

NATIONAL EDUCATION POLICY-2020
Common Minimum Syllabus for all
Uttarakhand State Universities and
Colleges



Syllabus Proposed
2023-24

Sri Dev Suman Uttarakhand University
Badshahithol, Tehri (Garhwal)

पाठ्यक्रम निर्माण समिति, उत्तराखण्ड
Curriculum Design Committee, Uttarakhand

क्र० सं०	नाम एवं पद	
1	प्रो० एन० के० जोशी कुलपति, श्रीदेव सुमन उत्तराखण्ड विश्वविद्यालय, टिहरी	अध्यक्ष
2	कुलपति, कुमाऊँ विश्वविद्यालय, नैनीताल	सदस्य
3	प्रो० जगत सिंह बिष्ट कुलपति, सोबन सिंह जीना विश्वविद्यालय, अल्मोड़ा	सदस्य
4	प्रो० सुरेखा डंगवाल कुलपति, दून विश्वविद्यालय, देहरादून	सदस्य
5	प्रो० ओ० पी० एस० नेगी कुलपति, उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी	सदस्य
6	प्रो. एम० एस० एम० रावत सलाहकार—रूसा, रूसा निदेशालय, देहरादून	सदस्य
7	प्रो० के० डी० पुरोहित सलाहकार—रूसा, रूसा निदेशालय, देहरादून	सदस्य

**Proposed Syllabus for PG PROFESSIONAL COURSE HOME SCIENCE (FOODS & NUTRITION)
UNDER NATIONAL EDUCATION POLICY- 2020**

Tentative Structure	Subject I	Subject II	Subject III	Subject IV	Practical	Subject V	Co-curricular course (Qualifying)	Industrial training/survey	Minimum credits (for the yr)	Cumulative Minimum credits (required for award of certificate/diploma/ degree)	
	Major	Major	Major	Major	Major	Minor Elective	Minor	Major			
	4 Credits	4 Credits	4 Credits	4 Credits	4 Credits	4 Credits	(Qualifying)	4 credits			
Yr	Sem.										
1	I	Basics of Nutrition and Hygiene	Food Science	Clinical Nutrition & Dietetics-I	Food Hygiene and Sanitation	Practical (Food Science and Clinical Nutrition and Dietetics-I)	Nutrition through Life Cycle *	Industrial Training/Survey/Research Project	28	Bachelor (Research) in Home Science (52)	
	II	Advance Human Nutrition	Clinical Nutrition & Dietetics-II	Food Preservation & Processing	Research Methods and Statistics	Practical (Clinical Nutrition and Dietetics -II and Food Preservation)		Industrial Training/Survey/Research Project	24		
2	III	Food Safety and Food Laws	Food Quality Analysis	Advanced Community Nutrition	Recent Trends in Food Science & Nutrition	Practical (Advance Community Nutrition and Food Quality Analysis)		Industrial Training/Survey/Research Project	24	Master in Home Science (Foods and Nutrition) (48)	
	IV	Food Microbiology	Pediatric and Geriatric Nutrition	Food Product Development & Marketing	Nutritional Biochemistry	Practical (Food Product Development & Marketing)		Industrial Training/Survey/Research Project	24		

SEMESTER-VII

Course Code	Course Title	L-T-P	Credits
BHS-701	Basics of Nutrition and Hygiene	4-0-0	4
BHS-702	Food Science	4-0-0	4
BHS-703	Clinical Nutrition & Dietetics-I	4-0-0	4
BHS-704	Food Hygiene And Sanitation	4-0-0	4
BHS-705	Practical (Food Science and Clinical Nutrition and Dietetics-I)	0-0-4	4
BHS-706	Nutrition through Life Cycle* (Minor Elective)	4-0-0	4
BHS-707	Industrial Training/Survey/ Research Project	0-0-4	4
	Total	28	28

SEMESTER-VIII

Course Code	Course Title	L-T-P	Credits
BHS-801	Advance Human Nutrition	4-0-0	4
BHS-802	Clinical Nutrition & Dietetics-II	4-0-0	4
BHS-803	Food Preservation & Processing	4-0-0	4
BHS-804	Research Methods and Statistics	4-0-0	4
BHS-805	Practical (Clinical Nutrition and Dietetics II and Food Preservation and Processing)	0-0-4	4
BHS-806	Industrial Training/Survey/ Research Project	0-0-4	4
	Total	24	24

SEMESTER-IX

Course Code	Course Title	L-T-P	Credits
MFN-901	Food Safety and Food Laws	4-0-0	4
MFN-902	Food Quality Analysis	4-0-0	4
MFN-903	Advanced Community Nutrition	4-0-0	4
MFN-904	Recent Trends in Food Science & Nutrition	4-0-0	4
MFN-905	Practical (Advance Community Nutrition and Food Quality Analysis)	0-0-4	4
MFN-906	Industrial Training/Survey/ Research Project	0-0-4	4
	Total	24	24

SEMESTER-X

Course Code	Course Title	L-T-P	Credits
MFN-10-01	Food Microbiology	4-0-0	4
MFN-10-02	Paediatric and Geriatric Nutrition	4-0-0	4
MFN-10-03	Food Product Development & Marketing	4-0-0	4
MFN-10-04	Nutritional Biochemistry	4-0-0	4
MFN-10-05	Practical (Food Product Development & Marketing)	0-0-4	4
MFN-10-06	Industrial Training/Survey/ Research Project	0-0-4	4
	Total	24	24

