and development of food microbiology
2. Micro-organisms of importance in food- bacteria, mold and yeast. Classification, morphology and physiology.
3. Factors affecting growth of micro-organisms- pH, moisture, oxidation reduction potential, nutrients, temperature.
4. Principles of preservation
   - General principles of food preservation: asepsis, removal, anaerobic conditions
   - Preservation by use of
     drying,
     low temperatures
     high temperatures
     irradiation
     food additives

UNIT II

5. Contamination, preservation, and spoilage of different kinds of foods
   - Cereals and it's products
   - Sugar and it's products
   - Vegetables and fruits
   - Eggs
   - Milk and it's products
   - Canned foods (Spoilage only)
6. Microbiology of fermented foods.
   Vinegar, Cheese, Beer
   Indian fermented foods: Idli, Dosa, Vada, Curd
7. Single cell proteins (SCP)

Dy. Registrar
(Academic)
University of

	Introduction to single cell proteins, types of single cell proteins, production of SCP, advantages and disadvantages
8.	Probiotics Introduction to probiotics, Overview of gut environment, types of probiotics, mechanism of action, health benefits, prebiotics
UNIT III	
9.	Role of Microbes in health and disease • Public health Hazards and Food borne illnesses due to microbial contamination Causes, food association, habitat, toxins, disease and symptoms, prevention of the following - Food borne intoxications ▪ Botulism ▪ Staphylococci ▪ Mycotoxicosis Food borne infections ▪ Salmonella ▪ E. Coli ▪ Clostridium
10.	Food Safety requirements for different food service establishments and safety measures (a) Definition of food safety, regulatory agencies, WHO and FAO (b) Food Safety regulations and laws in India i. Food safety and Regulations 2011 Part III Section 4 Sanitary and Hygienic Requirements for Street Food Vendors and Units other than Manufacturing/Processing ii. Part II Section 4 Annexure 3 Conditions of License (c) Food security assurance systems i. Good Hygienic Practices (GHP) ii. Good Manufacturing Practices (GMP) iii. Food Safety Management Systems- HACCP iv. Food Safety Management System- ISO 22000 Quality Management System- ISO 9001

References :

1. Frazier WC and Westhoff DC. Food Microbiology. McGraw Hill Co. Ltd., New Delhi, IV ed., 2008.
2. The Training manual for Safety Regulators and Food Safety Management, 2010, FSSAI.
3. Ananthanaryan R and Paniker's CKJ. Text book of Microbiology.VIII ed., International Universities Press, US, 2009.
4. Adams MR and Moss MO. Food Microbiology. Royal Society of Chemistry, UK, III ed., 2007.
5. Jay MJ, Loessner MJ and David GA. Modern Food Microbiology. Food Science Text Series,

Dy. Registrar
(Academic)

Microbiology, II ed., 2008.
7. Banwart GJ. Basic Food Microbiology. AVI Publishing Co., Westport, Conn. (USA), II ed., 1995.
8. Khetarpaul N. Food Microbiology. Daya Publishing House, Delhi, 2006
9. Harrigan WF. Laboratory Methods in Food Microbiology. Gulf Professional Publishing, Oxford. UK, 1998.
10. Garg N, Garg KL and Mukerji KG. Laboratory Manual of Food Microbiology. IK International Pvt. Ltd., New Delhi, 2010.
11. Mclandsborough L. Food Microbiology Laboratory. CRC Press, Florida, US, 2004.
12. Food Microbiology and Safety Practical Manual. MFNL-003. Indira Gandhi National Open University of Continuing Education The Training Manual For Food Safety Regulators Who Are Involved In Implementing Food, Safety And Standards Act 2006 Across The Country , Volume II Food Safety Regulations and Food Safety management.
13. Foods Safety and Standards Authority Of India (Ministry Of Health and Family Welfare)
14. FDA Bhavan, Kotla Road, New Delhi – 110 002 Website: www.fssai.gov.in
15. Heritage J, Evans EGV and Killingtin RA. Introductory Microbiology. III Series. Combridge University Press, Great Britain, 1996.
16. Bhatnagar A. Microbiology (A Remediation Study), RBSA Publishers, Jaipur, 1995.
17. Sulla SB and Shantharam S. General Microbiology. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, 2000.
18. Bella C, Neaves P and Williams AP. Food Microbiology and Laboratory Practice. Blackwell Publishing, Oxford, 2006.

HUMAN NUTRITIONAL PROBLEMS (THEORY)

Paper code: FHN 803
Credits : 4
Max. Marks:100
Teaching Hours : 4 Hours/Week
Total Teaching Workload : 60 Hours/Semester

Objectives:

1. To create understanding about nutritional assessment techniques applicable for individuals and community.
2. To create understanding of various nutritional problems.
3. To create understanding about various inborn errors of metabolism and their dietary management.

Contents:

UNIT I

1. Prevalence, etiology, biochemical and clinical manifestations, diagnostic technique, preventive and therapeutic measures for the following nutritional problems.
   - Protein Energy malnutrition
   - Vitamin A deficiency
   - Anaemia
   - Iodine Deficiency Disorders
   - Fluorosis
   - Rickets, osteomalacia and osteoporosis
   - Beriberi

(Academ...
University of R...
JAIPU...

	• Pellagra • Scurvy • Zinc Deficiency
UNIT II	
2.	Assessment of Nutritional Status. Various techniques for assessment of nutritional status: • Anthropometric measurements: • Definition, measurements, tools/instruments. • Techniques for measurements, standards for references, indices, classification, interpretation of data. • Use of anthropometry for onetime assessment, growth monitoring and emergency situation. • Biochemical estimations for diagnosis of protein energy malnutrition, vitamin A deficiency, anaemia, iodine deficiency disorders, fluorosis: Parameters, techniques for estimation, reference value • Clinical examination • Dietary survey • Vital statistics
UNIT III	
3.	Introduction to causative factors, biochemical and clinical manifestation, treatment and therapeutic measures of following Inborn errors of metabolism: Disorders of amino acid metabolism i.e. • Phenylketonuria, • Hypertyrosinaemia. • Hypervalaemia, • Hyperhistidinaemia. • Hyper lysinaemia, • Homocystinuria.
4.	Carbohydrate metabolism i.e Pentosuria, galacetosaemia
5.	Lipid metabolism i.e. Hyper chylo-micronaemia, pure hyper cholesterolaemia
6.	Food Safety and contamination • Naturally occurring toxins and anti-nutritional factors : • Lathyrism. • Epidemic dropsy.

References :

1. Vir SC. Public Health Nutrition in Developing Countries Pt I and 2 . Published by Wood head

Dy. Registrar
(Academic)
University of
IAT

publishing India PVT LTD, New Delhi. Cambridge, Oxford. Philadelphea.
2. Sehgal S and Raghuvanshi Rita S Textbook of Community Nutrition, Indian Council of Agricultural Research, Published by: Directorate of Information and Publication of Agricuture, Indian Council of Agriculture Reserach. Krishi Anusandhan Bhavan, Pusa, New Delhi-110012
3. Bami MS, Rao PN and Reddy V. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.1996.
4. Robinson CH and Lawler MR. Normal and Therapeutic Nutrition, Macmillon, NewYork, 1996.
5. Waterlow JC. Protein Energy Malnutrition, Edward Arnold, A division of Hodder and Stoughton, 1992.
6. Sachdeva HPS and Chaudhary P (Eds). Nutrition in Children: Developing country concerns, Department of Pediatrics, Maulana Azad Medical College, New Delhi, 1994.
7. McLaren DS. A colored Atlas and Textbook of Diet-Related Disorders, 1992.
8. Passmore R and Eastwood MR. Human Nutrition and Dietetics, ELBS, Churchill Livingstone, London, Baltimore, 1986.
9. De Mayer EM. Preventing and Controlling iron deficiency anaemia through Primary Health Care, WHO, 1989.
10. Jeliffe DS. The Assessment of Nutritional status of the community, WHO Geneva, 1966.
11. Gopaldas T and Sheshadri S. Nutritional Monitoring and Assessment, Oxford University Press, New Delhi, 1987.
12. Shukla PK. Nutritional problems of India, Prentice Hall of India Private Limited, New Delhi, 1982.
13. Shills ME,Young VR and Bombay KN. Modern Nutrition in Health and Disease, Varghese Company, VII Edition, 1988.
14. Beaton GH and Bengoa JM. Nutrition in preventive Medicine. The major deficiency syndrome Epidemiology and approaches to control. World Health Organization. Geneva. 1976.
15. Talwar GP. Textbook of Biochemistry and Human Biology. Prentice Hall of India Pvt. Ltd., New Delhi. 1980.

HUMAN NUTRITIONAL PROBLEMS (PRACTICAL)

Paper code: FHN 811
Credits : 6
Max. Marks:100
Teaching Hours :3 Practicals/ Week (3 Hours/ Practical)
Total Teaching Workload : 45 Practicals/Semester

Objectives

1. To develop an understanding of the principles of various techniques of nutritional assessment.
2. To develop competence in recording and interpretation of anthropometric measurements.
3. To develop skills in conducting dietary surveys and data interpretation.
4. To develop understanding and skills in clinical observation.

