B.Sc., FOODSCIENCE AND NUTRITION

# Syllabus

**(With effect from 2020-2021 batches onwards)**

**Program Code: 22N**



**DEPARTMENT OF FOOD SCIENCE AND NUTRITION**

**Bharathiar University**

**(A State University, Accredited with “A“Grade by NAAC and 13th Rank among Indian Universities by MHRD-NIRF) Coimbatore 641 046, INDIA**

**BHARATHIAR UNIVERSITY: COIMBATORE 641046 DEPARTMENT OF FOOD SCIENCE AND NUTRITION**

**MISSION**

Food Science and Nutrition promotion is to advance an integrative approach to foods, nutrition and health by innovative research and progressive education of undergraduate students and to educate the public through creative outreach.

Currently in Food Industry, where Industry 4.0 focusing more on nutrient composition of the products such as calories, percentage of macronutrients, nutraceutical properties etc.

Hence it is essential that Food Science and Nutrition is offered at various levels of education in general and masters in particular.

Job opportunities are wide in the field of nutrition both in public and private sector. Professionals can work at hospitals, fitness centers, food industries, self-employment (small scale industries), entrepreneurship, research and development etc.

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| **Program Educational Objectives (PEOs)** | |
| The **B.Sc., Food Science And Nutrition** program describe accomplishments that graduates  are expected to attain within five to seven years after graduation | |
| PEO1 | Our graduates will have successful Professional carriers in Food Industry,  Hospital Sector, Govt sector and also academicians. |
| PEO2 | Our graduates will be active members ready to serve the society locally and  Nationally |
| PEO3 | Being a dietitians graduates involved in social work helps the people to recognize the importance of food and teach them to take the diet foods to get the nutritive  value of food |
| PEO4 | Our graduates will continue to learn and do researches through the advanced  Technologies |
| PEO5 | Graduates are trained to demonstrate creatively develop innovative ideas and to  work in teams to accomplish a common goal |

# Program Specific Outcomes (PSOs)

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| **Program Specific Outcomes (PSOs)** | |
| After the successful completion of B.Sc., Food Science and Nutrition program, the students  are expected to | |
| PSO1 | Identify and explain nutrients in foods and the specific functions in maintaining  health. |
| PSO2 | Know the chemistry underlying the properties and reactions of various foods Components |
| PSO3 | Use the nutrition care process to make decisions, to identify nutrition related problems and determine and evaluate nutrition interventions. |
| PSO4 | Identify equipment required for basic sewing skills. |
| PSO5 | Explain the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage. |
| PSO6 | Explain the principles and current practise of processing techniques and the effects of processing parameters on productquality. |
| PSO7 | Discuss basic principles of common food preservation methods. |
| PSO8 | Explain the properties and uses of various packaging material. |
| PSO9 | Apply knowledge of biochemistry and physiology to human nutrition  metabolism. |
| PSO10 | Apply the principles of human resource management to different situations. |
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| **Program Outcomes (POs)** | |
| On successful completion of the B. Sc. Food Science and Nutrition program | |
| PO1 | **Academic Excellence:** Develop Professional skills in food, nutrition, textiles,  product making and human development |
| PO2 | **Scientific Knowledge:** Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and  disease process |
| PO3 | **Understand:** Understand and appreciate the role of interdisciplinary sciences in  the development and well being of individuals, families and communities |
| PO4 | **Thinking Skills:** Ability to critically think, analyze, evaluate and create new knowledge and skills both in the chosen discipline and across other fields like  Food Processing and Preservation, Food Packaging, Community nutrition |
| PO5 | **Modern Tool Usage:** Create, Select and apply appropriate techniques resources  and modern technology using industry 4.0 |
| PO6 | **Communicative Skills:** Communicative effectively on Food Science &  Technology activities with society at large and able to write effective reports and documentation and also to participate in public discourse on varied themes. |
| PO7 | **Life Long Learning:** Recognize the need and ability to learn and relearn  knowledge in the context of technological change |
| PO8 | **Civic and Social Responsibility:** Ability to function as a matured democratic  citizen as a dietitian to formulate their own personalized product, As a public educator and also as a freelancer |
| PO9 | **Professional Development:** The programme provides basic understanding of the correlation between food and health and also understanding the role of food under  specific diseased conditions. |
| PO10 | **Quality Research:** Ability to design and carryout independent research, to update  oneself with current research trends and to evaluate research contibution |
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**BHARATHIAR UNIVERSITY: COIMBATORE 641 046**

**B.Sc., FOOD SCIENCE AND NUTRITION Curriculum**

*(For the students admitted during the academic year 2020 – 21 onwards)*

*REVISED SYLLABUS FOR 2020-21 BATCH*

|  |  |  |  |  |  |  |  |
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| **Course code** | **Title of the Course** | **Credit** | **Hours** | | **Maximum Marks** | | |
| **Theory** | **Practical** | **CIA** | **ESE** | **Total Marks** |
| **FIRST SEMESTER** | |  |  |  |  |  |  |
| **I** | Language – I | 4 | 3 | - | 25 | 75 | 100 |
| **II** | English – I | 4 | 3 | - | 25 | 75 | 100 |
| **III** | Core paper – I Food Science | 4 | 3 | - | 25 | 75 | 100 |
|  | Core paper – II Chemistry of Foods | 4 | 3 | - | 25 | 75 | 100 |
|  | Core practical – I Food Science  Practical | 2 | - | 3 | 20 | 30 | 50 |
|  | Allied A: Chemistry I | 3 | 3 | - | 20 | 55 | 75 |
|  | Allied Practical – Chemistry | - | - | - | - | - | - |
| **IV** | Environmental Studies # | 2 | - | - | - | 50 | 50 |
| **Total** | | **23** | **15** | **3** | **140** | **435** | **575** |
| **SECOND SEMESTER** | |  |  |  |  |  |  |
| **I** | Language – II | 4 | 3 | - | 25 | 75 | 100 |
| **II** | English – II | 4 | 3 | - | 25 | 75 | 100 |
| **III** | Core paper – III Human Physiology | 4 | 3 | - | 25 | 75 | 100 |
|  | Core practical – II Human  Physiology Practical | 2 | - | 3 | 20 | 30 | 50 |
|  | Core paper – IV Principles of  Nutrition | 4 | 3 | - | 25 | 75 | 100 |
|  | Allied A: Chemistry II | 3 | 3 | - | 20 | 55 | 75 |
|  | Allied Practical – Chemistry | 2 | - | 3 | 20 | 30 | 50 |
| **IV** | Value Education – Human Rights# | 2 | 3 | - | - | 50 | 50 |
| **Total** | | **25** | **18** | **6** | **160** | **465** | **625** |
| **THIRD SEMESTER** | |  |  |  |  |  |  |
| **I** | Language – III | 4 | 3 | - | 25 | 75 | 100 |
| **II** | English – III | 4 | 3 | - | 25 | 75 | 100 |
| **III** | Core paper – V Nutrition in Health | 4 | 3 | - | 25 | 75 | 100 |
|  | Core practical – III Family Meal  Management | 2 | - | 3 | 20 | 30 | 50 |
|  | Allied B: Bio Chemistry I | 3 | 3 | - | 20 | 55 | 75 |
|  | Allied Practical - Bio Chemistry | - | - | - | - | - | - |
| **IV** | Skill based subject 1- Textile Science  and Basic sewing | 3 | 3 | - | 20 | 55 | 75 |
|  | Tamil @/Advanced Tamil# (OR) Non-major elective -  1(Yoga for Human Excellence)#/Women’s Rights# | 2 | 3 | - |  | 50 | 50 |
| **Total** | | **22** | **18** | **3** | **135** | **415** | **550** |

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| **FOURTH SEMESTER** | | | | | | | |
| **I** | Language – IV | 4 | 3 | - | 25 | 75 | 100 |
| **II** | English – IV | 4 | 3 | - | 25 | 75 | 100 |
| **III** | Core Paper VI – Clinical Nutrition and Dietetics | 4 | 3 | - | 25 | 75 | 100 |
|  | Core Practical – IV Dietetics Practical | 2 | - | 3 | 20 | 30 | 50 |
|  | Allied B: Paper II-Bio-Chemistry –II | 3 | 3 | - | 20 | 55 | 75 |
|  | Allied Practical – Bio-Chemistry | 2 | - | 3 | 20 | 30 | 50 |
| **IV** | Skill based Subject 2 - Interior Design | 3 | 3 | - | 20 | 55 | 75 |
|  | Tamil @/Advanced Tamil#(OR) Non-major elective –II ( General Awareness) | 2 | 3 | - | - | 50 | 50 |
| **Total** | | **24** | **18** | **6** | **155** | **445** | **600** |
| **Semester V** | |  |  |  |  |  |  |
| **III** | Core Paper VII Food Microbiology | 4 | 3 | - | 25 | 75 | 100 |
|  | Core Paper VIII Post Harvest Technology | 4 | 3 | - | 25 | 75 | 100 |
|  | Core Paper IX Community Nutrition | 4 | 3 | - | 25 | 75 | 100 |
|  | Practical V- Nutrition Practical | 2 | - | 3 | 20 | 30 | 50 |
|  | Practical VI - Computerized Database Management In Home Science | 2 | - | 3 | 20 | 30 | 50 |
|  | Elective I | 3 | 3 | - | 20 | 55 | 75 |
|  | Skill based Subject 3- Food Safety And Quality Control | 3 | 3 | - | 20 | 55 | 75 |
| **Total** | | **22** | **15** | **6** | **155** | **395** | **550** |
| **Semester VI** | |  |  |  |  |  |  |
| **III** | Core Paper X – Food Service Management | 4 | 3 | - | 25 | 75 | 100 |
|  | Core Paper XI – Food Preservation and Processing | 4 | 3 | - | 25 | 75 | 100 |
|  | Elective – II | 3 | 3 | - | 20 | 55 | 75 |
|  | Elective – III | 3 | 3 | - | 20 | 55 | 75 |
|  | Practical VII: Food Preservation and Quality Control | 3 | - | 3 | 30 | 45 | 75 |
| **IV** | Skill Based Subject 4- Health, Fitness and sports nutrition | 3 | 3 | - | 20 | 55 | 75 |
|  | Skill Based Subject 5- Dietary Internship report and viva | 2 | - | - | 50 | - | 50\*\* |
| **V** | Extension Activities@ | 2 | - | - | 50 | - | 50 |
|  | Employability Readiness- Naan Mudhalvan Course^ | - | - | - | - | - | - |
|  | **Total** | **24** | **15** | **3** | **240** | **360** | **600** |
|  | **Grand Total** | **140** | **99** | **27** | **985** | **2515** | **3500** |

\*\* One month internship in Dietary Department in the summer vacation after II year of study. For Viva: 10 marks and report: 40 marks.