Programme/Class: Bachelor (Research) in Home Science		Year: Fourth	Semester- Seventh
Course Code: BHS-701		Course Title: Basics of Nutrition and Hygiene	
Course Outcomes: The student at the completion of the course will be able to:			
<ul style="list-style-type: none"> • Students will get familiar with different methods of cooking. • Acquaint students with practical knowledge of nutrient-rich foods. 			
Credits: 4		Major	
Max. Marks:		Total No. of lectures-Tutorials-Practical: L-T-P: 4-0-0	
Units	Topic		No. of Lectures
Theory			
I	Introduction to Food and its functions, food groups, meaning of nutrition, Concept of Health.		10
II	Composition, Classification, functions, sources, digestion, Absorption and Utilization of Macronutrients (Carbohydrates, Fat, Protein) and Energy.		10
III	Composition, functions, sources, digestion, Absorption and Utilization of Micronutrients (Vitamins and Minerals), sources, functions, requirement and deficiency diseases		15
IV	Food Spoilage, factors contributing to food spoilage, personal hygiene, evaluating food for freshness, evaluating canned food for spoilage, food hygiene during cooking and serving, public health department and food sanitation. Food sanitation at household level.		15
V	Agents of contamination, sources and reservoirs of infection, modes of transmission of infection, mode of entry into a susceptible host, prevention and control of infection and disease.		10
Suggested Reading			
<ul style="list-style-type: none"> • Dr. Brinda Singh, Manav Sharirevam Kriya Vigyan PanchcheelPrakashan, Jaipur, 2015, 15th Ed. • Chatterjee, C.C, "Human Physiology" Medical Allied Agency: Vol I, II. • Sumati R Mudami, "Fundamentals of food Nutrition and Diet Therapy", New Age International Pvt. Ltd, New Delhi, 6th Ed. (2018) • Punita Sethi and Poonam Lakda, "Aahar Vigyan, Suraksha evamPoshan"; Elite Publishing House, New Delhi; 2015 • Dr. Anita Singh, AaharEvamPoshan Vigyan, star Publication, Agra • Dr.DevinaSahai, AaharVigyan, New Age International Publishers, New Delhi • Suggestive digital platforms web links-ePG-Pathshala, IGNOU & UPRTOU online study material 			
Svayam Portal http://heecontent.upsdc.gov.in/Home.aspx			
Suggested Continuous Evaluation Methods:			
<ul style="list-style-type: none"> • Seminar / Presentation on any topic of the above syllabus • Test with multiple choice question/ short and long answer questions 			

Programme/Class: Bachelor (Research)in Home Science		Year: Fourth	Semester: Seventh
Course Code:BHS-702		Course Title: FOOD SCIENCE	
Course outcomes:			
The Student at the completion of the course will be able to:			
<ul style="list-style-type: none"> • To provide an understanding of composition of various foodstuffs • Familiarize students with changes occurring in various • Food stuffs as a result of processing and cooking • Enable students to use the theoretical knowledge in various applications and food preparations. 			
Credits: 4		Major	
Max. Marks:		Min. Passing marks:	
Total No. of lectures-Tutorials-Practical: L-T-P: 4-0-0			
Unit	Topics		No. of Lectures
I	Introduction to Food Science. Properties of foods- Functions, measurement and factors affecting appearance, taste, texture, flavor, color.		5
II	Changes during food processing and storage in fruits and vegetables; milk and milk products; meat and poultry; fish, eggs, cereals and legumes; nuts; oilseeds and spices.		10
III	Carbohydrates: Functional role of sugars in foods- sweetness, texture, preservation, preservation, fermentation, appearance, maillard reaction, caramelization, freezing point, antioxidant activity, miscellaneous activity; sweetness; invert sugar.		5
IV	Proteins: Functional properties of protein- hydration properties, precipitation, viscosity, gelation, texturization, dough formation, surface properties.		5
V	Lipids: Functional properties of lipids, deep fat frying, deteriorative changes in fats/ oils, antioxidants		5
VI	Food polysaccharides: Functional properties of starch; hydrocolloids, non-starch polysaccharides, gums.		10
VII	Role of water in foods: free water and bound water, functional properties, water activity and intermediate moisture foods.		5
VIII	Sols, gel, emulsion; colloids, colloidal system, properties of solutions, foams.		5
IX	Enzymes and pigments: Biotechnological applications of enzymes; Natural pigments- sources and uses.		5
X	Sensory evaluation: importance, sensory panel, sample preparation, hedonic scale		5
	Total		60
Suggested Readings:			
<ul style="list-style-type: none"> ➤ Desroiser N. W. & Desroiser J. N. 1977. The Technology of Food Preservation. AVI Publication. ➤ Potty V. H. and Mulky M. J. 1993. Food Processing. Oxford & IBH Publishing House. ➤ Srilakshmi B. 2001. Food Science. New Age International. ➤ M. Shadakhsharaswamy and N. Shakuntala Manay. Food Facts and Principles, Mohindra Singh Sejwal for Wiley Eastern Limited, Ansari Road Daryaganj, New Delhi. ➤ Mudami, S. 1997. Food Science. New Age International (P) Limited Pub. 			

Suggested Digital Platform:

<http://ecoursesonline.iasri.res.in/course/view.php?id=195>

Suggested Continuous Evaluation Methods:

Seminar/ Presentation on any topic of the above syllabus • Test with multiple choice questions/ short and long answer questions • Attendance

Programme/Class: Bachelor (Research) in Home Science	Year: Fourth	Semester: Seventh
CourseCode:BHS-703	Course Title : CLINICAL NUTRITION AND DIETETICS-I	
Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> ➤ Understand the basics of normal diet, therapeutic diet related with specific disease condition ➤ Students will be able to know different feeding methods used in hospitals. 		
Credits:4	Major	
Max.Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Introduction to Clinical Nutrition and Dietetics; Definition and role of dietitian in Health Care; The Nutritional Care Process (NCP) - Nutrition assessment, Nutrition diagnosis, Nutrition intervention, Nutrition monitoring and evaluation, Documentation	10
II	Adaptation of therapeutic diets- Therapeutic diets, routine hospital diets-normal or generic diets, liquid diets, soft diets; Mode of feeding- oral feeding, tube or enteral feeding, peripheral vein feeding, total parenteral nutrition.	5
III	Nutritional management of fevers: Metabolic changes during fever, classification and etiology of fever. Nutritional management of typhoid and tuberculosis.	5
IV	Food allergies and food intolerance; Nutritional management, adverse food reactions- food allergy and food intolerance, adverse food reactions- The diagnosis process, treatment, management and prevention.	10
V	Nutritional management of eating disorders- anorexia nervosa, bulimia nervosa, binge eating, management of eating disorders.	10
VI	Nutrition during stress: The stress response; Surgery- physiological response to surgery, dietary management during surgery; Burns-classification, complications, dietary management, mode of feeding, non-dietary treatment; Trauma- physiological response, metabolic response, hormonal response, dietary management; Sepsis- systemic metabolic responses, catabolic responses, dietary management of sepsis with or without MODS.	10
VIII	Nutrient and drug interaction: basic concepts, effect of nutrition on drugs, effect of drugs on nutritional status, drug and drug interaction, clinical significance and risk factors for drug-nutrient interaction, guidelines to lower risk and wise use of drugs.	10
	Total	60

Suggested Readings:

- Anderson L., Dibble M. V., Turkki P. R., Mitchel H. S. & Rynbergen H. 1982. Nutrition in Health and Disease. JB Lippincott Co.
- ICMR 1998. Recommended Dietary Allowance for Indians. ICMR.
- Khanna K., Gupta S., Seth R. & Puri S. 1997. Text Book of Nutrition and Dietetics. Phoenix Publ.
- Srilakshmi B. 2002. Nutrition Science. New Age International.
- Swaminathan M. 1988. Principles of Nutrition and Dietetics. BAPPCO.