Contents:

1. Preparation of event calendar of past five years for assessment of age.

Dy. [illegible]
(Acad[illegible])
University of R[illegible]
JAIPUR

2. Assessment of nutritional status of infants using anthropometric measurements :

- Preparation of questionnaire, learn techniques of recording weight length and MUAC.
- Data collection (at least 10 infants)
- Data interpretation using WHO Z scores and report.
- Data interpretation using WHO growth.

3. Assessment of nutritional status of preschool children using anthropometric measurements:

- Preparation of questionnaire , learn techniques of recording height and weight using bathroom weighing scale as well as Salter weighting balance and MUAC.
- Data collection (at least 10 preschool children).
- Data interpretation using WHO growth standards and report writing.

4. Assessment of nutritional status of school going children using anthropometric measurements :

- Preparation of questionnaire, data collection (at least 10 children).
- Data interpretation using WHO growth standards and report writing.

5. Assessment of nutritional status of adolescent boys and girls using anthropometric measurements.

- Preparation of questionnaire and data collection.
- Data interpretation using WHO growth standards and BMI for age and height for age indices and report writing.

6. Assessment of nutritional status of adults using anthropometric measurements.

- Preparation of questionnaire. learning techniques of measuring waist circumference and hip circumference and calculation of WHR.
- Data collection.

7. Determination of haemoglobin level in blood sample of any age group and interpretation and comparison of results using: Sahli's. hemochek and cyanmethhemoglobin technique

8. Assessment of nutritional anaemia among college going students using haemoglobin estimation and clinical signs and symptoms of anaemia.

- Preparation of questionnaire. learn the techniques.
- Data collection (at least 10 students)
- Data interpretation and report writing

9. Assessment of nutritional anaemia among college going students using Haemoglobin estimation and clinical signs and symptoms of anaemia.

- Preparation of questionnaire and learn the techniques.

61

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

9.	Assessment of food and nutrient availability of inmates of any hostel/ orphanage /old age home etc. using food inventory methods. • Preparation of questionnaire and learn the techniques. • Data collection on 1st day of week. • Data collection on 7th day of week. • Data interpretation and report writing.
10.	Assessment of food and nutrient intake using 24 hours dietary recall methods • Preparation of questionnaire and learn the technique. • Standardization of recipes , using standardized cups , spoons , glasses, preparation of cut outs • Data collection, conversion of cooked foods into raw ingredients and food and nutrient calculation, using Diet Cal Software and report writing.
11.	Assessment of food consumption pattern using diet history method. • Preparation of questionnaire, learn the technique. • Data collection, interpretation of results and report writing.
12.	Assessment of diet and nutrient intake using qualitative as well as quantitative food frequency questionnaire.
13.	Visit to malnutrition treatment centres in hospital – Observation of clinical symptoms of PEM and other symptoms of SAM child.
14.	Planning and preparation of diets of in-patient admissions of severe acute malnutrition in children
15.	Case study of children suffering from SAM
16.	Design a research to study prevalence of major nutritional problems among pre-school children.
17.	Design a research to study prevalence of major nutritional problems among adolescent girls.

References:

1. Vir SC. Public Health Nutrition in Developing Countries Pt 1 and 2 . Published by Wood head publishing India PVT LTD, New Delhi. Cambridge, Oxford, Philadelphea.
2. Sehgal S and Raghuvanshi Rita S Textbook of Community Nutrition, Indian Council of Agricultural Research, Published by: Directorate of Information and Publication of Agricuture, Indian Council of Agriculture Reserach, Krishi Anusandhan Bhavan, Pusa, New Delhi-110012
3. Bami MS. Rao PN and Reddy V. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.1996.
4. Robinson CH and Lawler MR. Normal and Therapeutic Nutrition, Macmillon, NewYork, 1996.
5. Waterlow JC. Protein Energy Malnutrition, Edward Amold, A division of Hodder and Stoughton, 1992.
6. Sachdeva HPS and Chaudhary P (Eds). Nutrition in Children: Developing country concerns, Department of Pediatrics, Maulana Azad Medical College, New Delhi, 1994.
7. McLaren DS. A colored Atlas and Textbook of Diet-Related Disorders, 1992.
8. Passmore R and Eastwood MR. Human Nutrition and Dietetics, ELBS. Churchill Livingstone. London, Baltimore, 1986.

Dy. Registrar
(Academic)

9. De Mayer EM. Preventing and Controlling iron deficiency anaemia through Primary Health Care, WHO, 1989.
10. Jeliffe DS. The Assessment of Nutritional status of the community, WHO Geneva, 1966.
11. Gopaldas T and Sheshadri S. Nutritional Monitoring and Assessment, Oxford University Press, New Delhi, 1987.
12. Shukla PK. Nutritional problems of India, Prentice Hall of India Private Limited, New Delhi, 1982.
13. Shills ME, Young VR and Bombay KN. Modern Nutrition in Health and Disease, Varghese Company, VII Edition, 1988.
14. Beaton GH and Bengoa JM. Nutrition in preventive Medicine. The major deficiency syndrome Epidemiology and approaches to control, World Health Organization, Geneva, 1976.
15. Talwar GP. Textbook of Biochemistry and Human Biology, Prentice Hall of India Pvt. Ltd., New Delhi, 1980.

STATISTICS (THEORY)

Paper code: FHN B01
Credits : 4
Max. Marks:100
Teaching Hours :4 Hours/Week
Total Teaching Workload :60 Hours/Semester

Objectives:

1. To understand the basic concepts of statistics.
2. To enable the students to understand various types of statistical tools and their interpretation

Contents:

UNIT –I

1.	Meaning and scope of Statistics and its importance in research
2.	Classification and tabulation.
3.	Measures of central tendency and dispersion (Mean Median, Mode, Quartiles, Range and Standard Deviation).
4.	Graphic and diagrammatic representation of data (Frequency, Histogram, Graphs, Bar-diagram and Pie charts).

UNIT –II

5.	Elementary ideas on probability (Simple Probability) skewness and kurtosis definition. Elementary ideas of random variable and its density function (Binomial, Poison, Uniform, Normal varietic: Normal distribution and its properties, Use of Normal probability tables).
6.	Elements of testing a statistical hypothesis- formulation of the problem, Definition of type I and ..
7.	errors. Level of Significance, t test, Z-test. Design of Experiment: Analysis of Variance

UNIT –III

Dy. Registrar
(Academic)
University of Raja...
JAIPUR

5.	Elementary ideas on probability (Simple Probability) skewness and kurtosis definition. Elementary ideas of random variable and its density function (Binomial, Poison, Uniform, Normal varieties, Normal distribution and its properties, Use of Normal probability tables).
6.	Elements of testing a statistical hypothesis- formulation of the problem, Definition of type I and II
7.	errors. Level of Significance, t-test, Z-test. Design of Experiment: Analysis of Variance

UNIT –III

8.	Correlation and Regression: Correlation and its interpretation. Product moment and Rank order. Correlation Coefficient Regression Equations (without derivation)and its interpretations, use of prediction.
9.	Non-parametric Inference: Sign, Mann Whitney and Chi square test (as goodness of fit and independence of attributes in 2*2 and r*c contingency tables).
10.	Use of computer for statistical analysis using SPSS.

References:

1. Simpson G, Kafka F. Basic statistics: a textbook for the first course, Oxford and IBH Publishers, New Delhi, 1977.
2. Taro Y. Sampling Theory, Prentice-Hall Publishers, New Delhi,1967.
3. Snedecor and Cocharan. Statistics Methods, Oxford and I.B.H. Publishers, Calcutta, 1968.
4. Gupta SP. Statistics Methods, Sultan Chand and Co., New Delhi, 2008.
5. Good CV and Carter DE. Methods of Research-Educational Psychological Application, Century Craft, New York 1954.
6. Kerlinger FA. Foundation of Behavioural Research, Century Craft. New York, 1966.
7. Devdas RP and Kulandaivel. Handbook of Research Methodology. Sri Ram Krishna mission Vidhyalaya. 1971.
8. Good CV and Carter DE. Methods of Research- Educational. Psychological. Sociological Application. Century Craft. New York. 1954.