@ No University Examinations. Only Continuous Internal Assessment (CIA) # No Continuous Internal Assessment (CIA). Only University Examinations.

^Naan Muthalvan – skill course

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| **List of Elective papers (Colleges can choose any one of the paper as electives)** | | |
| Elective-I | **A** | Bakery \* |
|  | **B** | Food Product Development and Entrepreneurship |
| Elective-II | **A** | Quality Food Service and Physical Facilities |
|  | **B** | Human Development |
| Elective-III | **A** | Family Resource Management |
|  | **B** | Food Packaging |

# \*Training in a Bakery for 15 days in semester break of V semester compulsory to earn 3 credits.

**Minimum ten practical exercises per paper per semester**

U**nit VI, included all the papers, will not come under question paper setting**

**SEMESTER I**

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| **Course code** | | **13A** | **TITLE OF THE COURSE** | **L** | | **T** | **P** | | **C** |
| **Core I** | | | **FOOD SCIENCE** | **60**  **hrs** | |  |  | | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020**  **-21** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:   1. Obtain knowledge of different food groups and their nutritive value and role in day’sdiet. 2. Understand the principles underlying FoodPreparation. 3. Develop skill and techniques in Food Preparation with conservation of nutrients and Palatability using cooking methods generallyemployed. | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | To gain knowledge on food groups and its function, food pyramid and understanding cooking methods and evaluate sugar cookery. | | | | | | K2 | | |
| 2 | To gain knowledge on nutritive value, understand the cookery concepts involved  in cereals and pulses. | | | | | | K2 | | |
| 3 | To get clear ideas about nutritional classification and understand the changesin pigments of fruits and vegetables apply knowledge on preparation of beverages. | | | | | | K3 | | |
| 4 | To have an overview of the composition, nutritive value and develop skills in the preparation of milk and egg product and determine the smoking point of any cooking oil | | | | | | K5 | | |
| 5 | To understand the structure, nutritive value, selection and apply knowledge on methods of cooking fleshy foods and evaluate the uses and abuses of spices and condiments. | | | | | | K3 | | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION TO FOODS** | | | **10hours** | | | | |
| **Food group**: Basic 4, 5and7 food groups; functional food groups-energy yielding, body building and protective foods (only sources and not properties and functions), food pyramid.  **Study of various cooking metho**ds - Boiling, steaming, stewing, frying, baking, roasting, broiling, cooking under pressure.  **Sugar Cookery:** Stages of sugar cookery, crystallization and factors affecting crystallization. | | | | | | | | | |
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| **Unit:2** | | **CEREALS AND PULSES** | | | **12 hours** | | | | |
| **Cereals**– Cereals - composition of rice, wheat, effects of cooking on parboiled and raw rice, principles of starch cookery, gelatinization.  **Pulses**-Varieties of pulses and grams, composition, nutritive value, cooking quality of | | | | | | | | | |

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| pulses, germination and its effect. | | | |
| **Unit:3** | | **VEGETABLES, FRUITS AND BEVERAGES** | **12 hours** |
| **Vegetables** - Classification, composition, nutritive value, selection and preparation for cooking, methods and principles involved in cooking.  **Fruits** -Composition, nutritive value, changes during ripening, methods and effects of cooking, enzymatic browning.  **Beverages** - Classification, nutritive value, milk based beverages- methods of preparing tea and coffee, fruit based beverages and preparation of carbonated non – alcoholic beverages. | | | |
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| **Unit:4** | | **MILK AND EGG PRODUCTS, FATS AND OILS** | **12 hours** |
| **Milk** - Composition, nutritive value, kinds of milk, pasteurization and homogenization of milk, changes in milk during heat processing, preparation of cheese and milk powder  **Egg** - Structure, composition, selection, nutritive value, uses of egg in cookery, methods of cooking, foam formation and factors affecting foamformation.  **Fats and Oils** - Types of oils, function of fats and oils, shortening effects of oil, smoking point of oil, effect of heat on oil absorption and factors affecting absorption of oil. | | | |
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| **Unit:5** | | **MEAT AND MEAT PRODUCTS, POULTRY ,SPICES AND CONDIMENTS** | **12 hours** |
| **Meat and meat products** -Structure, composition, nutritive value, selection of meat, post mortem changes in meat, aging, tenderness, methods of cooking meat and their effects.  **Poultry** – Types, composition, nutritive value, selection, methods of cooking Fish - Structure, composition, nutritive value, selection of fish, methods of cooking and effects.  **Spices and Condiments** - Uses and abuses. | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar on milk and dairy products processing with some brief introduction on meat  processing | | | |
|  | | **Total Lecture hours** | **60hours** |
| **Text Book(s)** | | | |
| 1 | Srilakshmi, B., Food Science, (2016), 5th edition, New Age Publishers, India, New  Delhi. | | |
| 2 | Many, S and Shadaksharaswami, M. (2008) Food: Facts and Principles, 3rd  edition, New Age Publishers | | |
| **Reference Books** | | | |
| 1 | Swaminathan, M., (2012) Food science, Chemistry and Experimental foods,  Bangalore Printing and Publishing Company. | | |
| 2 | Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS  Publications and Distributors, Daryaganji, New Delhi. | | |
| 3 | Philip, T., Modern Cookery for teaching and trade, volume I and II, Orient  Longmans Ltd. | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | [www.nal.vsda.gov/fnic/foodcomp](http://www.nal.vsda.gov/fnic/foodcomp) | | |
| 2 | [www.fda.gov-vegetables](http://www.fda.gov-vegetables/) | | |

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| 3 | http://www.eatforhealth.gov.au-fleshfoods,egg&milk |
| 4 | [https://www.bus](http://www.business.qld.gov.av-sensoryanalysis/)iness[.qld.gov.av](http://www.business.qld.gov.av-sensoryanalysis/)-s[ensoryanal](http://www.business.qld.gov.av-sensoryanalysis/)y[sis](http://www.business.qld.gov.av-sensoryanalysis/) of food products |
| 5 | <https://youtu.be/oE8YV2zlO8M> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | M | S | M | M | S | S |
| **CO2** | S | S | M | S | M | S | M | M | M | S |
| **CO3** | S | M | M | M | M | S | M | M | M | S |
| **CO4** | S | M | S | S | M | S | M | M | M | S |
| **CO5** | S | M | S | S | M | S | M | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **13B** | **TITLE OF THE COURSE** | **L** | | **T** | **P** | **C** |
| **Core – II** | | | **CHEMISTRY OF FOODS** | **45** | |  |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020**  **-21** | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:   1. Understand relationship between the structure and functional properties offood 2. Improve the nutritional, safety and organoleptic aspects offood 3. Types of colloids and their nature and properties ofwater | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Understand the physical and chemical properties and reactions in food | | | | | | K2 | |
| 2 | To gain knowledge on colloidal systems in food and properties of sols and gels  and apply knowledge on gel formation | | | | | | K3 | |
| 3 | To have a clear idea on meaning , types and analyze properties of emulsion and foams | | | | | | K4 | |
| 4 | To have an overview on water and its properties | | | | | | K1 | |
| 5 | Apply knowledge on various methods of heat transfer mechanisms used in  cooking. | | | | | | K3 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION TO FOOD COMPONENTS** | | | **9 hours** | | | |
| Food components Food**,** nutrients principle components of foods, functions of foods, classification of foods, properties of foods, physical, chemical, functional and kinetic properties. Enzymatic and non-enzymatic browning reactions in foods, rancidity – types  and prevention. | | | | | | | | |
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| **Unit:2** | | **COLLOIDAL SYSTEM** | | **7 hours** |
| Colloidal system in foods – meaning, types, properties. Sols – meaning, types, properties: gels – meaning, type, properties, theory of gel formation, factors influencing gel  formation. | | | | |
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| **Unit:3** | | **EMULSION AND FOAM** | **10 hours** | |
| .Food Emulsion – meaning, types, properties, emulsifying agents, natural and synthetic  emulsifier, functions of emulsifying agent, Foam: properties – factors influencing foam formation, factors affecting stability of foam. | | | | |
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| **Unit:4** | | **PROPERTIES OF WATER** | **10 hours** | |
| Properties of Water – forms and types of water, water and ice properties, functions of  water in food, intermediate moisture foods, water activity – definition, measurement and control of water activity, estimation of moisture in foods. | | | | |
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| **Unit:5** | | **HEAT TRANSFER IN FOOD** | **7 hours** | |
| Heat transfer operation in foods – conduction, convection, and radiation, principles of  microwave cooking and baking - advantages and disadvantages. | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** | |
| Webinar on Viscosity measurement Fundamentals | | | | |
|  | | **Total Lecture hours** | **45 hours** | |
| **Text Book(s)** | | | | |
| 1 | Srilakshmi, B. (2016) Food Science, 7 th edition, New Age Publisher. | | | |
| 2 | Many, S and Shadaksharaswami, M. (2015) Food: Facts and Principles, 3rd edition, New Age Publishers. | | | |
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| **Reference Books** | | | | |
| 1 | Swaminathan, M. (2012) Food science, Chemistry and Experimental foods Bangalore printing and publishing company. | | | |
| 2 | Potter, N.N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi. | | | |
| 3 | Chandrasekhar,U.(2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi. | | | |
| 4 | Vaclacik, Vickie, Christian, Elizabeth W, Essentials of Food Science (2014) 4th  Edition, Springer Publication. | | | |
| 5 | Chopra H.K, Panesar, P.S, Food Chemistry (2010) Narosa Publishing House, New  Delh. | | | |
|  | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | |
| 1 | [https://www.rsc.org](https://www.rsc.org/) | | | |
| 2 | [www.frontiersin.org](http://www.frontiersin.org/) | | | |
| 3 | [https://theconversation.com](https://theconversation.com/) | | | |
| 4 | <https://youtu.be/yPFpJC_DxJk> | | | |
|  | Course Modified By: Dr. G.Suba | | | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | M | M | M | S | S | M | M | M |
| **CO2** | S | M | M | M | M | S | M | M | M | M |
| **CO3** | S | M | M | M | M | S | M | M | M | S |
| **CO4** | S | M | M | M | M | S | M | M | M | M |
| CO5 | S | M | M | M | M | S | M | M | M | M |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **13P** | **TITLE OF THE COURSE** | **L** | | **T** | **P** | **C** |
| **Core Practical – I** | | | **FOODSCIENCE PRACTICAL** |  | |  | **45** | **2** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:   1. Understand the measuringtechniques 2. Understand the changes duringcookery. 3. Enable ways to prevent nutrient losses duringcookery. | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Apply the scientific principles in food preparation | | | | | | K3 | |
| 2 | Demonstrate the different methods of cooking | | | | | | K4 | |
| 3 | Understand the desirable and undesirable changes taken place during cooking of foods | | | | | | K2 | |
| 4 | Evaluate the basic methods and principles involved in cooking | | | | | | K5 | |
| 5 | Evaluate the change of pigments during cooking | | | | | | K5 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | |
|  | | | | | | | | |
| **Contents:** | |  | | | **45hours** | | | |
| 1. Food group- Grouping of foods, discussion on nutritivevalue 2. Measuring ingredients Methods of measuring different types of foods – grains, flours andliquids 3. Edible portion Determination of edible portionpercentage. 4. Cooking methods Moist heat methods – boiling, simmering,steaming | | | | | | | | |