Suggested Continuous Evaluation Methods:

Seminar/Presentation on any topic of the above syllabus Test with multiple choice questions /short and long answer questions Attendance

Programme/Class: Bachelor (Research)in Home Science		Year: Fourth	Semester: Seventh
Course Code: BHS-704		Course Title: Food Hygiene and Sanitation	
Course outcomes: The Student at the completion of the course will be able to:			
➤ To impart to the student's knowledge regarding hygiene and sanitation in food processing and preparation, food borne infections and control measures to maintain the sanitation and quality of foods and water.			
Credits: 4		MAJOR	
Max. Marks: 100		Min. Passing marks:	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0			
Description of theory			
Unit	Topics		No. of Lectures
I	Meaning and principles of foods sanitation.		5
II	Concept of personal hygiene and personal hygiene of food handlers.		5
III	Sources of water supply and contamination: treatment of water for quality control.		5
IV	Food hazards		5
V	Basic facts about microorganisms		5
VI	Food spoilage: perishable, semi perishable and non- perishable foods.		5
VII	Food poisoning and food infection caused by bacteria: <i>Botulism</i> intoxication, <i>staphylococcus</i> poisoning, <i>salmonella</i> and <i>clostridiumperfringens</i>		10
VIII	Sanitary equipments and utensils		10
IX	Sanitary storage of foods		5
X	Sanitary procedures for preparing and holding food: general principles.		5
Suggested Readings:			
➤ Adams, M.K. and Moss. M.O. 2000. Food Microbiology. Panima Pub. Corp., New Delhi, Bangalore.			
➤ Longree, K.L. and Blaker, G.C. 1982. Sanitary Techniques in Food Service. John Wiley & Sons, New York.			
Suggested Continuous Evaluation Methods:			
Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance			

Programme/Class: Bachelor	Year: Fourth	Semester: Seventh
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(Research)in Home Science		
Course Code: BHS-705	Course Title: Practical (Food Science and Clinical Nutrition and Dietetics-I)	
Course outcomes: The Student at the completion of the course will be able to:		
1. To develop the knowledge for preparing and evaluate food products on the basis of sensory analysis.		
2. To plan and prepare diet for a critical conditions and for all age groups.		
Credits: 4	MAJOR	
Max. Marks:		
Total No. of lectures-Practical: L-T-P: 0-0-4		
Unit	Topics	No. of Lectures
I	Sensory Analysis: Different types of sensory tests for basic tastes and sensory attributes of products.	5
II	Starch gelatinization: factors affecting and measurement of viscosity.	6
III	Functional properties of proteins: Water and fat absorption, emulsion and foaming properties, (preparation of cakes).	6
IV	Fermentation: Fermented wheat and wheat based products.	5
V	Sugar cookery: stages and use in Indian sweet preparations.	5
IV	Use of oils and fats: as shortening and as frying media, effect of frying on physico-chemical properties.	6
VI	Planning and preparation of liquid diet	5
VII	Planning and preparation of soft diet.	5
VIII	Planning and preparation of diet in fevers.	5
IX	Planning and preparation of diet for children.	5
X	Planning and preparation of diet for old age person	5
XI	Visits to local hospitals: at least one outside having well developed diet/nutritional unit to observe the food service, intensive care units, non-invasive techniques etc.	2
	Total	60
Suggested Readings:		
1. Desroiser N. W. & Desroiser J. N. 1977. The Technology of Food Preservation. AVI Publication.		
2. Potty V. H. and Mulky M. J. 1993. Food Processing. Oxford & IBH Publishing House.		
3. Srilakshmi B. 2001. Food Science. New Age International.		
4. M. Shadakhsharaswamy and N. Shakuntala Manay. Food Facts and Principles, Mohindra Singh Sejwal for Wiley Eastern Limited, Ansari Road Daryaganj, New Delhi.		
5. Mudami, S. 1997. Food Science. New Age International (P) Limited Pub.		
Suggested Continuous Evaluation Methods:		
Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance		

Programme/Class: Bachelor (Research)in Home Science	Year: Fourth	Semester: Seventh
CourseCode:BHS-706	Course Title :NUTRITION THROUGH LIFE CYCLE	

Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> ➤ Know the role of diet in preventing the degenerative diseases ➤ Acquire knowledge about the types of diet. ➤ Improve the lifestyle through proper diet planning 		
Credits:4	Minor Elective	
Max.Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Nutritional status: malnutrition, undernutrition, overnutrition, factors associated with malnutrition, morbidity, and mortality. Global and national data on malnutrition, recommended dietary intake.	10
II	Nutritional in Pregnancy and Lactation: Stages of gestation, maternal weight gain, complications of pregnancy, nutritional problems and dietary management, the importance of nutrition during and before pregnancy, teenage pregnancy - nutritional problems, and dietary management. Nutrition in Lactation: Physiology of lactation, hormonal control, and reflex action, the efficiency of milk production, problems of breastfeeding, the nutritional composition of breast milk, nutritional concerns during lactation, special foods during lactation, dietary modification.	15
III	Nutrition in Infancy, Pre-School and School Children Infant feeding: nutritional needs, premature infant and their feeding, weaning foods. Feeding problems, infant formulae lactose intolerance. Nutrition in Pre-school - Physiological development related to nutrition, feeding problems, behavioral characteristics, nutritional requirement. Nutrition in school children - feeding school children and factors to be considered. Nutritional requirements, feeding problems.	15
IV	Nutrition in Adolescents and Adults – Physical changes, Nutritional requirements dietary practices, Nutritional problems.	10
V	Geriatric Nutrition- Nutritional requirements of the elderly & dietary management to meet nutritional needs.	10
	Total	60
Suggested Readings:		
<ul style="list-style-type: none"> • Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi,2011 2. • Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2001. 		
Suggested Continuous Evaluation Methods:		
Seminar/Presentation on any topic of the above syllabus •Test with multiple choice questions /short and long answer questions •Attendance		

Programme/Class: Bachelor (Research)in Home Science	Year: Fourth	Semester: Eighth
Course Code: BHS-801	Course Title: ADVANCED HUMAN NUTRITION	
Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> • Aware about the nutrient requirements and dietary recommendations • Describe the digestion, transport, and absorption of nutrients • Identify nutritional needs as they relate to the life cycle and performance 		