FOOD PROCESSING (THEORY)

Paper Code : FHN B02
Credits: 4
Max. Marks:100
Teaching Hours :4 Hours/Weeks
Total Teaching Workload :60 Hours/Semester

Objectives :

1. To impart systematic knowledge of basic and applied aspects in food processing and technology
2. To enable the students to understand food composition and its physico- chemical, nutritional and sensory aspects.
3. To gain in depth knowledge about processing and preservation techniques of cereals, pulses, oilseeds, meat and their products
4. To optimise process parameter for consistent quality processed food products

Contents:

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

UNIT-I	
1.	Brief introduction of Cereals and legumes
2.	Milling process: Complete milling process, types of milling processes: break rolls, reduction rolls, milled products and their nutritive values and applications. Baking technology: bread, biscuits /cookies and cake, principles of baking, Ingredients and their functions, methods of preparation, in process control, faults, causes and remedies, methods of leavening: physical, biological and chemical, scoring of quality parameters.
3.	Breakfast cereals: wheat, oat, rice and corn.
4.	Legume technology: general composition and processing : decortications, germination, Fermentation,
5.	agglomeration and effect of cooking.
6.	Soyabean: defatted flour, milk and isolated protein
UNIT II	
7.	Dairy and Flesh Food Technology
8.	Milk: composition, factors affecting milk quality, physical and chemical properties and its processing: clarification, Separation, centrifugal process, natural creaming, pasteurization, sterilization, homogenization, effect of processing on nutritive value. Milk Products: milk powder, Khoa, Cottage cheese, butter, butter oil, margarine, cheese, ice cream-commercial processing, BIS Standards, Packaging and distribution.
9.	Meat:slaughtering and related practices, pre slaughter handling, grading, ageing, curing, smoking and tenderizing of meat, meat pigments and color changes, cooking, storage, methods of preservation for value addition and spoilage. Sausages and table ready meat products.
10.	Poultry: Production consideration, processing plant operation (slaughter and bleeding, scalding, de-feathering, eviscerating, chilling and packaging), cooking, tenderness, flavor and color changes.
11.	Eggs: Structure, quality factors, storage, bacterial infection and pasteurization, freezing, drying and egg substitutes.
12.	Fish: Types of fishes, onboard handling and preservation, drying and dehydration, salt curing, smoking, marinades, fermented products, canning, Modified Atmosphere Packaging and quality factors.
13.	Oilseeds, Fruits and Vegetable technology
14.	Production and processing methods of fats and oils, hydrogenation Fat and oil Products: Margarine shortenings and frying oils, Mayonnaise and salad dressings, fat substitutes.
15.	Ripening of fruits and Food spoilage
16.	Principles of fruits and vegetables preservation. Processing technologies: Freezing, dehydration/drying blanching, canning, preserves: jam, jelly, marmalade, pickle, sauce, squash, syrup, chutney.
17.	Processing and preservation for small scale industry with special reference of FPO 1955.

References:

1. Herausgegeben VG, Fabriani C, Lintas S and Zahir AT. Durum Wheat: Chemistry and Technology, American Association of Cereal Chemists, Inc., St. Paul, Minnesota, USA, Vol 32, Issue 2, 1989.
2. Kent NL. Technology of Cereals, Pergamon Press, IV ed.Oxford, United Kingdom. . 1993.

Dy. Registrar
(Academic)
University of Rajasthan
Jaipur

Stadelman WJ, Olson VM, Shemwell GA and Pasch A. Egg and Poultry -Meat Processing, I ed. VCH Publication. New York, , 1998.
4. Winton KB and Winton AI. Techniques of Food Analysis. IV ed. Agrobios, Jodhpur, Rajasthan, 2006.
5. Samuel MA. Bakery Technology and Engineering. III ed., Pan-Tech International publishers,.. 1999.
6. Pomeranz Y and Meloan CE. Food Analysis: Theory and Practice. III ed., Springer Publishers, New York, , 2002.
7. Potter NN and Hotchkiss JH. Food Science. V ed.CBS Publishers and distributors, New Delhi, 2007.
8. Siddapa GS. Preservation of Fruits and Vegetables, ICAR Publication, New Delhi, 1986.
9. Van Loesecke HW. Outlines of Food Technology. VI ed., Agrobios, Jodhpur, Rajasthan, ,2002.
10. Salikhe DK, Kadam SS. Handbook of Fruit Science and Technology. V ed., Production Composition, Storage and Processing. Marcel Decker Inc, New York, 1995.
11. Subbulakshmi G and Udipi SA. Food Processing and Preservation. I ed., New age International Publishers, New Delhi, 2001.
12. Marriott NG, Gravani RB. Principles of Food Sanitation. V ed., Springer Publication, New York, 2006.
13. Kumar DS. Outlines of Dairy: Technology. I ed., Oxford University Press, USA, 2001

NUTRITIONAL BIOCHEMISTRY – II (PRACTICAL)

Paper Code : FHN B11
Credits: 4
Max. Marks : 100
Teaching Hours : 2 Practicals / Week (3 Hours/Practical)
Total Teaching Load : 30 Practicals /Semester

Objectives:

1. To demonstrate the need for careful planning and organization of laboratory work and skilful execution of practical/experiments.
2. To develop an understanding of the principles of various biochemical techniques.
3. To develop competence in biochemical estimations.
4. To apply the knowledge acquired from the biochemical estimation to human nutrition.

Contents:

1. Titrimetric estimation: Determination of calcium in milk powder , $CaCO_3$ solution.
2. Colorimetric estimation (in unknown solution)
   - Determination of Iron in Ferrous Ammonium sulphate solution and in blood.
   - Determination of Haemoglobin in blood by colorimetric method.
   - Determination of phosphorus in milk and phosphorus solution by F.S. colorimetric method.
   - Determination of protein by Lowry/ Biuret method.
3. Enzymes assays
   - Determination of Alkaline phosphatase Enzyme.
   - Determination of Transaminase enzyme (GOT and GPT)

Dy. Registrar (Academic) University of Rajasthan JAIPUR

4.	Paper Chromatographic separation of Amino Acids by • Circular method • Ascending and • Descending methods

FOOD MICROBIOLOGY (PRACTICAL)

Paper code: FHN B12
Credits : 4
Max. Mark :100
Teaching Hours : 2 Practicals/Week (3 Hours/Practical)
Total Teaching Workload: 30 Practicals/Semester

Objectives :

1. To understand the functioning of a microscope.
2. To understand the technique of culturing and staining strategies.
3. To learn about the microbiology of foods.

Contents :

1. Principles, use and maintenance of microscope.

2. Functioning and use of various microbiology laboratory equipments.

3. i)Preparation of Culture media :
   - Preparation of General Purpose Media
   - Preparation of Selective and Differential Medium

   ii)Techniques of Culturing :
   - Sub-culturing of a given culture

   iii)Pure Culture Techniques :
   - Isolation of Pure Culture of Bacteria by Streak Plate Method

4. Quantitative Techniques :
   - Estimation of Amount of Bacteria by Pour Plate Method
   - Quantitative Determination of Viable Microbes

5. Colony characteristics :
   - Preparation of culture media in the Laboratory and streaking
   - Observation of colony characteristics.

6. Staining Strategies in the Laboratory :
   - Preparation of bacterial smear
   - Simple Staining of Bacterial Culture
   - Gram Staining of Bacterial Culture

	• Determination of the Quality of Milk sample by Methylene Blue Reduction Test
9.	Microbiological Analysis of Food Samples: ice cream/ butter/ cheese/ curd/ fruits/ juices etc: • Observation and Recording for these Exercises
10.	Sampling and Analysis of Microbial Load on Food Contact Surfaces : • Assessing Sanitary Quality of Contact Surface by Swab Method • Analysis of Air of Processing Facility for Microbial Load
11.	Preparation of fermented foods –Sauerkrat and soya sauce
12.	Field visit to concerned food plants to food safety and HACCP practices.
13.	Field visit to any two food vendors to assess the food safety norms being followed.

FOOD PROCESSING (PRACTICAL)

Paper Code: FHN B13
Credits: 4
Max. Marks: 100
Teaching Hours : 2 Practicals/Week (3 Hours/Practical)
Total Teaching Load: 15 Practicals/Semester

Objectives :

1. To understand the raw materials analysis and their processing technology used in different products development.
2. To understand the processing technologies of different products and concept of product optimization
3. To impart systematic knowledge of basic and applied aspects in food processing and technology
4. To enable the student to understand food composition and its physico chemical, nutritional and sensory aspects.
5. To gain indepth knowledge about processing and preservation techniques of milk products technology and fruits and vegetables technology.

Contents:

1.	Cereal and Cereal Products Technology (A) Bread baking a) Quality testing of different flour: • Gluten quality and quantity • Moisture and ash percent • Water Absorption Power (WAP) • Pekar color test • Maltose value • Falling Number • Dough Raising Capacity

Dy. Registrar
(Academic)
University of Ra...

1. Cereal and Cereal Products Technology

(A) Bread baking

a) Quality testing of different flour:

- Gluten quality and quantity
- Moisture and ash percent
- Water Absorption Power (WAP)
- Pekar color test
- Maltose value
- Falling Number
- Dough Raising Capacity

b) Bread Processing: process optimization of

- Straight dough method
- Sponge and dough method (delayed salt method)
- Potassium bromate response of different flours
- Optimization of brown bread process
- Preparation of sweet buns
- Preparation of pizza base

(B) Biscuits and cakes

- Preparation of short and hard dough biscuits and packaging and shelf life studies for 5 weeks
- Preparation of sponge and cream cakes packaging and shelf life studies for 5 weeks

2. Visit to milk processing industry

3. Milk and milk products technology

- Chemical analysis of milk and determination of its components like fat, SNF, protein, TSS
- Detection of preservatives in milk (boric acid and borate)
- Detection of adulterants in milk and analysis of cheese, paneer, khoa as per BIS standards
- Tests to judge the efficiency of pasteurization and homogenization

4. Fruits and Vegetable Technology

- Analysis of Proximate principles: Carbohydrate, sugars, ash, moisture, fat and protein.
- Experiment on control of enzyme activity, enzyme inactivation in fruits and vegetables
- Preservation of fruits and vegetables using heat, salt and sugar and estimation of effect of processing on nutrients and color;
- Processing of tomato products
- Processing of jams, jellies and marmalades
- Processing of pickles and brines
- Estimation of acidity, total solids of different foods - Squashes, syrups and juice.