and pressure cooking. Dry heat methods – baking,

1. Fat as a medium for cooking-shallow and deep fatfrying.
2. Cereals - Methods of cooking fine and coarse cereals. Examination ofstarch.
3. Pulses Cooking of soaked and un soaked pulses. Common preparation withpulses.
4. Vegetables Experimental cookery using vegetables of different colours and textures. Preparation of soups and salads. Common preparation with vegetables.
5. Fruits Prevention of darkening in fruits and vegetables. Fruitsalad.
6. Milk and milk products Experimental cookery – cream of tomato soup, cheese curry and cooking vegetables in milk. Common preparation with milk, cheese andcurd.
7. Fleshy foods Fish, meat and poultry-preparations.
8. Egg Experimental cookery- boiled egg, poached egg. Common preparations with egg.
9. Beverages Preparation of hot beverages- coffee, tea. Preparation of cold beverages- fruit drinks and milkshake.
10. Evaluation Development of scorecard.
11. Developing value added foods (cereal, millet, pulse and vegetable based ) any Four.

# SEMESTER II

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| **Course code** | | **23A** | **TITLE OF THE COURSE** | **L** | **T** | | **P** | **C** |
| **Core – III** | | | **HUMAN PHYSIOLOGY** | **60**  **hrs** |  | |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:   1. Enable students to understand the structure and functions of various systems in ourbody. 2. Enable student to understand the function of different organs and system in thehuman body 3. Obtain a better understanding of the principles of nutrition through the study ofphysiology | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | To review the structure and functions of cell organelles tissue and gain knowledge on blood and its components and understand about sense organs | | | | | | K4 | |

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| 2 | | Understand the structure and functions of digestive system, digestion, absorption  and assimilation of food | | | K2 |
| 3 | | To gain knowledge on circulatory system understands the basic anatomy of respiration and transport of gases. | | | K2 |
| 4 | | Understand about the reproductive organs and menstrual cycle, structure functions of endocrine glands | | | K2 |
| 5 | | Obtain a better understanding of excretory system, physiology of muscular action, and about physiology of central nervous system. | | | K2 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | |
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| **Unit:1** | | | **CELL, TISSUES,BLOOD AND SENSE ORGANS** | **13hours** | |
| Cell - Structure and functions and Tissues - Structure and functions  Blood, RBC,WBC, Platelets and Lymph. Blood coagulation, blood grouping and Rh factor. Sense organs **-** Structure and function of eye, ear and skin. | | | | | |
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| **Unit:2** | | | **DIGESTIVE SYSTEM** | **9hours** | |
| Digestive system - Anatomical consideration – structure and functions, Brief study of the  organization of the digestion, absorption and assimilation of food. | | | | | |
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| **Unit:3** | | | **CIRCULATORY SYSTEM AND RESPIRATORYSYSTEM** | **12hours** | |
| Circulatory system - Heart structure and functions - cardiac cycle. Respiratory system - Basic anatomy of the respiratory system, process of respiration, transport and exchange of  oxygen and carbon di oxide in the body. | | | | | |
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| **Unit:4** | | | **REPRODUCTIVE SYSTEM AND ENDOCRINE GLAND** | **12hours** | |
| Reproductive system - Anatomy of the male and female reproductive organs. Menstrual cycle. Endocrine glands - Structure and function of pituitary, thyroid, islets of langerhans  and adrenal gland. | | | | | |
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| **Unit:5** | | | **EXCRETORY SYSTEM** | **12hours** | |
| Excretory system - Excretory organs - structure of kidney and functions, formation of urine,compositionofurine.Muscles-physiologyofmuscularaction.Centralnervous  system - Physiology of the nerve cell, parts of the central nervous system and function. | | | | | |
| **Unit: 6** | | | **CONTEMPORARY ISSUES** | **2 hours** | |
| **Webinar on Management of Heart Failure** | | | | | |
|  | | | **Total Lecture hours** | **60 hours** | |
| **Text Book(s)** | | | | | |
| 1 | Chatterjee C.C (2016), Human Physiology 11th Edition, Medical Allied Agency, Kolkata. | | | | |
| 2 | Sembulingam, K. (2012) Essentials of Medical Physiology, 6 th Edition, Jaypee  Brothers Medical Publishers (P) Ltd., New Delhi. | | | | |
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| **Reference Books** | | | | | |

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| 1 | Best and Taylor, (2011) 13th Edition The Physiological Basis of Medical Practice, Saunders Company. |
| 2 | Chaudhri, K. (2016) Concise Medical Physiology, 7th Edition, New Central Book Agency (Parentral) Ltd., Calcutta Fox. |
|  | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | microbenotes.com/category/human-physiology |
| 2 | [www.longdom.org/scholarly/human-physiology...](http://www.longdom.org/scholarly/human-physiology) |
| 3 | <https://youtu.be/IYQsinv938g> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | M | M | M | M | S | M |
| **CO3** | S | S | S | M | M | M | M | M | S | M |
| **CO3** | S | S | S | M | M | M | M | M | S | M |
| **CO4** | S | S | S | M | M | M | M | M | S | M |
| **CO5** | S | S | S | M | M | M | M | M | S | M |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **23P** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Core Practical II** | | | **HUMAN PHYSIOLOGY PRACTICAL** |  |  | **30**  **hrs** | **2** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to:  Identify different types of tissue and calculate BMI of individuals and measurements of blood Components. | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Identify the different types of tissues | | | | | K4 | |
| 2 | Determine the bleeding time and clotting time | | | | | K5 | |
| 3 | Identify the blood grouping of the individuals | | | | | K4 | |
| 4 | Measure the hemoglobin level, the blood pressure and calculate the pulse rate. | | | | | K4 | |

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| 5 | Measure the height and weight and calculate the BMI of individuals and to do the physical fitness tests and grade the level of fitness | | | K5 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | |
|  | | | | |
| **Contents:** | |  | **30 hours** | |
| 1. Identification oftissues 2. Bleedingtime 3. Clottingtime 4. Blood groups –identification 5. Measurement ofHemoglobin 6. Measuring PulseRate 7. Measuring BloodPressure 8. Measurement of height, weight and calculation ofBMI | | | | |

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| **Course code** | | **23B** | **TITLE OF THE COURSE** | **L** | **T** | | **P** | **C** |
| **Core – IV** | | | **PRINCIPLES OF NUTRITION** | **60**  **hrs** |  | |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:   1. Function, sources, metabolism and effects of deficiency ofnutrition. 2. Understand the vital link between nutrition andhealth. | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | To know the history of nutrition and gain idea on energy and carbohydrates. | | | | | | K1 | |
| 2 | Understand the role of food and nutrients in health and disease prevention | | | | | | K2 | |
| 3 | Evaluation nutrition information based on scientific reasoning for clinical and community application | | | | | | K5 | |
| 4 | To analyze conceptualize, implement and evaluate the functions, metabolism, requirements and effects of deficiency of nutrients. | | | | | | K4 | |