• Describe behavior modification techniques that promote good health		
Credits: 4		MAJOR
Max. Marks:		Min. Passing marks:
Total No. of lectures: L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	Basis for computing nutrient requirements: latest concepts in dietary recommendations, RDA- ICMR and WHO: their uses and limitations.	5
II	Body fluids and water balance: Body water compartments. Regulation of water balance, disorders of water balance.	5
III	Body composition: Methods of study, compositional changes during life cycle	5
IV	Energy metabolism: Basal and resting metabolism- influencing factors. Methods to determine energy requirements & expenditure. Thermo genesis, adaptation to altered energy intake.	5
V	Carbohydrates: Occurrence and physiological functions, factors influencing metabolism. Lactose intolerance. Dental caries. Artificial sweeteners. Role of dietary fiber in health and disease. Disorders related to carbohydrate metabolism. Glycemic index of foods and its uses.	5
VI	Lipids: Concepts of visible and invisible fats. EFA, SFA, MUFA, PUFA- sources and physiological functions. Role of lipoproteins, cholesterol and triglycerides in health and disease.	10
VII	Proteins: Concepts of essential and non-essential amino acids- their role in growth and development. Physiological functions of proteins. Requirements, nitrogen balance concept. Methods for evaluating protein quality. Protein energy malnutrition-clinical features and biochemical changes	5
VII	Macro minerals: Calcium, Phosphorus Magnesium, Sodium, Potassium chloride.	10
IX	Micro minerals: Iron, Zinc, copper, selenium, chromium, iodine, manganese, Molybdenum and fluoride.	10
X	Ultra trace minerals: Arsenic, Boron, Nickel, Silicon, Vanadium & cobalt: Digestion & absorption, Functions, Toxicity, interaction with other nutrients.	5
XI	Fat soluble Vitamins: Vitamin A, Vitamin D, E & K.	
	Total	60
Suggested Readings:REFERENCES		
1. Christian, J. L. and Gregor, J. L. 1985. Nutrition for Living. The Benjamin. Cummings Publishing House, Inc. 600p.		
2. Groff, J. L. and Gropper, S. S. 2000. Advanced Nutrition and Metabolism. Wadsworth Thompson Learning, Australia. 584p.		
3. Smolin, L. A. and Grosvenor, M. B. 1999. Nutrition: Science & Applications. Saunders College Publishing, New York. 597p.		
4. Stipanuk, Martha. 2006. Biochemical, Physiological and Molecular Aspects of Human Nutrition. 2 nd edition. Elsevier. New York. 1232p.		
5. Bamji, M.S.; Rao, N.P. and Reddy, V. 1996. Textbook of Human Nutrition. Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.		
Suggested Digital Platform:		
http://ecoursesonline.iasri.res.in/course/view.php?id=196		
Suggested Continuous Evaluation Methods:		

Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance

Programme/Class: Bachelor (Research) in Home Science	Year: Fourth	Semester: Eighth
CourseCode:BHS-802	Course Title :CLINICAL NUTRITION AND DIETETICS-II	
Course outcomes: The Student at the completion of the course will be able to:		
➤ Nutritional management of different disease conditions and apply them in their day to day life.		
Credits:4	Major	
Max.Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Nutritional care in weight management: weight imbalance- prevalence and classification, calculation of ideal body weight; obesity- etiology, energy balance, metabolic changes and clinical manifestations, consequences, management of obesity- dietary and lifestyle modifications, underweight- etiology, metabolic changes and clinical manifestations, dietary management.	10
II	Nutritional management of gastrointestinal diseases and disorders: Diarrhoea, constipation, oesophagitis, gastrooesophageal reflux disease, dyspepsia, gastritis, steatorrhoea, lactose intolerance, inflammatory bowel disease	10
III	Nutritional management in liver and pancreatic diseases: Liver disease- viral hepatitis, liver cirrhosis, hepatic encephalopathy, acute and chronic pancreatitis.	5
IV	Nutritional management of metabolic diseases: diabetes mellitus- prevention, classification, etiology, metabolic changes, symptoms, diagnosis, complications and management	10
V	Nutritional management of coronary heart disease (CHD): prevalence, etiology; common disorders of CHD and their management- dyslipidemia, atherosclerosis, hypertension, angina pectoris, hypertension, myocardial infarction, congestive cardiac failure, rheumatic heart disease; prevention of CHD.	10
VI	Gout- role of protein and purines, clinical features and complications, management; Inborn errors of metabolism- phenylketonuria, tyrosinemia, maple syrup urine disease, homocystinuria, galactosemia	5
VII	Nutritional management of renal diseases- etiology, clinical and metabolic manifestations and dietary management of acute and chronic nephritis, nephrotic syndrome, acute and chronic renal failure, end stage renal disease and renal calculi.	10
	Total	60

<p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. Anderson L., Dibble M. V., Turkki P. R., Mitchel H. S. & Rynbergen H. 1982. Nutrition in Health and Disease. JB Lippincott Co. 2. ICMR 1998. Recommended Dietary Allowance for Indians. ICMR. 3. Khanna K., Gupta S., Seth R. & Puri S. 1997. Text Book of Nutrition and Dietetics. Phoenix Publ. 4. Srilakshmi B. 2002. Nutrition Science. New Age International. 5. Swaminathan M.1988. Principles of Nutrition and Dietetics. BAPPCO.
<p>Suggested Continuous Evaluation Methods:</p> <p>Seminar/Presentation on any topic of the above syllabus <input type="checkbox"/> Test with multiple choice questions /short and long answer questions <input type="checkbox"/> Attendance</p>

Programme/Class: Bachelor (Research) in Home Science	Year: Fourth	Semester: Eighth
Course Code: BHS-803	Course Title: FOOD PRESERVATION & PROCESSING	
<p>Course outcomes:</p> <p>The student at the completion of the course will be able to:</p> <ul style="list-style-type: none"> • Develop knowledge about the benefits of the nutrient concentrated foods. • Develop knowledge about various methods of preserving the food. 		
Credits: 4	MAJOR	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	Preservation- Introduction, Principles Classification of food in relation to shelf life: Spoilage in food and its control: Spoilage caused by microorganisms (bacteria, fungi, and virus), enzymes, pests and rodents.	10
II	Contamination of: Cereals and pulses; sugar and sugar products; vegetables and fruits; flesh foods; eggs; milk and milk products.	5
III	Spoilage of: Cereals and pulses; sugar and sugar products; vegetables and fruits; flesh foods; eggs; milk and milk products.	10
IV	Application of food preservation- Concept of Hurdle Technology	5
V	Food dehydration and concentration: methods of drying and concentration, equipment for drying / dehydration, factors affecting drying process.	5
VI	Heat preservation: Heating processing, sterilization, pasteurization, blanching and canning. Cold preservation: refrigeration, freezing, freeze drying, refrigerated gas storage.	10
VII	Food irradiation and microwave heating.	5
VIII	Chemicals in food preservation.	5
IX	Fermentation: type of fermentation and fermented foods.	5
	Total	60
<p>Suggested Readings:</p> <ol style="list-style-type: none"> 1. Desroiser N. W. & Desroiser J. N. 1977. The Technology of Food Preservation. AVI Publication. 2. Frazier, W.C. 1988. Food Microbiology. Tata McGraw Hill. 3. Srilakshmi B. 2001. Food Science. New Age International. 4. Mudami, S. 1997. Food Science. New Age International (P) Limited Pub. 		
<p>Suggested Digital Platform:</p> <p>http://ecoursesonline.iasri.res.in/mod/page/view.php?</p>		