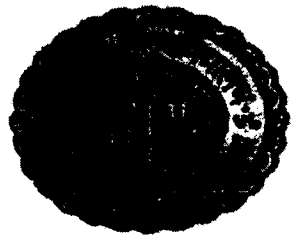
	• Dehydration of fruits, and vegetables and shelf life studies: its effect on color, texture and flavor. Rehydration ratio, rehydration coefficient • Preservation of fruits and vegetables using low temperature
5.	Fat and oil technology • Fat absorbance, • Degree of unsaturation • Peroxide value • Acid value • Saponification value

Dy. Registrar
(Academic)
University of Rajasthan
Jaipur

Department of Home Science

University of Rajasthan

Jaipur



SYLLABUS

M.Sc. HOME SCIENCE

FOODS AND HUMAN NUTRITION

THIRD SEMESTER

Third Semester

S. No.	Subject Code	Course Title	Course Category	Credit	Contact Hours Per Week			EoSE Duration (Hrs)	
					L	T	P	Thy	P
1.	FHN 901	Clinical Nutrition and Dietetics- I	CCC	4	4	0	0	3	0
2.	FHN 902	Public Health Nutrition - I	CCC	4	4	0	0	3	0
3.	FHN 903	Institutional Food Administration – I	CCC	4	4	0	0	3	0
4.	FHN 911	Public Health Nutrition –I	CCC	6	0	0	9	0	6
5.	FHN C01	Food and Nutrition Security	ECC	4	4	0	0	3	0
6.	FHN C02	Skill Development in Clinical Nutrition	ECC	2	2	0	0	3	0
7.	FHN C11	Clinical Nutrition and Dietetics- I	ECC	4	0	0	6	0	6
8.	FHN C12	Institutional Food Administration - I	ECC	4	0	0	6	0	6
9.	FHN C13	Skill Development in Clinical Nutrition	ECC	4	0	0	6	0	4
				36					

CCC = 18,
ECC = 18
Total = 36 credits

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Third Semester

CLINICAL NUTRITION AND DIETETICS – I (THEORY)

Paper code: FHN 901
Credits : 4
Max. Marks:100
Teaching Hours :4 Hours/Week
Total Teaching Workload : 60 Hours/Semester

Objectives:

- To enable the students to understand about body composition and its application in nutrition and health.
- Identification of high risk patients, malnutrition in hospital patients.
- To enable the students to understand the special nutrition concerns and the dietary management of various diseases.
- To give practical insight for assessment, nutritional care and counseling to patients.

UNIT I

1. **Body Composition**
   - Body composition and cellular basis of growth
   - Significance and methods used for measurement of body composition in nutrition.
   - Application of body composition in nutrition and health.
   - Cellular Growth and development during life cycle

2. **Pathophysiology, aetiology, clinical features, prevention and dietary management of Obesity and Eating disorders**
   - Obesity
   - Anorexia Nervosa
   - Bulimia Nervosa

3. **Geriatric Nutrition**
   - Ageing process.
   - Cellular basis of Ageing
   - Nutritional and Medical problems of elderly
   - Nutritional care and lifestyle modifications in elderly persons
   - Management of Common ailments related to ageing

UNIT II

4. **Nutrition Care Process in Hospitalized Patients**
   - Nutrition care process
   - Interpretation of routine medical and laboratory data

5. **Methods of Feeding:**

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

	Enteral and Parenteral feeding
6.	**Nutritional care of hospitalized children** • Nutritional care of neonates • Nutrient modifications and special feeding problems • Nutritional care of Malnourished children
7.	**Food Allergies**
8.	Clinical features, diagnosis and management of Food Allergy and food intolerance.
	Immunity and Nutrition
9.	**Effect of Stress on Health and Nutrition**
UNIT III	
10.	**Classification, Aetiology, Clinical features , diagnosis, prevention and dietary management of Gastrointestinal Diseases** • GERD, • Peptic Ulcer, • Constipation, • Diarrhoea, • Celiac Disease, • Irritable Bowel Disease, • Ulcerative Colitis
11.	**Classification, Aetiology, Clinical features , diagnosis, prevention and dietary management of Liver and Pancreatic Diseases** • Hepatitis. • Liver Cirrhosis - ALD & NALD • Fatty liver • Hepatic Coma • Pancreatitis

References :

1. Mahan LK and Escott-Stump S. Krause's Food, Nutrition & Diet Therapy .WB Saunders Company, Pennysylvania, USA, 2004.
2. Bamji MS, Rao NP, Reddy VE. Text Book of Human nutrition Second Edition. Oxford & IBH Publishing Co. Pvt. Ltd, 2003.
3. Wardlaw GM and Kessel MW. Perspectives in Nutrition. Fifth Edition. Mc Graw Hill Publications, Ohio, USA, 2007.
4. Joshi YK. Basics of Clinical Nutrition. II Edition Jaypee Brothers medical Publishers (P) Ltd. New Delhi. 2008.
5. Shils ME, Olson JA, Shike N and Roos. Modern Nutrition in Health and Disease, 8th Edition.Lea and Febiger. Philadelphia . 1994
6. Williams SR. Essentials of Nutrition and Diet Therapy. Times Mirror/Mosby College Publishing. 1990.

Dy. Registrar (Academic) University of Rajasthan

7. Carol WS and Merrily FC. Nutrition: Principles and Application in Health Promotion, Published by J. B. Lippincott, 1984.

Journals

1. Indian Journal of Nutrition and Dietetics
2. American Journal of Nutrition
3. World Review of Nutrition and Dietetics

PUBLIC HEALTH NUTRITION - I (THEORY)

Paper Code: FHN 902
Credits: 4
Max. Marks:100
Teaching Hours :4 Hours /Week
Total Teaching Workload : 60 Hours /Semester

Objectives:

1. Gain insight into national nutritional problem, and national & international contribution towards nutrition improvement in India.
2. Development of skills in organizing and evaluating nutrition projects in the community.
3. To be familiar with various approaches to public health nutrition programs and policies.

Contents :

UNIT- I

Public Nutrition and Health Care System

1. Concept and scope of public health nutrition
2. Levels of Health care and Health care system in India
3. National Policy: Health, nutrition and population
4. Brief note on : Dual burden of malnutrition, National Health Mission, Millennium Development Goals

Nutritional Epidemiology

5. Definition, aims, basic measurement and applications

Study designs - methods applied in conducting nutrition research

Measuring exposure (diet) outcome (diseases) relationship and their interpretation

UNIT- II

6. **Assessing and Intervening the Community's Nutritional Needs**
   - Community Need Assessment
   - Reaching out to High Risk population
7. **Promoting the Public's Nutritional Health**
   - Growing a Healthier Nation: Maternal, Infant, Child and Adolescent Nutrition
   - Importance of Public Health Nutrition Programs in Preventing Disease and Promoting Health
   - Providing Services in Public Health Primary care

UNIT- III

Dy. Registrar
(Academic)
... of Rajasthan
...R

	Public Health Aspects of under nutrition
8.	Etiology. Public Health Implications. preventive/curative strategies for: - Chronic energy deficiency - Protein energy malnutrition - Micronutrient deficiency
9.	Approaches/strategies for improving nutrition and health status of community: • Health based interventions including immunization, provision of safe drinking water, hygiene, prevention and management of diarrheal diseases. • Food based interventions including food fortification, dietary diversification, supplementary feeding and biotechnological approaches.
10.	Education based interventions including growth monitoring and promotion, and nutrition health education

References:

1. Vir SC. Public Health Nutrition in Developing Countries Pt 1 and 2 . Published by Wood head publishing India PVT LTD, New Delhi. Cambridge, Oxford, Philadelphea, 2010.
2. Sehgal S and Raghuvanshi Rita S. Textbook of Community Nutrition, Indian Council of Agricultural Research, Published by: Directorate of Information and Publication of Agricuture, Indian Council of Agriculture Research, Krishi Anusandhan Bhavan, Pusa, New Delhi, 2011.
3. Bamji MS. Rao PN and Reddy V. Textbook of Human Nutrition, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, 1996.
4. Sari Edelstein (Editor). Nutrition in Public Health: A handbook for developing Programs and Services. Jones Bartlett Learning, 3rd Edition. 2011.
5. Waterlow JC. Protein Energy Malnutrition, Edward Arnold. A division of Hodder and Stoughton, 1992.
6. Sachdeva HPS and Chaudhary P (Eds). Nutrition in Children: Developing country concerns, Department of Pediatrics. Maulana Azad Medical College. New Delhi, 1994.
7. Mc Laren DS. A colored Atlas and Textbook of Diet-Related Disorders. 1992.
8. Passmore R and Eastwood MR. Human Nutrition and Dietetics. ELBS, Churchill Livingstone. London, Baltimore. 1986.
9. De Maeyer EM. Preventing and Controlling iron deficiency anemia through Primary Health Care, WHO. 1989.
10. Jeliffe DS. The Assessment of Nutritional status of the community. WHO Geneva, 1966.
11. Gopaldas T and Sheshadry S. Nutritional Monitoring and Assessment, Oxford University Press, New Delhi. 1987.
12. Shukla PK. Nutritional problems of India. Prentice Hall of India Private Limited, New Delhi, 1982.
13. Beaton GH and Bengoa JM. Nutrition in preventive Medicine. The major deficiency syndrome Epidemiology and approaches to control, World Health Organization, Geneva, 1986.