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| 5 | | To apply knowledge on functions, distribution of water and regulation of water balance and acid base and electrolyte balance. | | | | K3 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | |
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| **Unit:1** | | | **INTRODUCTION TO NUTRITION** | | **12 hours** | |
| Introduction to Nutrition - General introduction, history of Nutrition. Energy **-** Definition of Kilocalories, Joule, energy value of foods, determination, physiological fuel values, SDA of foods, basal metabolic rate- definition, factors influencing BMR. Recommended Dietary Allowances for energy. Carbohydrates **-** Classification, functions,source,  digestion, absorption and utilization, dietary fibre and health. | | | | | | |
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| **Unit:2** | | | **PROTEIN, FATS AND LIPIDS** | | **12 hours** | |
| Protein - Classification, functions, sources and requirements, digestion, absorption and utilization, Protein quality – PER, BV, NPU, digestibility coefficient, -definition and calculation Reference protein, essential amino acids and mutual supplementation of dietary protein .Fats and Lipids - Classification, functions, sources, requirement, importance of  essential fatty acids, their requirements and deficiency. | | | | | | |
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| **Unit:3** | | | **VITAMINS** | **12 hours** | | |
| Vitamins – Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders. Water soluble vitamins –The B-complex vitamins – Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid and Vitamin C - functions, source,  requirements and deficiency disorders. | | | | | | |
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| **Unit:4** | | | **MINERALS** | **12hours** | | |
| Minerals - General functions in the body, classification- macro and micro minerals. Micro minerals – Iron, Fluorine, Zinc, copper, Iodine -functions, absorption, utilization, requirements, deficiency and toxicity. Macro minerals – Calcium and phosphorus -  functions, absorption and utilization of iron requirements, deficiency and toxicity. | | | | | | |
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| **Unit:5** | | | **WATER BALANCE** | **10hours** | | |
| Water Balance – Functions of water, water distribution, maintenance of water and  regulation of acid-base balance in the body. Electrolyte balance. | | | | | | |
| **Unit: 6** | | | **CONTEMPORARY ISSUES** | **2 hours** | | |
| Vitamin D Nutrition Biochemistry | | | | | | |
|  | | | **Total Lecture hours** | **60 hours** | | |
| **Text Book(s)** | | | | | | |
| 1 | Srilakshmi, B. (2017) Nutrition Science, New Age International (P) Ltd., New Delhi. | | | | | |
| 2 | Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam (2015) Text Book of  Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., NewDelhi. | | | | | |
| 3 | Swaminathan, M. (2012) Advanced Textbook on Food and Nutrition, Vol. 1,  Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore. | | | | | |
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| **Reference Books** | |
| 1 | Dietary Guidelines for Indians, ICMR (2013) National Institute of Nutrition,  Hyderabad. |
| 2 | Gordon M. Wardlaw, Paul M.Insel. (2015) Perspectives in nutrition, 3rd Edition,  MosbyyearBook,Inc.St.Louis,Missouri. |
| 3 | Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th  Edition, W.B. Saunders Company, Philadelphia, London. |
|  | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | study.com/…/basic-principles-of-nutrition.html |
| 2 | ocw.jhsph.edu/index.cfm/go/viewCourse/course/.. |
| 3 | [www.britannica.com/science/human-nutrition](http://www.britannica.com/science/human-nutrition) |
| 4 | <https://youtu.be/ljbBjlw0Xis> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | M | M | M | S | M | S | S | M |
| **CO3** | S | S | S | S | M | S | S | S | S | M |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO4** | S | S | S | S | M | S | S | S | S | S |
| **CO5** | S | S | S | S | M | S | S | S | S | S |
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\*S-Strong; M-Medium; L-Low

# SEMESTER III

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| **Course code** | | **33A** | **TITLE OF THE COURSE** | **L** | **T** | | **P** | **C** |
| **Core – V** | | | **NUTRITION IN HEALTH** | **75**  **hrs** |  | |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:   1. Gain knowledge on the nutritional needs of individuals at different agelevel. 2. Gain expertise in planning and preparing normaldiets. 3. Understand the required dietary allowances of anindividual. | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Understand the dietary guidelines in meal planning and acquainted with meal planning for all age groups. | | | | | | K2 | |
| 2 | Evaluate the nutrition demands in various stages of life cycle. | | | | | | K5 | |

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| 3 | Analyze and explain the physiological changes taking place in pregnancy, lactation and old age. | | | | K4 |
| 4 | Discuss the impact of socioeconomic, cultural and physiological factors on food habits of school going children. | | | | K1 |
| 5 | Identify socioeconomic and cultural barriers to meat nutrient needs of adolescence and adults. | | | | K4 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | |
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| **Unit:1** | | **MEAL PLANNING** | **12hours** | | |
| Basic Principles of Meal Planning –Basic Principles and factors to be consider while planning menu for different age groups Recommended allowance-RDA for Indians, basis for requirement, energy allowance for different growth pattern of children, energy  allowance for various activities. | | | | | |
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| **Unit:2** | | **PREGNANCY AND LACTATION** | | **16 hours** | |
| Nutritional needs during Pregnancy – Stages of pregnancy Normal growth and weight change, complications, Nutritional requirements, and meal planning Nutrition during Lactation - physiology of lactation, hormonal control and relaxation, nutritional componentsofcolostrumandmaturemilk.Nutritionalrequirementsoflactatingwomen.  Meal planning. | | | | | |
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| **Unit:3** | | **INFANCY, PRESCHOOL AND SCHOOL GOING CHILDREN** | | **15hours** | |
| Nutrition during Infancy - Growth and development- advantages of breast feeding, factors to be considered in bottle feeding. Weaning foods. Growth chart, Problems of feeding in normal and premature infants. Nutritional needs of toddlers (1-5 year) and School going  children - Nutritional requirements of toddlers. | | | | | |
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| **Unit:4** | | **NUTRITION DURING ADOLESCENT** | | **15 hours** | |
| Factors to be considered while planning meals for going children. Eating problems of children and their management, packed lunch. Nutrition during Adolescence - Physical Growth- changes, Nutritional requirements and problems in adolescence- anemia, obesity,  anorexia nervosa and bulimia nervosa. | | | | | |
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| **Unit:5** | | **NUTRITIONAL NEEDS OF ADULT AND OLD AGE** | | **15 hours** | |
| Nutritional needs of adults (men and women) – In relation to occupation, Nutrition in Menopausal women, hormonal changes, Low cost balanced food. Nutrition during OldAge  -Physiologicalchangesinageing-psycho-socialandeconomicfactorsaffectingeating  behaviour. Nutritional problems of aged and their management. | | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | | **2 hours** | |
| Webinar on Covid-19 and world Breastfeeding week, Health of pregnant women & Children  Webinar on WHO Theme Support Breast feeding for healthier Planet on 0408 | | | | | |
|  | | **Total Lecture hours** | | **75 hours** | |
| **Text Book(s)** | | | | | |

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| --- | --- |
| 1 | Manay,S. and Shadaksharaswamy. M (2017) Foods, Facts and Principles, New Age,  2nd Edition, International Pvt Ltd Publishers. |
| 2 | Srilakshmi,B. (2016) Dietetics, New Age International Pvt. Ltd. |
| 3 | Swaminathan, M. (2015) Food Science, Chemistry and Experimental Foods, Bangalore Publishers, Bangalore. |
|  | |
| **Reference Books** | |
| 1 | Vinodhini Reddy, Prahlad Rao, Govmth Sastry and Kashinath (1993) Nutrition Trends in India, NIN, Hyderabad. |
| 2 | Shills, E.M. Olson, A.J. and Shike, Lea and Febiger (2001) Modern Nutrition in  Health and Diseases, 9th Edition, |
| 3 | Chandrasekhar, U. (2002) Food Science and applications in Indian Cookery Phoenix  Publishing House, New Delhi |
| 4 | Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th  Edition, W.B. Saunders Company, Philadelphia, London. |
| 5 | Davidson S Passmore R, Brock JP (1999) Human Nutrition and Dietetics-, 10th  Edition, ELBS and Churchill, Livingstone. |
|  | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | [www.four-h.purdue.edu/foods/Nutrition](http://www.four-h.purdue.edu/foods/Nutrition) through the... |
| 2 | <https://main.icmr.nic.in/guidelines> |
| 3 | https:/[/www.nutrtion.org.uk](http://www.nutrtion.org.uk-/)- pregnancy |
| 4 | https:/[/www.who.int](http://www.who.int-/)- infants nutrition |
| 5 | <https://youtu.be/ZF4aNuttc3g> |
| 6 | [https://youtu.be?S0\_ZipHXW1A](https://youtu.be/?S0_ZipHXW1A) |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO4** | S | S | S | S | M | S | S | S | S | S |
| **CO5** | S | S | S | S | M | S | S | S | S | S |