<http://ecoursesonline.iasri.res.in/mod/page/view.php?5>

Suggested Continuous Evaluation Methods:

Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance

Programme/Class: Bachelor (Research) in Home Science		Year: Fourth	Semester: Eighth
Course Code: BHS-804		Course Title: Research Methods and Statistics	
Course outcomes: The Student at the completion of the course will be able to:			
<ol style="list-style-type: none"> 1. To understand the signification of statistics and research methodology in Home Science research. 2. To understand the type's tools and methods of research and develop the ability to construct data gathering instruments appropriate to the research design. 			
Credits: 4		Major	
Max. Marks: 100		Min. Passing marks:	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0			
Description of theory			
Unit	Topics	No. of Lectures	
I	Research Methodology: An Introduction, Meaning of Research, Objectives of Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India. Defining the Research Problem, Selecting the Problem Social Science Research, Need and Importance of social science research.	10	
II	Research design; defining concepts, advantages of research design, need for research design, Types of research design: descriptive research design, experimental research design, Correlational research design, diagnostic research design, explanatory research design	5	
III	Hypotheses, types of hypothesis, formulation of hypothesis, characteristics of hypothesis, Basic assumptions and the limitations of the problems, Conceptualization of study, Operationalization of variables and types of variables.	10	
IV	Sampling Design: meaning and definition of sampling, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, probability sampling and non-probability sampling.	10	
V	Methods and tools of data collection: Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaires, Collection of Data through Schedules, Difference between Questionnaires and Schedules, Collection of Secondary Data, Selection of Appropriate Method for Data Collection, Case Study Method, Instruments; concepts of measurement, reliability and validity of instruments.	10	

VI	Data processing methods, Graphical Representation of data, General guidelines for presenting data, tables, graphs and illustrations, Interpretation and generalization and analysis of data.	10
VII	Scientific reporting, points to be considered in report writing, Footnotes, Bibliographic citation, Citation style, Preparation of an abstract	5
	Total	60
Suggested Readings:		
<ol style="list-style-type: none"> 1. C. R. Kothari, GauravGarg, 2014 Research Methodology Method and Techniques, (IIIrd edition), New age International Publishers. 2. C R. kothari research methodology methods and techniques Wiley eastern.limited 3. Bandarker, P.L. and Wilknsn T.S. 2000, Methodology and Techniques of Social Research, Himalaya Publishing House, Mumbai. 4. Bhatnagar, GL. 1990: Research Methods and Measurements in Academy, New Delhi. 5. Dooly, D, 1995, Strageies for interpreting Qualitative data: sage Publication California 		
Suggested Continuous Evaluation Methods:		
Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance		

Programme/Class: Bachelor (Research) in Home Science	Year: Fourth	Semester: Eighth
Course Code: BHS-805	Course Title: Practical (Clinical Nutrition and Dietetics II and Food Preservation and Processing)	
Course outcomes:		
The student at the completion of the course will be able to:		
<ul style="list-style-type: none"> ➤ Plan and prepare a diet for different clinical conditions in all age groups. ➤ Develop knowledge about different procedure to increase the shelf-life of food products by processing them with chemical reagents. ➤ Formulate various food products by using different methods. 		
Credits: 4	Major	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 0-0-4		
Unit	Topics	No. of Lectures
I	Planning and preparation of diet for an obese person.	5
II	Planning and preparation of diet for an underweight person.	5
III	Planning and preparation of diet for a high BP patient.	5
IV	Planning and preparation of diet for a heart disease patient.	5
V	Planning and preparation of diet for a diabetic patient.	5
VI	Planning and preparation of diet for a patient suffering from peptic ulcer.	5
VII	Planning and preparation of diet for a patient suffering from liver disease.	5
VIII	Planning and preparation of diet for a patient with renal failure.	2
IX	Planning and preparation of diet for a patient with renal calculi.	2
X	Work experience in hospitals (special units- ICU)/ emergency relief camps and health oriented camps and presenting as seminar/ report.	1
XI	Study of changes in fruits/vegetables during storage	2

XII	Blanching and dehydration of seasonal fruits and vegetables.	2
XIII	Preparation of fruit bars/candy	5
XIV	Freezing of seasonal vegetables, meat and fish products	2
XV	Preparation of Jam, Jelly & squash	4
XVI	Pickle preparation	2
XVII	Preparation of ice-cream	2
XVIII	Visit to any Food Processing industry	1
	Total	60
	Suggested Readings: <ul style="list-style-type: none"> • Nelson, David L. and Michael M. Cox. Principles of Biochemistry. W.H. Freeman & Co. • Swaminathan M.1988. Principles of Nutrition and Dietetics. BAPPCO 	
	Suggested Continuous Evaluation Methods: Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance	

Programme/Class: Masters in Home Science (Foods and Nutrition)	Year: Fifth	Semester: Ninth
Course Code: MFN-901	Course Title: FOOD SAFETY & FOOD LAWS	
Course outcomes: The Student at the completion of the course will be able to: <ul style="list-style-type: none"> • Demonstrate an understanding of Food Safety and its importance. • Explain the difference between Food Safety and Food Quality. • Explain the importance of Food Safety for the consumer, employer, and employee. • To provide a general overview of food laws and regulations 		
Credits: 4	MAJOR	
Max. Marks:	Min. Passing marks:	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	Food safety and importance of safe food; factors affecting food safety- physical hazards, biological hazards, chemical hazards; micro-organisms in foods; recent concerns of food safety.	5
II	Food adulteration, foods commonly adulterated, common adulterants and their classification and harmful effects, methods for detection of some adulterant.	5
III	Food contaminants: naturally occurring toxicants in animal foods, plant foods; environmental contaminants- biological contaminants, pesticide residues, veterinary drug residues, heavy metals, miscellaneous.	10
IV	Food standards, food laws and regulations: PFA, Essential Commodity Act, FPO, MPO, MMPO, BIS, Agmark, Export Quality Control and Inspection Act, Standards of Weight and Measures Act, Consumers Protection Act, Vegetable Oil Products (Regulation) Order, Edible Oil Packaging Order, regulations related to genetically modified foods, misbranding.	10