INSTITUTIONAL FOOD ADMINISTRATION – I (THEORY)

Paper Code : FHN 903
Credits: 4
Max. Marks : 100
Teaching Hours : 4 Hours / Week

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Total Teaching Workload : 60 Hours/ Semester

Objectives :

1. The various aspects of food service planning
2. The management of food service organisations.
3. Developing in students the skill of menu planning for quantity and quality food preparation.

Contents :

UNIT- I

1. **Introduction to Foodservice systems**
   - Development of food services in Institutions.
   - Consumer behaviour and eating trends- teenagers, family, business- corporate world.
   - Food services facility planning – introduction to foodservice facilities planning, the planning process, the planning team, planning the prospectus, functional planning, planning the atmosphere, workplace design, equipment requirements (writing equipment specifications, purchasing, factors affecting equipment selection, type of equipments), space requirements, layout of facilities.

UNIT- II

2. **Organisation and Management**
   - Organization – definitions, nature and characteristics of organisation, theories of organisation, steps in process of organisation, principles of organisation, departmentation, types of organisations.
   - Systems approach to management
   - Management – definitions, management process, roles of a manager, level and skills of management, principles of management, tools of management, management of resources, functions of management.
   - Financial Management – Key accounting concepts, basic financial statements, tools for comparison and analysis, budgeting, book keeping- principles of double entry, records.
   - Energy management-energy utilisation, energy conservation, energy management systems
   - Time management.

UNIT- III

3. **Food Management**
   - Food acceptability and sensory evaluation – definition, application, difference between organoleptic and sensory evaluation, qualification and types of panelists, testing area, methods of sensory testing.
   - Menu planning – importance of menu planning in food service organisation, types of menu and their application, factors affecting menu planning, steps in menu planning, quality food standards, standardised recipes.
   - Food Purchasing – Market and the buyer, forecasting in foodservice, methods of purchasing, mode of purchasing (centralized and group purchasing), purchasing process and records, vendor selection and evaluation, Food selection.
   - Food production – Food production planning, production schedules, principles of food production, methods of food production, production controls, quantity and quality control.
   - Receiving and store room management - Elements of receiving, receiving process, dry storage, and low temperature storage.

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

- Food cost control – factors affecting food cost, records for control, pricing the products.
- Food Laws and standards

References:

1. Massie JL. Essentials of Management, Prentice Hall of India Private Limited, New Delhi, 1992.
2. Phillip TE. Modern Cookery for Teaching and the Trade, Orient Longman Ltd, Bombay, 1965.
3. Negi J. Food and Beverage Management and Cost Control. Kanishka Publishers and Distributors, New Delhi, 1999.
4. Negi J. and Manohar G. Food and Beverage Costing, Himalaya Publishing, Bombay, 2001.
5. Sudan AS. Foods and Beverage Management, Anmol Publications Pvt. Ltd., New Delhi, 2002.
6. Avery AC. A Modern Guide to Food Service Equipment, CBI Publishing Co. Boston, 1985.
7. Dewan JM. Catering and Food Service Management, Commonwealth Publishers, New Delhi, 1997.
8. Spears MC and Vaden AG. Food Service Organizations – A Managerial and Systems Approach, MacMillan Publishing Company, New York, 1985.
9. West BB. Wood L, Shughart GS and Harger VF. Food Service Institutions, V ed., John Willy Sons, New York 1977.
10. Malhan S and Sethi M. Catering Management: An integrated Approach, Wiley Eastern Limited, New Delhi, 1989.
11. Kotshevar LN and Terrell ME. Food Service Planning, Layout and Equipment. John Wiley and Sons Inc., USA, 1961.
12. Kinton R, Ceserani V, Foskett D. The Theory of Catering, ELST, London, 1999.
13. Palacio JP, Theis M. Introduction to Food Service. Pearson Prentice Hall, New Jersey, 2009.

PUBLIC HEALTH NUTRITION - I (PRACTICAL)

Paper Code: FHN 911
Credits : 6
Max. Marks:100
Teaching Hours : 3 Practicals/Week (3 Hours/Practical)
Total Teaching Workload : 45 Practicals/ semester

Objectives:

1. To enable students to assess needs of the community
2. To enable students to strategize programs on health and nutrition with available resources
3. To enable students to develop effective audio visual aids for community
4. To enable students to plan and develop low cost recipes with specific nutritional need.

1	Participatory Rapid Assessment (PRA) Techniques
2	Strategies for reaching community for public health and nutritional development.
3	Communication: Channels, barriers
4	Methods of communication
5	Audio visual aids
6	Planning and preparation of pre mixes for complementary feeding to children 6-9, 9-12 and 12-24 months.
7	Planning and preparation of fresh complementary foods for children 6-9, 9-12 and 12-24 months.
8	Planning and preparation of energy, protein, iron and calcium rich food for pregnant

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

	woman.
9	Planning and preparation of energy, protein, vitamin A and calcium rich food preparations for lactating woman.
10	Planning and preparation of food baskets for pregnant and lactating woman.
11	Preparation of energy and protein rich snack for severely malnourished children
12	Preparation of recipe based on pre-mix provided at AWC
13	Community Analysis for identification of needs related to public health and nutrition issues of community using PRA techniques
14	Assessment of causes of problems identified in above exercise and Prioritization of focus areas
15	Collection, analysis and presentation of literature on contemporary Public Health and Nutrition
16	Preparing messages which needs to be disseminated on contemporary issues of Public health and nutritional issues
17	Preparation of audio visual aids on any one public health and nutrition issues

FOOD AND NUTRITION SECURITY (THEORY)

Paper Code : FHN C01
Credits: 4
Max. Marks : 100
Teaching Hours: 4 Hours /Week
Total Teaching Workload: 60 Hours/ Semester

Objectives :

1. To understand the concept of Food and Nutrition Security.
2. To gain knowledge regarding policies and programmes for improving Food Security.

Contents :

UNIT- I

Public Health Aspects of under nutrition

1. **Food and Nutrition Security**
   - Definitions of Food and Nutrition Security.
   - Basic concepts and conceptual frame work of Food and Nutrition Security.
2. **Analysis of food security**
   - Food availability
   - Food access
   - Food absorption
3. **Beneficiaries for National Programs**
   - Infants
   - School Children
   - Adolescent Girls
   - Pregnant and Lactating Women

UNIT- II

4. **Policies and Programmes for reducing insecurity (Social Protection Initiatives)**

Dy Registrar
(Academic)
University of Raj...
[illegible]

	• The Public Distribution System (PDS) and the Targeted Public Distribution System (TPDS) • Antyodaya Anna Yojana (AAY) • National Food for Work Programme (NFFWP).Mahatma Gandhi National Rural Employment Guarantee Act (NREGA) • The right to Food Act
UNIT- III	
5.	**Agriculture initiatives to improve food security** • The National Food Security Mission (NFSM) • National Horticulture Mission • Rashtriya Krishi Vikas Yojana Conditional cash transfer program
6.	**Programs/Assistance targeted toward specific needy section of the population.** • National Social Assistance Programme • Annapurna Scheme • Village Grain Bank Scheme • National Programme for Adolescent Girls • National programme of Nutritional support to Primary Education (Mid day meal programme)
7	**Integrated child development services (Scheme)**

References :

1. Understanding the dynamics of Food Insecurity and Vulnerability in Himachal Pradesh, India. ESA Working Paper No 07-22. FAO, May 2007.
2. Food Security and Nutrition. Cambodian Food Security and Nutrition website. http://www.foodsecurity.gov.kh/CamSituation.aspx
3. Food Security, Policy Brief. Issue 2, FAO, June 2006.
4. The Food Insecurity Atlas of Rural India. Swaminathan Research Foundation (2001).
5. Understanding the Dynamics of Food Insecurity and Vulnerability in Orissa, India. ESA Working Paper No 07-28. FAO, October 2007 (22).
6. Climate Change, Water and Food Security. Technical Background Document From the Expert Consultation Held on 26 to 28 February 2008, FAO, Rome. ftp://ftp.fao.org/docrep/fao/meeting/013/ai783e.pdf. Accessed on 24-7-08.
7. Climate Change: Impact on Agriculture and Costs of Adaptation. International Food Policy Research Institute (IFPRI), 2009 (26).
8. FS Atlas of Rural Rajasthan WFP/ Institute of HD, 2010.
9. Report on the state of FS in Rural Rajasthan WFP/MS Swaminathan Research Foundation, 2010.
10. Report on the state of FS in Urban India WFP/MS Swaminathan Research Foundation, 2010.

SKILL DEVELOPMENT IN CLINICAL NUTRITION (THEORY)

Paper Code: FHN C02
Credits : 2
Max. Marks: 100
Teaching Hours: 2 Practicals/ Week (3Hours/ Practical)
Total Teaching Workload: 30 Practicals / Semester

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Objectives:

1. Identification of high risk patients, malnutrition in hospital patients.
2. To enable the students to understand the special nutrition concerns and the dietary management of various diseases.
3. To give practical insight for assessment, nutritional care and counselling to patients.