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| **Course code** | | **33P** | **TITLE OF THE COURSE** | **L** | | **T** | **P** | | **C** |
| **Core Practical- III** | | | **FAMILY MEAL MANAGEMENT** |  | |  | **45**  **hrs** | | **2** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  Menu planning, preparation and nutrient calculation during different stages of life | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Prepare and serve the planned menu | | | | | | | K3 | |
| 2 | Explain the need for including each food group in the menu | | | | | | | K3 | |
| 3 | Determine the nutrient content of the menu per meal and per portion | | | | | | | K5 | |
| 4 | Analyze the menu planning for infants, preschool children, school going children and adolescent | | | | | | | K4 | |
| 5 | Express on the planning and preparing of low, medium, and high cost food items for sedentary, Moderate and heavy worker adults. Plan and justify the planned menu for elderly. | | | | | | | K3 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Contents:** | |  | | | **45 hours** | | | | |
| 1. Foodgroups 2. Planning a menu for a pregnant mother and display prepareditems 3. Planning a menu for a lactating mother and display prepared itemsand calculate nutritive value for the prepared menu. 4. Preparation of low cost supplementary and weaningfoods 5. Planning and preparing diet for infants and preschoolchildren 6. Planning and preparing diet for school going children and adolescent girls andboys 7. Planning and preparing diet for low, medium, high income groups and basedon sedentary, moderate and heavy workers – Adult (Men andWomen). 8. Planning and preparing diet for oldage. | | | | | | | | | |

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| **Course code** | | **3ZA** | **TITLE OF THE COURSE** | **L** | | **T** | | **P** | **C** |
| **SBS-I** | | | **TEXTILE SCIENCE AND BASIC SEWING** | **45**  **hrs** | |  | |  | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:   1. Gain knowledge on fibres and itsproperties 2. Enable skills in sewingtechniques | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Acquire knowledge about fundamentals of fibre. | | | | | | | K1 | |
| 2 | Understand the basics of fabrication. | | | | | | | K2 | |
| 3 | Apply knowledge on dyeing and printing techniques. | | | | | | | K3 | |
| 4 | Gain knowledge about the basics of sewing techniques. | | | | | | | K2 | |
| 5 | Understand the garment construction process. | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **FIBRE** | | | **9hours** | | | | |
| Fibre – Fibre classification – Natural fibres – vegetable fibres – cotton and jute, animal  fibres- wool and silk, mineral fibres-Asbestores. | | | | | | | | | |
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| **Unit:2** | | **FABRICATION** | | **9 hours** | | | | | |
| Fabrication methods – Woven fabrics- Parts and functions of loom, basic weaves – plain, jwill and satin weaves, knitted fabrics- definition and types –wrap knits and neft knits. | | | | | | | | | |
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| **Unit:3** | | **DYING AND PRINTING** | | **9 hours** | | | | | |
| .Dyeing and printing – dyeing – meaning and classification- direct dyes, reactive dyes, vat dyes, sulphur dyes and natural dyes. Printing - meaning, methods - block printing, roller  printing, stencil printing and screen printing. | | | | | | | | | |
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| **Unit:4** | | **BASICS OF SEWING** | | **8 hours** | | | | | |
| Basics of sewing – sewing machine, parts and functions. Basic stitches - functional and  decorativestitches. | | | | | | | | | |
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| **Unit:5** | | **SEAMS** | | **8 hours** | | | | | |

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| Seams – types, plain, flat feel, slot, welt, piped and flapped. Fullness- pleats and gathers. | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** | |
| Webinar on Impact of Covid-19 on the Indian and International Home Textile Markets | | | | |
|  | | **Total Lecture hours** | | **45hours** |
| **Text Book(s)** | | | | |
| 1 | Deepali Rastogi and Sheetal Chopra (2017) Textils Science, Direct Black swan  private lte, Hydrabad. | | | |
| 2 | CorbmanB.P and Potter.M.D. (1983) Textiles fiber to fabric, , International Edition,  McGraw-hill book Co, New York. | | | |
| 3 | Chakarborty, J.N. (2010) Fundamentals and practices in colouration of Textiles,  Wood head publishing India, pvt. Ltd. New Delhi. | | | |
|  | | | | |
| **Reference Books** | | | | |
| 1 | E.P.G. Gohl and L.D. vilensky, Textile Science, 1983, 2nd Ed., Publishers, New Delhi. | | | |
| 2 | Spencer, D.J. (2005) Knitting Technology, : A comprehensive text book and  practical guide, 4th Edition, Wood head, Cambridge. | | | |
| 3 | W.D. Klein , A Practical Guide to Ring Spinning Textile Institute, Manchester. | | | |
| 4 | Mark and Robinson, Principles of weaving, Textile institute Manchester | | | |
| 5 | N.N. Banner.J.I, Mechanism of Weaving, Vol – I and II, Textile Institute | | | |
| 6 | Joseph J Pretal, Fabric Science, 1990, 5thedition , Fairchild Publications Newyork. | | | |
| 7 | Practical Clothing Construction – Part I and II, Mary Mathews, Cosmic Press, Chennai  (1986) | | | |
| 8 | Sewing and Knitting – A Readers Digest, step- by – step guide, Readers Digest Pvt  Ltd, Australia. | | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | |
| 1 | [https://www.hindawi.com](https://www.hindawi.com/) | | | |
| 2 | Natural dyes- nptelhrd | | | |
| 3 | Introduction to textile materials and different types of seams- Vidya-mitra | | | |
| 4 | https://youtu.be/w2W6XYYPFao | | | |
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| Course Designed By: Dr.G.Suba | | | | |

**APPAREL DESIGNING AND TEXTILE SCIENCE PRACTICAL( No practical exam)**

* 1. Types of embroidery and surfaceornamentation
     + Hand embroidery
     + Machineembroidery
     + Applique ( machine / hand)
     + BeadWork
     + Mirror work –Shapes (Round, square,diamond)
     + Fixing thestones.
  2. Planning and preparation of colourcharts
  3. Different types ofdying
  4. Different types offullness
  5. Identification offibres
  6. Flowerarrangement

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | M | M | M | M | M | M | M | M |
| **CO3** | S | S | M | M | M | M | M | M | M | M |
| **CO3** | S | S | S | S | S | M | S | M | M | S |
| **CO4** | S | S | M | M | M | M | M | M | M | M |
| CO5 | S | S | M | S | M | M | M | M | M | M |
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\*S-Strong; M-Medium; L-Low

# SEMESTER - IV

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| **Course code** | | **43A** | **TITLE OF THE COURSE** | **L** | | **T** | | **P** | **C** |
| **Core –VI** | | | **CLINICAL NUTRITION AND DIETETICS** | **60**  **hrs** | |  | |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:   1. Obtain knowledge on role of diet in diseaseconditions. 2. Gain experience in planning, preparing and serving therapeuticdiet. | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Gain knowledge about principles of diets therapy and different therapeutic diets. | | | | | | | K2 | |
| 2 | Develop aptitude for taking up dietetics as a profession. | | | | | | | K3 | |
| 3 | Understand the pathology of diseases and apply nutritional principles to discuss dietary management. | | | | | | | K3 | |
| 4 | Gain knowledge on the ethiological factor and treatment and dietary modification of obesity, underweight, disease of liver and gall bladder. | | | | | | | K2 | |
| 5 | Learn about the causes, types, biochemical changes, glycemic index of diabetes and disease of kidney. | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **OBJECTIVES OF DIET THERAPY** | | | **10 hours** | | | | |
| Objectives of diet therapy - Role of a dietician. Principles of diet preparation and counseling. Normal diet in the hospitals –, liquid ,semi liquid, light , soft diet, bland diet and regular diet Different types of Feeding - Basic concepts of oral feeding, tube feeding,  IV feeding, gastrostomy feeding. | | | | | | | | | |
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| **Unit:2** | | **THERAPEUTIC DIETS** | | | **11hours** | | | | |
| Therapeutic diets for the following disorders- Under weight - definition, etiology, treatment Obesity - definition, etiology, treatment. Diseases of the gastro intestinal tract- ulcer,  constipation and diarrhoea. Diverticular Diseases, Crohn’s Disease and Ulcerative Colitis | | | | | | | | | |
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| **Unit:3** | | **DISEASE OF LIVER.GALL BLADDER AND HEART** | | **12hours** | | | | | |
| Diseases of the liver and gall bladder (risk factors and diet therapy) jaundice, hepatitis, cirrhosis,fattyliverandDietTherapyDiseasesofthecardiovascularsystem(riskfactors  and diet therapy), atherosclerosis, arteriosclerosis, hypertension and congestive heart | | | | | | | | | |

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| failure. | | | | | |
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| **Unit:4** | | | **DIABETES MELLITUS** | **12hours** | |
| Diabetes mellitus – Types, causes, symptoms, bio-chemical changes, insulin, hypo- glycemicdrugs, types only, food exchange list, dietary management Diseases of the kidney and urinary tract - Acute and chronic nephritis, Nephrotic syndrome, Renal failure, Urinary  calculi Causes and dietary treatment of kidney diseases and dialysis. | | | | | |
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| **Unit:5** | | **DIET IN ALLERGY, FEBRILE CODITIONS, STRESS & CANCER AND AIDS** | | | **13 hours** |
| Diet in Allergy - Definition, classification, common food allergy, test of allergy, diet therapy. Diet in febrile conditions - Short duration -Typhoid, Long duration- Tuberculosis. Metabolic stress and cancer - Metabolic and clinical aberrations, diagnosis, complications, treatment, MNT and dietary counselling in Metabolic Stress -Surgery, Burns, Sepsis and Trauma Critical care, Cancer- General and Specific cancers, Effect of Cancer therapy on  MNT, Diet in AIDS. | | | | | |
| **Unit: 6** | | | **CONTEMPORARY ISSUES** | | **2 hours** |
| Nutritional Management Of Pediatric Crohn’s Disease | | | | | |
|  | | | **Total Lecture hours** | **60 hours** | |
| **Text Book(s)** | | | | | |
| 1 | Srilakshmi, B (2002) Dietetics, IVth Edition. New Age International (P) Limited,  Publishers, New Delhi | | | | |
| 2 | Joshi, S.J. (2002) Nutrition and dietetics, Tata Mc Graw- Hill publishing company  limited, New Delhi. | | | | |
| 3 | Srilakshmi (2017) Nutrition science, New age international (P) limited, New Delhi. | | | | |
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| **Reference Books** | | | | | |
| 1 | Krause, M.V. and Hunesher, M.A. (2013) Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders Company, Philadelphia, London. | | | | |
| 2 | Davidson S Passmore R, Brock JP (1999) Human Nutrition and Dietetics-, 10th  Edition, ELBS and Churchill, Livingstone. | | | | |
| 3 | ICMR (2010) Nutrient Requirements and recommended dietary allowances for  Indians. | | | | |
| 4 | Antia FP (1987) Clinical Dietetics and Nutriton, Oxford University Press, New Delhi | | | | |
| 5 | Sue rod Williams, Nutrition and diet Therapy, Times Mirror Mosby College publishing,Boston, 1989. | | | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | | |
| 1 | <https://www.rdehospital.nhs.uk/docs/trust/foi/foi_responses/2015/december/Enteral_feed> ing\_guideline~version\_Jan\_201411.pdf | | | | |
| 2 | <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5038894/> | | | | |
| 3 | <https://www.kidney.org/sites/default/files/11-50-0114_docsnutrikidfail_stage1-4.pdf> | | | | |