V	International organizations and agreement in the area of food standardization and quality control- Codex Alimentarius, Codex India, WTO, SPS, TBT, ISO, FAO, WHO.	10
VI	GMP, GAP, use of hazard analysis and critical control points in processing of foods.	5
VII	Safety aspects of water, Safety of beverages, soft drinks, tea, coffee, cocoa.	5
VII I	Safety evaluation of food irradiation heat treatment and related processing techniques.	5
IX	Waste disposal in food industries.	5
	Total	60
Suggested Readings:		
1. Srilakshmi B. 2001. Food Science. New Age International.		
Suggested Digital Platform:		
http://ecoursesonline.iasri.res.in/course/view.php?id=196		
Suggested Continuous Evaluation Methods:		
Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance		
At the End of the whole syllabus any remarks/ suggestions:		

Programme/Class: Master in Home Science (Foods and Nutrition)	Year: Fifth	Semester: Ninth
Course Code: MFN-902	Course Title :FOOD QUALITY ANALYSIS	
Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> ➤ To understand physical, rheological properties of foods ➤ To get acquainted with sensory analysis of food. ➤ To get knowledge about food intoxicants. 		
Credits:4	Major	
Max. Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Chemical changes in foods during processing.	10
II	Physical and rheological properties of foods.	10
III	Changes in flavor components and natural food pigments during processing and storage.	10
IV	Bioavailability of micronutrients: vitamins and minerals.	10
V	Sensory evaluation methods for foods.	10
VI	Food intoxicants: Enzyme inhibitors; lathyrogens; goitrogens; cyanogenic glycosides; phenolics; oxalates; phytates; alkaloids; carcinogens; polycyclic aromatic hydrocarbons; allergens.	10
	Total	60

Suggested Readings:

1. AOAC. 1975. Official Methods of Analysis of the Association of Official Analytical Chemists. 12th edition, Washington. D. C.
2. Raghuramulu, N.; Nair, K.M. and Kalyanasundaram, S. 2003. A Manual of Laboratory Techniques. National Institute of Nutrition. ICMR. Hyderabad.
3. Ranganna , S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Product. Tata McGraw Hill Pub. Co. Ltd., New Delhi

Suggested Continuous Evaluation Methods:

Seminar/Presentation on any topic of the above syllabus Test with multiple choice questions /short and long answer questions Attendance

Programme/Class: Master in Home Science (Foods and Nutrition)	Year: FIFTH	Semester: NINTH
Course Code: MFN-903	Course Title: ADVANCED COMMUNITY NUTRITION	
Course outcomes: The Student at the completion of the course will be able to: Research specific topics of interest in community nutrition Apply nutrition knowledge and skills in a community setting		
<ul style="list-style-type: none"> • Understand the complexities of working within a community agency • Develop professional skills in preparing community grant applications, leading class discussions and preparing presentations 		
Credits: 4	MAJOR	
Max. Marks:	Min. Passing marks:	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	Methods for assessing nutritional status: indirect methods- demography, population dynamics and vital events and their health implications, indicators of health and nutrition (IMR, TMR, MMR); direct methods- anthropometry, biochemical, clinical, dietary and functional methods of assessments.	10
II	Pregnancy: physiological adjustments, nutritional requirements, nutritional status of Indian pregnant women, effect of malnutrition on outcome of pregnancy. Lactation: physiology of lactation, factors affecting lactation, nutritional requirements, effect of lactation on maternal malnutrition and fertility	10
III	Infancy: growth and development, nutritional requirements, feeding pattern, compositional differences between human milk and milk substitute and their suitability for infant feeding. weaning practices, weaning and supplementary foods.	5
IV	Preschool age: growth and development, nutritional requirements, special care in feeding them, nutritional problems specific to this age. School age and adolescent: growth and development, nutritional requirements, special care in feeding preschoolers, nutritional problems specific to this age.	10
V	Young adults: nutritional requirements, nutritional status of Indian adult population, nutritional problems common to this age. Elderly: nutritional requirements, special needs, nutritional problems.	5

	Major nutritional problems prevalent in India: prevalence, causes, manifestation and prevention.	
VI	Food security: definition, national and household food security, factors affecting food security system, national and international systems to improve food security.	5
VII	Nutrition policy and programs: national nutrition policy, need for nutrition policy, policy strategies and their implementation; nutrition programs- National Anemia Prevention, prevention of night blindness, National Iodine Prophylaxis Program, ICDS, national nutrition surveillance system, food for work etc; NGO in community development operations.	10
VIII	Nutrition education- rationale, planning, execution and evaluation.	5
	Total	60

Suggested Readings:

1. Gopaldas, T. & Seshadri, S. 1987. Nutrition Monitoring and Assessment. Oxford University Press.
2. Jeanette B Endres. 1990. Community Nutrition Challenges and Opportunities. Merill.
3. McLaren D. S. 1977. Nutrition in the Community. John Wiley & Sons.
4. Shukla, P. K. 1982. Nutritional Problems of India. Prentice Hall of India.

Suggested Digital Platform:

<http://ecoursesonline.iasri.res.in/course/view.php?id=196>

Suggested Continuous Evaluation Methods:

Seminar/ Presentation on any topic of the above syllabus • Test with multiple choice questions/ short and long answer questions • Attendance

Programme/Class: Master in Home Science (Foods and Nutrition)	Year: FIFTH	Semester: NINTH
Course Code: MFN 904	Course Title: RECENT TRENDS IN FOOD SCIENCE & NUTRITION	
Course outcomes: The student at the completion of the course will be able to:		
1) Knowledge about different methods of research.		
2) Knowledge about recent concepts like nutrigenomics, metabolomics and neutraceuticals.		
Credits: 4	MAJOR	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	<i>Methods of research used in human and animal studies related to nutrition. (cross sectional, longitudinal, retrospective, prospective, cohort and so on, available source of information to review the literature for research)</i>	10
II	Nutrition and mental development.	5
III	Nutrition and work performance including exercise and sports	5
IV	Nutrition for space and mines/under water.	5
V	Nutrition and Infection	4
VI	Nutrition and phyto-chemicals.	8
VII	Recent concepts in Human Nutrition. nutrigenomics, metabolomics, neutraceuticals, phytochemicals.	8

VIII	Recent concepts in Food Science: genetically modified foods, functional foods, health foods and novel foods, organically grown foods, Emerging technologies in food processing, Application of nano-technology in food processing	10
IX	Newer packaging materials: edible gums and coatings, automation in food processing operation available India	5
	Total	60
Suggested Readings:		
➤ Debasis Bagehi. Nutraceuticals and Functional Food Regulations in the United States and around the World. Academic Press.		
Suggested Continuous Evaluation Methods:		
Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance		