UNIT I

1. **Nutrition Care Process in Hospitalized Patients**
   - Nutrition care process
   - Nutritional Assessment of hospitalized patients
   - Methods of feeding (Enteral and Parenteral feeding)
   - Interpretation of routine medical and laboratory data

2. **Behaviour Change Communication**
   - Assessment of Problem in food behaviours
   - Stages of Change

UNIT II

3. **Factors affecting Food Choices**
   Social, cultural, religious, economic, emotional factors.

4. **Food Drug Interactions**
   - Effect of drugs on food and nutrition
   - Effect of food on drug therapy

5. **Food Allergies**
   Clinical features, diagnosis and management of Food Allergy and food intolerance.

UNIT III

6. **Alternative Therapies**
   - Alternative Therapies
   - Ayurveda, Siddha, Yunani and Homeopathy systems

7. **NABH Regulations in context with Dietitians**

8. **Traditional Diets**

References :

1. Mahan LK and Escott-Stump S. Krause's Food, Nutrition & Diet Therapy .WB Saunders Company, Pennysylvania, USA, 2004.
2. Bamji MS, Rao NP, Reddy VE. Text Book of Human nutrition II Edition. Oxford& IBH Publishing Co. Pvt. Ltd., 2003
3. Wardlaw GM and Kessel Margaret W. Perspectives in Nutrition. Fifth Edition. McGraw Hill Publications. Ohio. USA , 2007
4. Joshi YK. Basics of Clinical Nutrition IInd Edition. Jaypee Brothers medical Publishers

Dy. Registrar
(Academic)
University of Kashmir
JAMMU

(P) Ltd. New Delhi. 2008.
5. Shils ME, Olson JA, Shike N and Roos. Modern Nutrition in Health and Disease, 8th Edition,Lea and Febiger, Philadelphia , 1994.
6. Sue RW. Essentials of Nutrition and Diet Therapy. Times Mirror/Mosby College Publishing. 1990.
7. Carol WS and Merrily FC. Nutrition: Principles and Application in Health Promotion, Published by J. B. Lippincott, 1984.

Journals

1. Indian Journal of Nutrition and Dietetics
2. American Journal of Nutrition
3. World Review of Nutrition and Dietetics

CLINICAL NUTRITION AND DIETETICS- I (PRACTICAL)

Paper Code : FHN C11

Credits: 4

Max. Marks : 100

Teaching Hours: 2 Practicals/Week (3 Hours/Practical)

Total Teaching Workload : 30 Practicals /Semester

Objectives :

1. To make students understand the nutritional assessment of elderly and hospitalized patients
2. To make students understand the nutritional management of obesity and eating disorders
3. To make students understand the nutritional management of patients suffering from gastrointestinal diseases . ulcers, liver, pancreatic diseases and food allergies

Contents :

1.	Planning and preparation of diet for elderly persons
2.	Plan, calculate diets for Obese and Overweight Persons
3.	Plan, calculate diets for persons with eating disorders (Anorexia and Bulimia)
4.	Visit to ICU to see various methods of feeding
5.	Planning and preparation of diet for tube feeding
6.	Nutritional Assessment of hospitalized patients
7.	Visit to Pediatric Hospital to study the feeding of sick children
8.	Planning and preparation of diet for a sick child
9.	Plan, calculate diets for persons with constipation and diarrhea
10.	Plan, calculate diets for patients with GERD
11.	Plan, calculate diets for gastric and duodenal ulcers
12.	Planning and preparation of diet for Celiac Disease
13.	Planning and preparation of diet for Irritable Bowel Disease,
14.	Planning and preparation of diet for Malabsorption Syndrome
15.	Planning and preparation of diet for Ulcerative Colitis
16.	Planning and preparation of diet for Hepatitis
17.	Planning and preparation of diet for Hepatic Coma

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

18.	Planning and preparation of diet for Liver Cirrhosis
19.	Planning and preparation of diet for Pancreatitis
20	Planning nutrition support for fatty liver
21	Adaptation of traditional diets for healthy life style.
22	Plan. calculate diets for food intolerances and counsel them regarding management of food intolerance

INSTITUTIONAL FOOD ADMINISTRATION –I (PRACTICAL)

Paper Code : FHN C12
Credits: 4
Max. Marks :100
Teaching Hours : 2 Practicals / week
Total teaching workload : 30 Practicals/Semester

Objectives :

1. To visit different food service institutions to gain an insight into the functioning of such units.
2. To plan menus for different occasions/institutions
3. To cook certain food items in large quantities ie., in 50-60 portions each.

Contents :

1. Carrying out market survey of perishable, non-perishable and processed foods for meal planning.
2. Planning and preparation of meals for various occasions giving general consideration, assumptions, organization chart, budget breakup, menu, cost calculations, comparison of actual and estimated costs and evaluation, for example:
   - Hostel mess
   - Railway canteen
   - Office canteen
   - College canteen
   - Mid day meal
   - Conference
3. Visit to different institutes for eg:
   - Girls' hostel
   - Railway canteen
   - Office
   - College
   - Akshaya patra
4. Quantity cookery classes for preparation of food items for eg: Coconut cookies, Samosas, Chole tikki, Masala idlies, Masoor dal pakories, Bhelpuri, Dahi wada, Chikki etc.

SKILL DEVELOPMENT IN CLINICAL NUTRITION (PRACTICAL)

Paper Code: FHN C13
Credits :4
Max. Marks: 100
Teaching Hours: 2 Practicals/ Week (3 Hours/Practicals)

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Total Teaching Workload: 30 Practicals/ Semester

Objectives:

1. To make students familiar with hospital environment
2. To make students understand the importance and method of nutritional assessment of hospitalized patients
3. To enable students to understand and get trained in management of hospital kitchens
4. To enable students to make appropriate recipe formulations and modifications in a hospital based kitchen
5. To enable students to develop an understanding of working in various wards and counseling patients having difficulty in feeding and catering to their needs

UNIT I

1.	Working of a Dietetics Department in a hospital. Job profile of a Dietician, liaison with doctors and nursing staff.
2	Assessment of Nutritional Status of Hospitalized patients- in 4 wards on rotation To understand the working of a Kitchen in a hospital. Inventory and management of kitchen.
3	Duties of a Dietician in menu planning.
4	Recipe modification and standardization in the lab
5	Conversion of requisitions and prescriptions to menus
6.	Case Study Case study in various wards like pediatric, critical care, surgery, gynecology, renal etc. 2 students will be posted in a ward for 5 days, and shall complete two case studies. Case study to be submitted shall include anthropometric, biochemical data, clinical examination and dietary data of the patients.
7.	Report writing and submission and presentation

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Department of Home Science

University of Rajasthan

Jaipur

SYLLABUS

M.Sc. HOME SCIENCE

FOODS AND HUMAN NUTRITION

FOURTH SEMESTER

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Fourth Semester

S. No.	Subject Code	Course Title	Course Category	Credit	Contact Hours Per Week			EoSE Duration (Hrs.)	
					L	T	P	Thy	P
1.	FHN X01	Clinical Nutrition and Dietetics-II	CCC	4	4	0	0	3	0
2.	FHN X02	Public Health Nutrition – II	CCC	4	4	0	0	3	0
3.	FHN X03	Institutional Food Administration - II	CCC	4	4	0	0	3	0
4	FHN X11	Clinical Nutrition and Dietetics-II	CCC	6	0	0	9	0	6
5	FHN D01	Nutrition Research Design	ECC	4	4	0	0	3	0
6	FHN D02	Skill Development in Public Health Nutrition	ECC	2	2	0	0	3	0
7	FHN D11	Public Health Nutrition – II	ECC	4	0	0	6	0	4
8	FHN D12	Institutional Food Administration - II	ECC	4	0	0	6	0	6
9	FHN D13	Skill Development in Public Health Nutrition	ECC	4	0	0	6	0	4
				36					

CCC – 18,
ECC = 18
Total = 36 credits

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Fourth Semester

CLINICAL NUTRITION AND DIETETICS- II (THEORY)

Paper Code : X01
Credits: 4
Max. Marks:100
Teaching Hours : 4 Hours/Week
Total Teaching Workload : 60 Hours /Semester

Objectives :

1. To impart knowledge about health, fitness and sports nutrition.
2. To impart advanced knowledge to students about path physiology of various diseases.
3. To enable the students to understand the special nutrition concerns and the dietary management of Cancer, AIDS, Surgery, Burns, Renal Disorders, Cardiovascular Diseases, Diabetes,
4. To give practical insight for assessment, nutritional care and counseling to patients.

Contents:

Unit I

1. Nutrition in health and fitness
   - Interrelationship between health, nutrition, exercise and fitness
   - Energy input and output
   - Effect of specific nutrients on work performance and fitness
2. Sports nutrition
   - Energy sources during different exercises
   - Nutritional requirements of athletes
   - Water and electrolyte balance.