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| 4 | <http://youtu.be/GBKu3_8Rkcw> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO4** | S | S | S | S | M | S | S | S | S | S |
| **CO5** | S | S | S | S | M | S | S | S | S | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **43P** | **TITLE OF THE COURSE** | **L** | **T** | **P** | | **C** |
| **Core Practical: IV** | | | **DIETETICS PRACTICAL** |  |  | **45hrs** | | **2** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Apply principles of diet therapy in planning, preparation and nutrient calculation of hospital diets,  therapeutic diets for various diseases like disease of liver and gall bladder, cardiovascular system, kidney and diabetes mellitus. | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Plan, prepare and serve different therapeutic diets. | | | | | K3 | | |
| 2 | Assess the nutritive value of the diets. | | | | | K5 | | |
| 3 | Discuss on the foods to be included and avoided in various disease conditions with reason | | | | | K4 | | |
| 4 | Select specific foods for the management for obesity and underweight | | | | | K4 | | |
| 5 | Identify the relationship between diet and cardiovascular disease | | | | | K2 | | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | |
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| **Contents** |  | **--hours** |
| 1. Weights and measures offoods. 2. Menu planning, prescription and preparationof 3. Normal diet, regular diet, light diet, soft diet, full liquid diet, clear liquiddiet and blanddiet. 4. Diet forobesity 5. Diet forunderweight 6. Diet foranaemia 7. Diet for diseases of the GI tract – peptic ulcer, diarrhoea,constipation. 8. Diet for Cardio-vascular diseases- atherosclerosis,hypertension. 9. Diet for diseases of the kidney – nephritic and nephrotic syndrome.Diet before and afterdialysis. 10. Diet for diabetes – Type I and II, Diabetes with CVDdisease. 11. Diet in febrile conditions- Short duration – typhoid; long duration –tuberculosis 12. Diet in liver diseases – Viral hepatitis andcirrhosis 13. Observation of a dietary department in ahospital. 14. Preparation of power point presentations on diet anddisease | | |

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| **Course code** | | **4ZB** | **TITLE OF THE COURSE** | **L** | **T** | **P** | | **C** |
| **SBS: II** | | | **INTERIOR DESIGN** | **45hrs** |  |  | | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Gain understanding of the basic art principles.  Develop ability to apply the above knowledge to create interesting and beautiful Interiors for varied purposes. | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Develop skills in using the elements and principles of art and design. | | | | | K3 | | |
| 2 | Apply the theoretical knowledge in colour and light to practical situation in  interior design. | | | | | K3 | | |
| 3 | Gain knowledge in selection, use and care of furniture, furnishing material and accessories. | | | | | K2 | | |
| 4 | Identify and evaluate the technical aspects of interior design. | | | | | K5 | | |

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| 5 | | Demonstrate basic flower arrangement techniques and styles. | | | | K3 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | |
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| **Unit:1** | | | **Introduction to Interior Design** | | **8hours** | |
| Concept of Interior Design-Meaning of Interior Design and Interior Decoration.  Design – Definition, Meaning, Purpose. Types- structural and decorative design, elements and principles of design. | | | | | | |
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| **Unit:2** | | | **Colour** | | **8hours** | |
| Concept of colour. Dimensions of colour – Hue, value and intensity, Colour system- prang and Munsell colour system, Colour harmonies – related and contrasting colourhormonies, Application of elements and principles of colour n interiors. | | | | | | |
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| **Unit:3** | | | **Lighting** | **9 hours** | | |
| Importance of lighting. Sources, Types, Glare- its types, causes and prevention. Accessories-Meaning, Types-functional, decorative, both functional and decorative.  Lighting accessories- fixtures, Lighting for areas and specific activities. Picture mounting, wall hangings | | | | | | |
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| **Unit:4** | | | **Furniture** | **9hours** | | |
| Styles of furniture – traditional, contemporary and modern design.  Furniture for different purpose, furniture materials, Selection and arrangement – Furniture for various rooms – Living, dining, bedroom, kitchen, study room, office. Furniture Dimensions, Care and maintenance. | | | | | | |
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| **Unit:5** | | | **Use of Furniture and Flower Arrangement** | **9 hours** | | |
| Selection, Use and Care of furnishing materials. draperies, curtains,draperies, carpetsrugs. Use of flowers and containers for flower arrangement- importance, basic materials needed,  basic shapes, types and styles in flower arrangement - Japanese arrangements – IKEBANA | | | | | | |
| **Unit: 6** | | | **CONTEMPORARY ISSUES** | **2 hours** | | |
| Webinar on Interior Space and Furniture design | | | | | | |
|  | | | **Total Lecture hours** | **45 hours** | | |
| **Text Book(s)** | | | | | | |
| 1 | Chaudhri. S.N. (2005) Interior Design, Aavishkar publication, Jaipur, India. | | | | | |
| 2 | Mullik, P. (2007) A text Book of Home Science, Kalyani Publications, New Delhi. | | | | | |
| **Reference Books** | | | | | | |
| 1 | The making of interiors – An introduction- Allen Tate- Harper and Row Publishers, New York, 1987. | | | | | |
| 2 | Interior Design and Decoration, Fourth Edition, Sherrill Whiton- Prentice Hall, 1974. | | | | | |
| 3 | Interior lighting for Designers, Third edition – Gary Gordon andJamco L. Nuckolls – John Wiley and Sons, New York, 1995. | | | | | |
| 4 | The Encyclopaedia of Decorative Styles – William Hardy and Steve Adams – New Burlington books, London, 1988. | | | | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | | | |
| 1 | KEVINRIGDONElementsandPrincipalsof Design.pdf | | | | | |

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| 2 | https:/[/www.researchgate.ne](http://www.researchgate.net/publication/290591878)t[/publication/290591878](http://www.researchgate.net/publication/290591878) - Factors influential in  Consumers’ Furniture selection and their Preferences regarding Product Features |
| 3 | https:/[/www.resea](http://www.researchgate.net/publication/320800578)r[chgate.net/publication/320800578](http://www.researchgate.net/publication/320800578) \_Interior\_Finishing\_Materials |
| 4 | https:/[/www.researchgate.ne](http://www.researchgate.net/publication/315835473)t[/publication/315835473](http://www.researchgate.net/publication/315835473) \_Interior\_Decoration |
| 5 | <http://anj.co.in/idea-at-anj/>importance-of-lighting |
| 6 | <https://youtu.be/yrhbTDoi1KY> |
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| Course Designed By: Dr.G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | M | M | S | S | M | S | M | M | M |
| **CO3** | M | M | S | S | S | M | S | M | M | S |
| **CO3** | M | M | M | S | S | M | S | M | M | M |
| **CO4** | M | M | S | S | S | M | S | M | M | S |
| **CO5** | M | M | M | S | M | S | S | M | M | M |
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\*S-Strong; M-Medium; L-Low

# SEMESTER-V

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| **Course code** | | **53A** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Core Paper: VII** | | | **FOOD MICROBIOLOGY** | **90 hrs** |  |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to:   1. Provide knowledge of microorganisms associated with food spoilage and food bornediseases 2. Determine the presence, growth and survival of microorganism infood | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Understand different terminology related to microorganism | | | | | K2 | |
| 2 | Understand the different factors responsible for the microbial growth | | | | | K2 | |
| 3 | Analyze and describe the characteristics of important pathogens and spoilage in food | | | | | K4 | |
| 4 | Acquire, discover and understand the theories and principles of food microbiology | | | | | K2 | |
| 5 | Apply the importance of personal hygiene for food and food service personnel | | | | | K3 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | |
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| **Unit:1** | | **Different Terminology, Food Spoilage & Prevention** | | **15hours** |
| Different terminology – Heterotrophic nutrition, autotrophic nutrition, saprophytic, holozoic, host, culture, parasite. General principles underlying spoilage-causes for spoilage,factorsaffectingkindsandnumberofmicroorganismsinfood.Preventionand  control of spoilage. Food poisoning, and food borne diseases. | | | | |
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| **Unit:2** | | **Morphology of Bacteria, Mold, Yeast and Algae** | | **19 hours** |
| Bacteria and Mold- Nomenclature, genera of bacteria and mold, morphology, growth curve, importance in food microbiology. Observation of motility of bacteria in milk, demonstrationofmoldgrowthinbread.Yeast-Morphology,classification,importanceof  yeast in food. Observation of yeast cells. Algae – Morphology and importance of algae. | | | | |
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| **Unit:3** | | **Contamination of Cereals , Fruits and Vegetables and Fleshy Foods** | **18 hours** | |
| Contamination and kinds of micro organisms causing spoilage of cereal products grains, flour, baked products and cake. Fruits and vegetables and their products- fruit uice,pickles.  Fleshy foods - meats, poultry and fish. | | | | |
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| **Unit:4** | | **Contamination of Egg, Milk & Milk Product, Beverages, Fats and Oils** | **17hours** | |
| Contamination and kinds of micro organisms causing spoilage of eggs, milk and milk products- cream, milk frozen desserts and butter. Fats and oils, bottled beverages, spices  and condiments. | | | | |
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| **Unit:5** | | **Microorganisms in Water** | **19 hours** | |
| Micro-organisms in Water - sources, bacteriological examinations, total count, test of E.Coli, purification of water, water borne diseases. Micro organisms in sewage and sewage disposal Destruction of bacteria- sterilization, physical agents, light, desiccators, electricity, heat and chemical agents. Importance of sanitation and hygiene in relation with spreading  of microorganisms. | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** | |
| Webinar on Microbiology testing for food products and their permissible limits | | | | |
|  | | **Total Lecture hours** | **90hours** | |
| **Text Book(s)** | | | | |
| 1 | Frazier, W.C. (2014) Food Microbiology, Tata McGraw Hills Publishing Company  Limited, Chennai. | | | |
| 2 | Adams, MR and Moss, MO (2015) Food Microbiology, New Age International (P)  Ltd., New Delhi. | | | |
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| **Reference Books** | | | | |
| 1 | Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and  Distributors, New Delhi. | | | |
| 2 | Sullia SB and S Shantharam- (1998) “General Microbiology” Oxford and IBH  Publishing Ltd. | | | |