Programme/Class: Master in Home Science (Foods and Nutrition)	Year: FIFTH	Semester: NINTH
Course Code: MFN-905	Course Title: Practical(Advance Community Nutrition and Food Quality Analysis)	
Course outcomes:		
The Student at the completion of the course will be able to:		
➤ To examine the chemical and microbiological quality of food samples		
➤ To detect Adulteration in food samples		
➤ To assess nutritional status using anthropometric measurement and through food list method.		
➤ To plan and organize nutrition education and nutritional awareness programs. in community		
Credits: 4	MAJOR	
Max. Marks:		
Total No. of lectures-Practical (in hours per week): L-T-P: 0-0-4		
Unit	Topics	No. of Lectures
I	Bioavailability of iron	4
II	Estimation of ascorbic acid	
III	Estimation of dietary fibers content of foods.	4
IV	Estimation of protein.	4
V	Sensory evaluation of foods: Selection of panel, training of panel members, objective tests of sensory evaluation and consumer acceptability.	5
VI	Physical test of grain quality and texture evaluation of foods.	5
VII	Standardization of cups for raw food equivalents.	5
VIII	Assessment of nutritional status of pre- school children using Anthropometric measurement.	5
IX	Assessment of Nutritional status through food list method.	5
X	Food Weightment method	4
XI	Market survey for fortified and supplementary foods	4
XII	Low cost recipes for pre- school children	4
XIII	Nutrition awareness for pre-school children	4

XIV	<i>Planning and organizing nutrition education programs in the community.</i>	4
XIV	<i>Visit to Anganwadi (ICDS) and Primary Health Centre</i>	3
Suggested Readings:		
1. AOAC. 1975. Official Methods of Analysis of the Association of Official Analytical Chemists. 12 th edition, Washington. D. C.		
2. Raghuramulu, N.; Nair, K.M. and Kalyanasundaram, S. 2003. A Manual of Laboratory Techniques. National Institute of Nutrition. ICMR. Hyderabad.		
3. Ranganna, S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Product. Tata McGraw Hill Pub. Co. Ltd., New Delhi		
4. Gopaldas, T. & Seshadri, S. 1987. Nutrition Monitoring and Assessment. Oxford University Press.		
5. Jeanette B Endres. 1990. Community Nutrition Challenges and Opportunities. Merrill.		
6. McLaren D. S. 1977. Nutrition in the Community. John Wiley & Sons.		
7. Shukla, P. K. 1982. Nutritional Problems of India. Prentice Hall of India.		
Suggested Continuous Evaluation Methods:		
Seminar/ Presentation on any topic of the above syllabus • Test with multiple choice questions/ short and long answer questions • Attendance		

Programme/Class: Master in Home Science (Foods and Nutrition)	Year: FIFTH	Semester: TENTH
CourseCode:MFN-10-01	Course Title :FOOD MICROBIOLOGY	
Course outcomes:		
The Student at the completion of the course will be able to:		
➤ To know about different microorganism occurring in food.		
➤ To be able to know food spoilage and factors responsible for food spoilage.		
Credits:4	Major	
Max. Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Microbiology of foods: basic concepts, role of micro-organisms in fermented foods.	10
II	Micro-organisms in foods: bacteria, fungi, yeasts, moulds, viruses, parasites.	10
III	Occurrence and growth of micro-organisms in food: microbiology of air, water and soil, sources of food contamination, factors affecting the growth of micro-organisms- nutrition, oxygen, temperature, moisture, osmotic pressure, pH, light, control and destruction of micro-organisms.	10
IV	Food spoilage: Factors responsible for food spoilage, chemical changes due to spoilage, spoilage of meat, poultry and fish; fruits and vegetables; cereals and cereal products; milk and milk products; soft drinks; fruit juices, fruit preserves; miscellaneous products.	10

V	Food hazards of microbial origin: food borne diseases; food borne intoxications- staphylococcal poisoning, bacillus cereus poisoning, botulism; food borne infections- Salmonellosis, Shigellosis, Vibrio Parahaemolyticus gastroenteritis, E. coli Diarrhoea, Hepatitis A, Shellfish poisoning; Food borne toxic infections- clostridium perfringens gastroenteritis, E. coli gastroenteritis, cholera, listeriosis, Yersinia Enterocolitica gastroenteritis, Campylobacter Jejuni Diarrhoea; mycotoxins	20
Total		60

Suggested Readings:

1. Frazier, W.C. 1988. Food Microbiology. Tata McGraw Hill

Suggested Continuous Evaluation Methods:

Seminar/Presentation on any topic of the above syllabus Test with multiple choice questions /short and long answer questions Attendance

Programme/Class: Masters in Home Science (Foods & Nutrition)		Year: FIFTH	Semester: TENTH
CourseCode:MFN-10-02		Course Title: PAEDIATRIC AND GERIATRIC NUTRITION	
Course outcomes: The Student at the completion of the course will be able to:			
<ul style="list-style-type: none"> ➤ To know normal growth pattern of child and factors affecting growth pattern. ➤ To get knowledge about paediatric problems and its dietary management. ➤ To know about nutritional management of elderly people and their problems. 			
Credits:4		Major	
Max.Marks:		Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0			
Unit	Topics		No. of Lectures
I	Normal pattern of growth in children, Factors affecting growth of child		10
II	Breast feeding/ formula feeding (birth to 6 month) Complementary and early diet (6 month- 2 years of age)		5
III	Role of prebiotics and probiotics in child nutrition.		5
IV	Pediatric <ul style="list-style-type: none"> • Problems and nutritional management • Congenital heart disease • Preterm/low birth weight • Lactose intolerance • Celiac disease. 		15
V	Geriatric nutrition- <ul style="list-style-type: none"> • Physical and physiological changes • Requirements • Nutritional assessment 		15
VI	Health and feeding problems among elderly nutrition support- parenteral/enteral/oral		10

	Total	60
Suggested Readings:		
<ul style="list-style-type: none"> • Anderson L., Dibble M. V., Turkki P. R., Mitchel H. S. & Rynbergen H. 1982. Nutrition in Health and Disease. JB Lippincott Co. • Srilakshmi B. 2002. Nutrition Science. New Age International. • Swaminathan M.1988. Principles of Nutrition and Dietetics. BAPPCO. 		
Suggested Continuous Evaluation Methods:		
Seminar/Presentation on any topic of the above syllabus <input type="checkbox"/> Test with multiple choice questions /short and long answer questions <input type="checkbox"/> Attendance		