Unit II

3. Nutrition in Renal Disorders:-
   - Glomerulonephritis
   - Nephrotic Syndrome
   - Acute Renal Failure
   - Chronic Renal Failure
4. Nutrition in Surgery and Burns
   - Pre and post operative nutritional care
   - Nutrition support in burns
5. Nutrition related problems and Support in Human Immuno Deficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)

Unit III

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

6.	Pathophysiology, aetiology, clinical features prevention and dietary management of Cardiovascular Diseases: • Hypertension • Coronary Heart Disease • Hyperlipidemias
7.	Pathophysiology, aetiology, clinical features, prevention and dietary management of Diabetes mellitus • Type 1 Diabetes • Type 2 Diabetes
8.	Nutrition and Cancer • Role of nutrition in etiology of cancer • Nutritional effects of cancer and it's therapies • Nutritional care of cancer patients

References :

1. Mahan LK and Escott-Stump S. Krause's Food, Nutrition & Diet Therapy .WB Saunders Company, Pennysylvania, USA, 2004.
2. Bamji MS, Rao NP, Reddy VE. Text Book of Human nutrition II Edition. Oxford& IBH Publishing Co. Pvt. Ltd., 2003
3. Wardlaw GM and Kessel Margaret W. Perspectives in Nutrition. Fifth Edition. McGraw Hill Publications. Ohio, USA , 2007
4. Joshi YK. Basics of Clinical Nutrition. IInd Edition. Jaypee Brothers medical Publishers (P) Ltd. New Delhi. 2008.
5. Shils ME, Olson JA, Shike N and Roos. Modern Nutrition in Health and Disease. 8th Edition.Lea and Febiger, Philadelphia . 1994.
6. Sue RW. Essentials of Nutrition and Diet Therapy. Times Mirror/Mosby College Publishing. 1990.
7. Carol WS and Merrily FC. Nutrition: Principles and Application in Health Promotion. Published by J. B. Lippincott, 1984.

Journals

1. Indian Journal of Nutrition and Dietetics
2. American Journal of Nutrition
3. World Review of Nutrition and Dietetics

PUBLIC HEALTH NUTRITION – II (THEORY)

Paper code :FHN X02
Credits: 4
Max. Marks :100
Teaching Hours :4 Hours/Weeks
Total Teaching Workload :60 Hours/Semester

Objectives :

1. Gain insight into national nutritional problem, and national & international contribution towards nutrition improvement in India.

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

Stoughton, 1992.
6. Sachdeva HPS and Chaudhary P (Eds). Nutrition in Children: Developing country concerns, Department of Pediatrics. Maulana Azad Medical College, New Delhi, 1994.
7. McLaren DS. A colored Atlas and Textbook of Diet-Related Disorders, 1992.
8. Passmore R and Eastwood MR. Human Nutrition and Dietetics, ELBS, Churchill Livingstone, London. Baltimore, 1986.
9. De Maeyer EM. Preventing and Controlling iron deficiency anemia through Primary Health Care, WHO, 1989.
10. Jelliffee DS. The Assessment of Nutritional status of the community, WHO Geneva, 1966.
11. Gopaldas T and Sheshadri S. Nutritional Monitoring and Assessment, Oxford University Press, New Delhi, 1987.
12. Shukla PK. Nutritional problems of India, Prentice Hall of India Private Limited, New Delhi, 1982.
13. Beaton GH and Bengoa JM. Nutrition in preventive Medicine. The major deficiency syndrome Epidemiology and approaches to control, World Health Organization,Geneva, 1986.
14. Edelstein S (Editor). Nutrition in Public Health: A handbook for developing Programs and Services. Jones Bartlett Learning, 3rd Edition, 2011.

INSTITUTIONAL FOOD ADMINISTRATION – II (THEORY)

Paper Code: FHN X03
Credits: 4
Max. Marks: 100
Teaching Hours: 4 Hours / Week
Total Teaching Workload: 60 Hours/ Semester

Objectives :

1. The aspects of food service management.
2. The management of personnel in smooth running of an organisation.
3. How to maintain a food service facility as a sanitary, safe and secure place

Contents :

UNIT I

1. Food service Management
   - Food service systems- Conventional, Commissary, Ready Prepared and Assemble serve.
   - Delivery and service of food in different food service systems- Hospitals, Schools, Industries, Airlines.
   - Types of service- Self, Tray, Waiter, Portable Meals.
   - Dining room management- furnishings and equipment for dining rooms

UNIT II

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

2.	Personnel Management • Functions of personnel manager • Leadership – qualities and responsibilities of a leader, styles and theories of leadership, motivation, theories of motivation, philosophies of human nature-theories • Human resource planning-human resource inventory, human resource forecasting, human resource development plans. • Employment process- recruitment, selection, orientation, training, development • Performance appraisal and MBO • Employee facilities and benefits • Labour Cost Control- factors affecting labour control, records for control. • Labour management relations- reasons why workers join unions, development of labour unions, structure of unions, union and contract negotiations • Personnel functions- kitchen, dining room • Labour Laws affecting foods service operations.
UNIT III	
3.	Plant and equipment management • Maintenance of equipments and facilities- manual and mechanical warewashing, sanitary facilities and equipment, preventive maintenance, pest control • Sanitation – principles of food sanitation, sanitation of food, personnel, physical plant and equipment, controlling microbial quality of food, food service sanitation, development of quality assurance (sanitation) programme. • Safety – Accident prevention, fire prevention, 3 Es of safety, safety and health programme, HACCP, Food Safety and Standards Act of India, Function of FSS Act, General Principals of Food and Science. • Security- management of security system, main security risks.

References :

1. Massie JL. Essentials of Management, Prentice Hall of India Private Limited, New Delhi, 1992.
2. Phillip TE. Modern Cookery for Teaching and the Trade, Orient Longman Ltd, Bombay, 1965.
3. Negi J. Food and Beverage Management and Cost Control. Kanishka Publishers and Distributors, New Delhi, 1999.
4. Negi J and Manohar G. Food and Beverage Costing, Himalaya Publishing, Bombay, 2001.
5. Sudan AS. Foods and Beverage Management, Anmol Publications Pvt. Ltd., New Delhi, 2002.
6. Avery AC. A Modern Guide to Food Service Equipment, CBI Publishing Co. Boston, 1985.
7. Dewan JM. Catering and Food Service Management, Commonwealth Publishers, New Delhi, 1997.
8. Spears MC and Vaden AG. Food Service Organizations – A Managerial and Systems Approach, MacMillan Publishing Company, New York, 1985 .
9. West BB, Wood L, Shughart GS, Harger VF. Food Service Institutions, V ed., John Willy

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

10. Malhan S and Sethi M. Catering Management: An integrated Approach, Wiley Eastern Limited, New Delhi, 1989.
11. Kotshevar LN. & Terrell ME. Food Service Planning, Layout and Equipment, John Wiley and Sons Inc., USA, 1961.
12. Kinton R, Ceserani V, David F. The Theory of Catering, ELST, London, 1999.
13. Palacio JP, Theis M. Introduction to Food Service. Pearson Prentice Hall, New Jersey, 2009.

CLINICAL NUTRITION AND DIETETICS- II (PRACTICAL)

Paper Code : FHN X11

Credits: 6

Max. Marks : 100

Teaching Hours: 3 Practicals /Week (3 Hours/Practical)

Total Teaching Workload : 45 Practicals /Semester

Objectives :

1. To make students understand the nutritional assessment of hospitalized patients
2. To make students understand the nutritional management of patients suffering from gastrointestinal diseases , liver, pancreatic diseases and food allergies
3. To make students understand the nutritional management of sports persons.
4. To familiarize students with the actual working in the Dietetics department in hospitals.

Contents :

1.	a. Make a list of Protein rich, calcium rich, iron rich, sodium rich and potassium rich foods, MUFA, PUFA, Omega-3 and Omega -6 b. Make a list of foods deficient in Protein, calcium, iron, sodium and potassium, MUFA, Saturated fats
2.	c. Plan and Standardized recipes with the foods rich in Protein, calcium, iron, sodium and potassium, d. Plan and Standardized recipes with the foods deficient in Protein, calcium, iron, sodium and potassium e. Incorporate recipes rich in MUFA, PUFA, Omega-3 and Omega -6
3.	Sports Nutrition a. Planning and preparation of snacks and drink suitable for various sports activities. b. Planning and preparation of diets for endurance training c. Plan and calculate a pregame and a post game meal d. Market Survey of Sports drinks, powders, snacks and meals e. Evaluate the nutritional quality of the sport supplements
4.	Renal Diseases f. Planning and preparation of diet for Glomerulonephritis g. Planning and preparation of diet for Nephrotic Syndrome h. Planning and preparation of diet for Chronic Renal Failure
5.	Cardiovascular and Hypertension a. Planning and preparation of diet for Hypertension b. Planning and preparation of diet for Coronary Heart Disease

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

	c. Planning preventive nutrition for Hyperlipidemias d. Planning preventive nutrition for hypertension (DASH diet)
6.	Diabetes mellitus a. Planning and preparation of diet for Type 1 Diabetes b. Planning and preparation of diet for Type 2 Diabetes c. Planning preventive nutrition for diabetes
7.	AIDS Dietary management for HIV AIDS patients.
8.	Cancer Plan for cancer patients. Diets and lifestyle for prevention of cancer

NUTRITION RESEARCH DESIGN (THEORY)

Paper code: FHN D01
Credits: 4
Max. marks: 100
Teaching hours: 4 Hours/Week
Total teaching workload: 60 Hours/ Semester

Objectives:

1. To impart knowledge on research methods and designs.
2. To provide an insight into writing research proposal and thesis/dissertation.
3. To develop projects and have an understanding of ethical guidelines, plagiarism and Copy Right Act.