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| 3 | Ramesh, K.V (2012) Food Microbiology, MJP Publishers, Chennai. |
| 4 | Tamine, A (2015) Probiotic Dairy Products, Blackwell Publishing, USA |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | <https://swayam.gov.in/nd1_noc19_ago7> |
| 2 | [http://nptel.iitm.ac.in](http://nptel.iitm.ac.in/) |
| 3 | <https://youtu.be/x8rkY-7B-8c> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | S | S | S | M | S | S | M | M | S |
| **CO3** | M | M | S | S | M | M | S | M | M | S |
| **CO3** | M | M | M | S | M | M | S | M | M | S |
| **CO4** | M | M | S | S | M | S | S | M | M | S |
| **CO5** | M | S | S | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **53B** | **TITLE OF THE COURSE** | **L** | **T** | | **P** | **C** |
| **Core Paper: VIII** | | | **POSTHARVEST TECHNOLOGY** | **75hrs** |  | |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Gain knowledge about postharvest technology which enables storage of food grains and explain the causes of postharvest food losses and the preventive measures | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Understand the safety control measures in handling foods from harvest to consumption and agencies of control. | | | | | | K2 | |
| 2 | Understand the types of food losses and the agents causing food loss. | | | | | | K2 | |
| 3 | Gain knowledge about food processing methods. | | | | | | K1 | |
| 4 | Apply physical and chemical methods to control spoilage agents. | | | | | | K3 | |
| 5 | Analyze the importance of storage of grains. | | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | |
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| **Unit:1** | | | **INTRODUCTION TO POST HARVEST TECHNOLOGY** | **16hours** | |
| Introduction to Post Harvest Technology - Definition, importance and problem encountered. Buffer stock – definition, quantity of stores available. Governmental measures to augment food production- need for food conservation. Food loss in the post harvest period, extent of losses, loss in the field, threshing yard, storage,marketing loss.  Role of Post Harvest Technology in combating malnutrition in India. | | | | | |
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| **Unit:2** | | | **AGENTS CAUSING FOOD LOSSES** | **16hours** | |
| Agents Causing Food Losses - Physical agents, (moisture, temperature), Chemical losses, biological losses- insects- insects attacking food grains - types and life cycle, damage caused to food grains and detection of insect infestation, rats and rodents, birds, animals-  Nature of damage, identification. | | | | | |
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| **Unit:3** | | | **CONTROL OF SPOILAGE AGENTS** | | **16hours** |
| .  Control of Spoilage Agents - Importance and methods of sanitary handling, physical, chemical, biological and other means of control of insects, rats and rodents and birds. Insect control methods- Physical methods and chemical methods including fumigation techniques. Handling and Transport of Food Commodities - Traditional andimproved  methods. Nutrient losses in spoiled grains and National program to save grains. | | | | | |
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| **Unit:4** | | **STORAGES OF GRAINS AND AGENCIES CONTROLLING FOOD LOSSES** | | | **14 hours** |
| Storage of Grains - Importance of storage structures- requirements, traditional and modern and underground and above ground storage and their improvements, FCI godowns. PDS. Agencies Controlling Food Losses **-** Role of SGC, FCI, CWC, SWC, IGSI in controlling  food losses. | | | | | |
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| **Unit:5** | | | **FOOD PROCESSING** | | **11 hours** |
| Food Processing of Selected Food Items – wheat, rice, breakfast cereals, pulses and oilseeds. | | | | | |
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| **Unit: 6** | | | **CONTEMPORARY ISSUES** | | **2 hours** |
| Webinar on Post harvest food loss and waste monitoring protocol | | | | | |
|  | | | **Total Lecture hours** | | **75hours** |
| **Related Experiences:**   1. Visit toFCI 2. Visit to Processing Mill (Cereal andPulse) | | | | |  |
| **Text Book(s)** | | | | | |
| 1 | Chakravarthi, A., Mujumdar, A.S., Raghavan, G.S.V and ramasami, H. S. (2003)  Handbook of Post Harvest Technology, Marcel Dekker Inc., New York. | | | | |

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| 2 | Handling and storage of food grains in tropical and subtropical areas- D W Hall,  FAD, Rome, 1970. |
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| **Reference Books** | |
| 1 | Handling and storage of food grains- S V Pingale ICAR, New Delhi, 1976. |
| 2 | Food Technology, Prescott and Proctor.B.B.Mc Graw Hill Book Co., New York, 1937. |
| 3 | Gordon G Birth, Food science, Pub in New York. 6. Robins M Philip Convenience  food- Recent Technology 1976. |
| 4 | Technology of cereals by NL Kent and JAD Evers. |
| 5 | Food protection technology by Charles W., Felix Havis Pub.1987. |
| 6 | John A Troller, 1983, Sanitation in food processing, Academic press. |
|  | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | [https://biologyreader.com](https://biologyreader.com/) |
| 2 | [www.fao.org](http://www.fao.org/) |
| 3 | [http://agritech.tnau.ac.in-agriculturalproducts](http://agritech.tnau.ac.in-agriculturalproducts/) |
| 4 | <https://youtu.be/3GsSx9LCIZ4> |
| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | S | S | S | M | S | S | M | M | S |
| **CO3** | M | M | S | S | M | S | S | M | M | S |
| **CO3** | S | M | S | S | M | S | S | M | M | S |
| **CO4** | M | M | S | S | M | S | S | M | M | S |
| **CO5** | S | M | S | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | **53C** | **TITLE OF THE COURSE** | **L** | **T** | | **P** | **C** |
| **Core Paper: IX** | | **COMMUNITY NUTRITION** | **75hrs** |  | |  | **4** |
| **Pre-requisite** | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to:  Understand the Malnutrition problems and prevalence in India. Gain knowledge on the National effort in combating malnutrition. Appreciate the National and International contributor towards National improvement in alleviating nutrition problems. | | | | | | | |

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| **Expected Course Outcomes:** | | | | | |
| On the successful completion of the course, student will be able to: | | | | | |
| 1 | Understand the factors influencing health of a community | | | | K2 |
| 2 | Analyze nutritional problems, policies, programs and agencies involved in  combating malnutrition | | | | K4 |
| 3 | Organizing nutrition education programs for the community | | | | K3 |
| 4 | Evaluate nutritional status of the community | | | | K5 |
| 5 | Outline the various agencies in combating malnutrition | | | | K2 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | |
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| **Unit:1** | | **Introduction to Public Nutrition** | | **15hours** | |
| Concept and scope of public nutrition **–**Definition, concept, scope and multidisciplinary nature of public nutrition.Nutritional problems affecting the community- Etiology, prevalence, clinical features and preventive strategies for malnutrition related problem and deficiency disorders- Protein energy malnutrition, Obesity, Nutritional anemia, Vitamin A  deficiency, Iodine deficiency disorders, Fluorosis. | | | | | |
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| **Unit:2** | | **Assessment of nutritional Status** | | **12 hours** | |
| Assessment of nutritional status**-** Objectives and importance, Methods of assessment:  Direct (Clinical signs, nutritional anthropometry, biochemical tests, biophysical tests); Indirect (Diet surveys, vital statistics). | | | | | |
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| **Unit:3** | | **Nutrition Education** | **12 hours** | | |
| Nutrition education**-** Objectives, principles and scope of nutrition and health education and  promotion. | | | | | |
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| **Unit:4** | | **Nutrition Policy and Programs** | **17 hours** | | |
| Nutrition policy and programs**-** National nutritional policy**;** Integrated child development  scheme (ICDS), Midday Meal Program, National programs for the prevention of anemia, Vitamin A deficiency, Iodine deficiency disorders. | | | | | |
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| **Unit:5** | | **National and International Agencies** | **17 hours** | | |
| National and International agencies in combating malnutrition- International: WHO, FAO, UNICEF; National: FSSAI, ICAR, ICMR, NIN, FNB, CFTRI, and NNMB. | | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** | | |
| Nutritional Problems and Nutritional Programmes in India | | | | | |
|  | | **Total Lecture hours** | **75hours** | | |
| **PRACTICAL (No Examination)**  1. Planning of low cost nutritious recipes for infants, preschoolers,pregnant/ lactating mothers for nutritioneducation. | | | | | |