Programme/Class: Masters in Home Science(Foods and Nutrition)	Year: FIFTH	Semester: TENTH
CourseCode:MFN-10-03	Course Title :FOOD PRODUCT DEVELOPMENT AND MARKETING	
Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> • To understand various aspects of the development of a food product • Standardize and generate the process flow chart for a new food product • To acquire knowledge on the importance of Consumer Research, Finance 		
Credits:4	MAJOR	
Max.Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No. of Lectures
I	Product development – need for product development, factors influencing product development, sensory evaluation during product life cycle. Trends in Social Change as a Base for New Product Development. Food product development in India, advantages of new food product development and its new trends.	15
II	Recipe Development - Traditional Foods, Weaning Foods, Convenience Foods, RTE, RTS, Extruded foods, IMF Foods, Specialty Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals, and Designer Foods, Sports Foods, Foods for Defense Services, Space foods. Different food products and its significance.	15
III	Testing, Evaluation, and Packaging of Products- Standardization, Portion size, Quantity Cooking, Shelf-Life of foods, Suitable Packaging Materials for Different Foods, SWOT Analysis, cost calculation and its importance, nutrient calculation.	15
IV	Financial Management and Marketing of Food Products- Changing food trends and consumer behavior in purchasing foods: life style changes- economic, socio-cultural, psychological influences and marketing influences. Financial Accounting Procedures, Book Keeping, Market Research, Marketing Strategies, Cost Calculation, Advertising Methods, Product sales, Product License, Legal specifications, Consumer Behaviour and Food Acceptance	15
Total		60

<p>Suggested Readings:</p> <ul style="list-style-type: none"> • Fuller, Gordon W. <i>New food product development: from concept to marketplace</i>. CRC Press, 2016. • Smith, Jim, and Edward Charter, eds. "Functional food product development."(2011). • Sankaranarayanan, A., N. Amaran, and Dharu Madurai Dhanasekaran, eds. <i>Fermented food products</i>. CRC Press, 2019.
<p>Suggested Continuous Evaluation Methods: Seminar/Presentation on any topic of the above syllabus •Test with multiple choice questions /short and long answer questions •Attendance</p>

Programme/Class: Masters in Home Science(Foods & Nutrition)	Year: Fifth	Semester: Tenth
Course Code: MFN-10-04	Course Title: NUTRITIONAL BIOCHEMISTRY	
<p>Course outcomes: The student at the completion of the course will be able to:</p> <ul style="list-style-type: none"> ➤ Develop uncover vital information about the role of diet. ➤ Develop knowledge about various nutrients, their functions and importance in the body. 		
Credits: 4	Major	
Total No. of lectures-Tutorials-Practical (in hours per week): L-T-P: 4-0-0		
Unit	Topics	No. of Lectures
I	Cell structure and Function- component, fluid mosaic model, cell cycle- mitosis and meiosis. Tissues and their function; Blood- composition and their functions, erythropoiesis, blood groups, homeostasis.	10
II	Carbohydrates: structural features, digestion, absorption, transport and metabolism- glycolysis, citric acid cycle, gluconeogenesis, glyconeogenesis, HMP shunt, glycogenesis, glyogenolysis, electron transport chain, regulation of blood glucose level.	10
III	Proteins and amino acids: structure and chemical properties of amino acids, digestion, absorption, transport and metabolism- transamination, deamination, urea cycle.	10
IV	Lipids: structure and chemical properties of fatty acids, digestion, absorption, transport and metabolism	5
V	Nucleic acids: component, structure, physic-chemical properties, biological importance, purine nucleotide synthesis, salvage pathway, degradation of purines, pyrimidine synthesis, formation of deoxyribonucleotide synthesis.	10
VI	Enzymes and coenzymes- nomenclature, classification, specificity, mechanism of action, enzyme kinetics, factors affecting enzyme activity, enzyme inhibition, role of enzymes and coenzymes in metabolisms, isozymes, enzymes in clinical diagnosis.	5
VII	Hormones: Introduction, classification, synthesis, regulatory functions and mechanism of hormone action.	5
VIII	Detoxication: Definition, xenobiotics, enzyme systems involved, mechanism of detoxification. Bioenergetics: Principles of bioenergetics.	5
	Total	60

<p>Suggested Readings:</p> <ul style="list-style-type: none"> • Nelson, David L. and Michael M. Cox. Principles of Biochemistry. W.H. Freeman & Co. • Biochemistry By Dr. U. Satyanarayana, U Chakrapani (z Lib.org)
<p>Suggested Continuous Evaluation Methods:</p> <p>Seminar/ Presentation on any topic of the above syllabus• Test with multiple choice questions/ short and long answer questions• Attendance</p>

Programme/Class: Masters in Home Science (Foods and Nutrition)	Year: Fifth	Semester: Tenth
CourseCode:MFN-10-05	Course Title :PRACTICAL (FOOD PRODUCT DEVELOPMENT AND MARKETING)	
Course outcomes:		
The Student at the completion of the course will be able to:		
<ul style="list-style-type: none"> • To acquire skills in food product development. • To analyze the process of optimizing food product development • To assess the food product-based analysis for marketing 		
Credits:4	MAJOR	
Max.Marks:	Min .Passing marks:	
Total No. of lectures-Tutorials-Practical(in hours per week):L-T-P:4-0-0		
Unit	Topics	No.of Lectures
I	<p>A. Product Development and Standardization</p> <ul style="list-style-type: none"> • Cereal and Pulse Based Foods • Fruit Juices, Squash and Jams • Pickles, Ketchup, Sauce • Weaning Foods • Convenience foods, RTS, and RTE foods • Healthy Bakery foods 	30
II	<p>Marketing of a Food Product</p> <ul style="list-style-type: none"> • Selection of a Product, Preparation, Standardization, and Cooking • Selection of Packaging Material, Labeling, Cost Calculation, and Marketing • Presentation of Report 	30
	Total	60
Suggested Readings:		
<ul style="list-style-type: none"> • Pomeranz, Yeshajahu, ed. <i>Food analysis: theory and practice</i>. Springer Science & Business Media,2013. • Nollet, Leo ML, and Fidel Toldrá, eds. <i>Food analysis by HPLC</i>. CRC press,2012. • Hart, Frank L., and Harry J. Fisher.<i>Modern food analysis</i>.Springer Science & Business Media, 2012. • Fuller, Gordon W. <i>New food product development: from concept to marketplace</i>. CRC 		

Press, 2016.

- Smith, Jim, and Edward Charter, eds. "Functional food product development."2011.

Suggested Continuous Evaluation Methods:

Seminar/Presentation on any topic of the above syllabus Test with multiple choice questions /short and long answer questions Attendance