Contents:
UNIT – I

1. Research studies and methods
   - i) Epidemiological methods-
     - Observational: correlation study, case reports and case series, cross-sectional study, case control study, cohort study, ecological study
     - Experimental: community trials, clinical trials (individual), controlled trials and uncontrolled trials
   - ii) Qualitative research methods-
     - ethnography/anthropological methods
     - observation
     - interviewing
     - group discussion
     - archival (i.e. newspapers)
     - visual data (i.e. photos images)
     - linguistic/ conservation analysis
     - content analysis

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

- biographies, oral history (normative).

iii) Quantitative research methods-
- experimental studies
- non – experimental designs such as surveys, cross sectional and longitudinal studies.

iv) Mixed methods-
- Sequential
- concurrent
- transformative

2. Nutrition Research Designs in

i) Observational studies
- Cohort study Prospective study
  Retrospective study
- Case control study

ii) Experimental studies
- Interventional study
- Clinical trials
- Randomized control trials
- Cluster randomized trails

iii) Survey research
- Cross sectional study
- Longitudinal study

iv) Mixed methods study

3. Design Process of Research

i) Conceptualizing a study: hypothesis, objectives
ii) Selecting research methods and design
iii) Data management
iv) Communication of research through presentations and writing

UNIT – II

3. Types of reports

i) Thesis/ dissertation
ii) Research papers/articles
iii) Review papers: systematic review paper, meta-analysis review paper
iv) Case studies
v) Term papers
vi) Synopsis/ research proposal
vii) Project reports
viii) Seminar reports
ix) Popular articles

Dy. Registrar
(Academic)
University of [illegible]
JAIPUR

	x) Research abstracts xi) Research progress reports
4.	Writing Research Proposal for Thesis/ Dissertation i) Title page, table of contents, abbreviations, certificate ii) Introduction- introduction, rationale, objectives, hypothesis iii) Review- structure, citation of references iv) Methodology- structure, sample design, sample size and characteristics, sampling procedure, locale of the study, tools of data collection, methods and procedures, statistical analysis v) Bibliography- structure, methods of citation, different styles followed vi) Appendices, footnotes, other accessories
5.	Writing thesis / dissertation (additional chapters) i) Abstract ii) Results and discussion- structure, tables, figures and discussion iii) Summary and conclusions- structure, conclusions iv) Recommendations- relevant to research work
UNIT – III	
7.	Designing projects i) Project title ii) Introduction: • origin of the research problem • interdisciplinary relevance • review of research and development in the subject – international status and national status • significance of the study • its potential contribution to knowledge in the field of social relevance or national importance iii) Objectives iv) Methodology v) Year wise plan of work and targets to be achieved vi) Budget: recurring: salary, travel and field work, hiring services, contingency and non-recurring: equipments, building
8.	Funding for projects- National agencies i) University Grant Commission (UGC) ii) Department of Biotechnology (DBT) iii) Department of Science and Technology (DST) iv) Indian Council of Medical Research (ICMR) v) Ministry of Food Processing Industry (MFPI) vi) Indian National Science Academy (INSA) vii) Indian Council of Agricultural Research (ICAR) viii) Council of Scientific and Industrial Research (CSIR)

Dy. Registrar
(Academic)
University of Rajasthan
Jaipur

	ix) Indian Council of Social Science Research (ICSSR) International Agencies i) UN Agencies: UNICEF, USAID, UNFPA ii) International Funding of Science iii) Third World Academy of Sciences iv) Third World Network of Scientific Organization
9.	National ethical guidelines for biomedical and health research involving human participants
10.	Plagiarism
11.	Copy Right Act

References:

1) Richard AP. The little book of plagiarism. University of Sterling, UK. 2016.
2) Stern L. What every student should know about avoiding plagiarism. Pearson's WESSKA Series, 2007.
3) Creswell JW. Research design qualitative, quantitative and mixed methods approaches. 2nd edition, Sage Publications, New Delhi.
4) National ethical guidelines for biomedical and health research involving human participants. Indian Council of Medical Research, New Delhi, 2016.
5) Indian Copyright Act, 1957. http://copyright.gov.in/documents/copyrightrules1957.pdf.
6) A hand book of copyright law. Government of India, Ministry of Human Resource Development and Department of Secondary Education and Higher Education. http://copyright.gov.in/documents/handbook.html
7) Rahim A. Thesis Writing: Manual for all researchers. New Age International Pvt. Ltd., New Delhi.
8) Singh T, Shah D, Gupta P. Principles of thesis writing. Indian Academy of Pediatrics, JPB Publishers, 1st edition, 2008.
9) Gurumani N. Scientific Thesis Writing and Paper Presentation. MJP Publishers: 1st edition , 2010.
10) Ingle PO. Scientific and technical report writing. Nikhil Graphics, Akola, 2012.
11) Vir SC. Editor. Public health nutrition in developing countries. Part I. Woodhead Publishing India Pvt Ltd, New Delhi.
12) PHFI. Post graduate diploma in public health nutrition by distance learning 2014-15. Vol 3. Module 7: Nutrition Epidemiology. Public Health Foundation of India, New Delhi.

PUBLIC HEALTH NUTRITION - II (PRACTICAL)

Paper code: PHN DII
Credits : 4
Max. Marks:100
Teaching Hours :2 Practicals /Week (3 Hours/Practical)
Total Teaching Workload : 30 practicals/Semester

Dy. Registrar
(Academic)
University of Science
JAIPUR

Objectives:

1. To enable students to plan programs for nutritional problems of public health importance
2. To collect literature on aspects of public health and assess them for their content hence enabling students to develop IEC and material
3. To plan and evaluate ongoing programs of public health

Contents :

1.	Program planning on Public Health and nutritional problems identified as priority area during need assessment.
2.	Collection of literature related to problem
3.	Prepare messages to be disseminated on identified PHN issue
4.	Plan communication methods for execution of program
5.	Prepare suitable audio visual aids as well as collect audio visual aids already available at various Government departments or NGO
6.	Implementation and Evaluation of program in field(selected village or slum areas) (Execute five programs of five groups of students)
7.	Writing one article on any one contemporary public health and nutrition issues for print media

INSTITUTIONAL FOOD ADMINISTRATION – II (PRACTICAL)

Paper Code: FHN D12
Credits: 4
Max. Marks: 100
Teaching Hours: 2 Practicals / week (3 Hours/Practical)
Total Teaching Workload: 30 Practicals/Semester

Objectives :

- To visit different food service institutions to gain an insight into the functioning of such units.
- To plan menus for different occasions/institutions
- To cook certain food items in large quantities i.e., in 50-60 portions each.

Contents :
Practicals

1.	Carrying out market survey of perishable, non-perishable and processed foods for meal planning.
2.	Planning and preparation of meals for various occasions giving general consideration, assumptions, organization chart, budget breakup, menu, cost calculations, comparison of actual and estimated costs and evaluation: • Theme party • Special cuisine • Cocktail party

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR

- Hospital meal
- Tea party after a lecture
- International airlines
- Country of your choice

3. Visit to different institutes for eg.
   - Hotel
   - School
   - Institute of Hotel Management
   - McDonalds
   - Industrial canteen
   - Philanthropic institution
   - Airport
4. Quantity cookery classes for preparation of food items for eg.: Chaula dal kipakori, Bread rolls, Mini pizzas, Burgers, Mexican tacos, Idlisambhar, Pavbhaji, Cholebhaturas, Bhelpuri

SKILL DEVELOPMENT IN PUBLIC HEALTH NUTRITION (PRACTICAL)

Paper code: FHN D13
Credits : 4
Max. Marks:100
Teaching Hours : 2 Practicals/ Week (3 Hours/Practical)
Total Teaching Workload : 30 Practicals /Semester

Objectives:

1. To enable students to carry out Community Programs at Urban, Rural and Slums
2. To develop skills and to translate skills into action at Community level
3. To strengthen skills of frontline workers in all programs
4. To create interest in Community and create awareness and motivation for lifestyle modification

Content

Skills through trainings

1. **Malnutrition treatment centre:**
   - Placement at MTC in Hospital
   - Skill in calculating, preparation and feeding of therapeutic diets.
2. **Infant and young child nutrition**
   - Placement at AWCs- Strengthening skill of ASHAs and AWW
   - Techniques of initiation of breast feeding, and complementary feeding.
   - Techniques in calculation of frequency and adequacy of complementary food. (frequency, adequacy, density, utilisation)
3. **Home Based Care of Neonates and Children**
   - Counseling and Strengthening IHBNC in frontline workers by Placement at AWC in rural set up
   - Counseling and Strengthening in Growth Monitoring and Promotion of Growth Monitoring in frontline workers by Placement at AWC in rural set up

By Registrar (Academic)

4. **...cation of nutritional components of ICDS program**

- Activities for MCHN day: Celebrating MCHN Day at Slum/ Village
- Nutritional care of pregnant woman in terms of weight gain during pregnancy, calcium & iron-folic acid supplementation and consumption of iodized salt.
- Infant and young child nutrition in terms of early initiation of breast feeding, exclusive breast feeding, timely introduction of complementary feeding and nutrition of children aged 6 months to 2 years.

5. **Holding health Camp for all Population groups in Community/ Campus**

Dy. Registrar
(Academic)
University of Rajasthan
JAIPUR