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| 1. Assessment of nutritionalstatus    * Anthropometry: Weight and height measurements    * Plotting and interpretation of growth charts for children below 5years    * Identification of clinical signs of common nutritionaldisorders    * Dietary assessment: FFQ and 24 hoursrecall 2. Visit to an ongoing nutrition and health promotionprogram | |
| **Text Book(s)** | |
| 1 | Wadhwa A and Sharma S (2003). Nutrition in the Community- A textbook. Elite  Publishing House Pvt. Ltd. New Delhi. |
| 2 | Park K (2011). Park’s Textbook of Preventive and Social Medicine, 21st Edition. M/s  BanarasidasBhanot Publishers, Jabalpur, India |
| 3 | Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam (2015) Text Book of  Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi. |
| **Reference Books** | |
| 1 | Brahman, G.N.V., Lakshmaiah, A., Rao, M. and Reddy, G.(2005) Methodology on Assessment of Diet and nutritional Status of Community, National Institute of nutrition, Hyderabad. |
| 2 | Jellife DB, Jellife ERP, Zerfas A and Neumann CG (1989). Community nutritional assessment with special reference to less technically developed countries. Oxford University Press. Oxford. |
| 3 | Reports of National Family Health Survey, International Institute for Population  Science, Mumbai. |
| 4 | WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height andbody mass index-for-age [(http://www.who.int/childgrowth/standards/en/).](http://www.who.int/childgrowth/standards/en/)) |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | [https://www.ncbi.nlm.nih.gov-nutritionalassessment](https://www.ncbi.nlm.nih.gov-nutritionalassessment/) |
| 2 | [https://www.medicalnewstoday.com-anemia](https://www.medicalnewstoday.com-anemia/) |
| 3 | <https://www.nhp.gov.in/national-vitamin-a-prophylaxis-program-pg> |
| 4 | https:/[/www.dshs.wa.gov/altsa/progra](http://www.dshs.wa.gov/altsa/program-services)m[-services](http://www.dshs.wa.gov/altsa/program-services) /nutrition-education |
| 5 | <https://youtu.be/KySquUSrBhM> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO3** | S | S | S | S | M | S | S | S | S | S |
| **CO4** | S | S | S | S | M | S | S | S | S | S |
| **CO5** | S | S | S | S | M | S | S | S | S | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **53P** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Core Practical: V** | | | **NUTRITION PRACTICAL** |  |  | **45hrs** | **2** |
| **Pre-requisite** | | |  | **Syllabu s Version** | | **2020-21** | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to: Determine the nutrient content present in foods | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Understand the principles and procedure of determination of nutrients | | | | | K2 | |
| 2 | Gain knowledge about analysis of nutrients | | | | | K4 | |
| 3 | Develop skills in analyzing the nutrient content in various food items | | | | | K4 | |
| 4 | Evaluate the standard experimental techniques. | | | | | K5 | |
| 5 | Understand basic principles of food analytical procedures. | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | |
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| **Contents:** | |  | | | **45 hours** | | |
| 1. Determination of Gluten content inwheat. 2. Estimation of Acidity in tomatojuice. 3. Estimation of Fibre content in any onefood. 4. Determination of acid number ofoils. 5. Determination of iodine number ofoils. 6. Estimation of ash content in any onefood. 7. Determination of Calcium content inmilk. 8. Estimation of Iron content in any onefood. 9. Estimation of Phosphorous content in any onefood. 10. Demonstration of Protein content infoods. 11. Estimation of Ascorbic Acid content in Citrus fruitjuice. | | | | | | | |

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| **Course code** | | **53Q** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Core Practical : VI** | | | **COMPUTERISED DATABASE MANAGEMENT IN HOME SCIENCE** |  |  | **45hrs** | **2** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-21** | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to:  Gain knowledge on computer operations and applications to use existing health and nutrition based software. | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Understand the coding, entry of data in MS office. | | | | | K2 | |
| 2 | Gain knowledge about preparation of various types of AV aids | | | | | K2 | |
| 3 | Develop skills in calculation of mean, median, mode, standard deviation, correlation. | | | | | K5 | |
| 4 | Develop skills in graphical presentation of data using MS Office | | | | | K5 | |
| 5 | Develop skills in preparation of models for interior design | | | | | K3 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | |
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| **Contents:** | |  | | | **45hours** | | |
| 1. Database management of Anthropometric indices (Height, Weight,BMI) 2. Database management of Biochemical indices (Haemoglobin, BloodPressure) 3. Preparation of Visual Aids for a Health Educationprogramme. 4. Preparation of Interior Designingmodels. 5. Calculation ofMean. 6. Calculation ofMedian. 7. Calculation ofMode. 8. Calculation of StandardDeviation. 9. Determination of Correlation between the given set ofdata. 10. Graphical presentation ofData. | | | | | | | |

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| **Course code** | | **5ZC** | **TITLE OF THE COURSE** | **L** | | | **T** | **P** | **C** |
| **SBS: III** | | | **FOOD SAFETY AND QUALITY CDONTROL** | **45hrs** | | |  |  | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to: Study about the control of quality and use of additives and gain knowledge on standards for food quality and food laws | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Understand the control of quality and use of additives | | | | | | | K2 | |
| 2 | Gain knowledge on standards for food quality and food laws | | | | | | | K2 | |
| 3 | Apply safety principles related to food industry | | | | | | | K3 | |
| 4 | Analyze basic principles of HACCP and FSSAI | | | | | | | K4 | |
| 5 | Know about food safety measures and food labeling | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **PRINCIPLES OF QUALITY CONTROL** | | | | **8 hours** | | | |
| Principles of Quality control of food –Raw material, processed and finished product inspection. Leavening agents - classification, uses and optimum levels. Food additives -  Preservatives, colouring, flavouring, sequestering agents, emulsifiers and antioxidants. | | | | | | | | | |
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| **Unit:2** | | **STANDARDISATION SYSTEM & ADULTERATION** | | | | **10hours** | | | |
| Standardisation systems for quality control of foods-National and International standardization system, Food grades, Food laws-compulsory and voluntary standards. Food  adulteration - Common adulterants in foods and tests to detect common adulterants. | | | | | | | | | |
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| **Unit:3** | | **METHODS OF DETERMINING QUALITY** | | | **10hours** | | | | |
| Methods for determining quality - Subjective and objective methods. Sensory assessment  of food quality-appearance, colour, flavour, texture and taste, different methods of sensory analysis, preparation of score card, panel criteria, sensory evaluation room. | | | | | | | | | |
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| **Unit:4** | | **FOOD SAFETY, RISKS & HAZARDS** | | | **8 hours** | | | | |
| Food safety, Risks and hazards: Food related hazards, Microbial consideration in food  safety, HACCP-principles and structured approach. Chemical hazards associated with foods. FSSAI | | | | | | | | | |
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| **Unit:5** | | **LABELLING** | | | **7hours** | | | | |
| Principles of labelling, nutrition labelling, Food packaging- principles, functions and types  (metal, glass and flexible films), merits and demerits of packaging materials. | | | | | | | | | |

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| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar on Food safety framework from consumer perspective | | | |
|  | | **Total Lecture hours** | **45hours** |
| **Text Book(s)** | | | |
| 1 | Roday, S. (2011) Food Hygiene and Sanitation, 2nd Edition, Mac Grawhill Publication  New Delhi. | | |
| 2 | Joshi, S.A. (2010) Nutrition and Dietetics with Indian Case Studies. Tata McGraw Hill Education Pvt. Ltd., Mumbai. | | |
| 3 | Manay, S.N. and M. Shadaksharawamy, 2001. (Eds) Foods, Facts and Principles. 3rd  edition, New Age International. New Delhi. | | |
| 4 | Begum, R. (2006) A Textbook of Foods, Nutrition and Dietetics. Sterling Publishers  Pvt. Ltd. New Delhi. | | |
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| **Reference Books** | | | |
| 1 | Mudambi, S.R. and M.V. Rajgopal 2006. Fundamentals of Foods and Nutrition. Wiley  Eastern Ltd. | | |
| 2 | Vijaya Ramesh, Food Microbiology, MJP Publications, 2007. | | |
| 3 | David, A. Shapton, and Naroh F. Shapton (2011) Principles and Practices for the Safe Processing of Foods, Heineman Ltd., Oxford. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | [https://www.fssai.gov.in](https://www.fssai.gov.in/) | | |
| 2 | [mofpi.nic.in › Schemes › food-safety-quality-assurance.](https://mofpi.nic.in/Schemes/food-safety-quality-assurance-infrastructure) | | |
| 3 | <https://youtu.be/LcM_ukojKjM> | | |
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| Course Modified By: Dr. G.Suba | | | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | S | M | M | S | S | M | M | S |
| **CO3** | S | M | M | S | M | S | S | M | M | S |
| **CO3** | S | M | S | S | M | S | S | M | M | S |
| **CO4** | S | M | S | S | M | S | S | M | M | S |
| **CO5** | S | M | M | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

# SEMESTER- VI

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| **Course code** | | **63A** | **TITLE OF THE COURSE** | **L** | | | **T** | | **P** | **C** |
| **Core Paper: X** | | | **FOOD SERVICE MANAGEMENT** | **90hrs** | | |  | |  | **5** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | | | |
| The main objectives of this course are to: understand the principles of planning, organizing and controlling in food service institution. Develop skills in meal planning to catering institution | | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | |
| 1 | Understand the principles of planning, organizing and controlling in food service | | | | | | | | K2 | |
| 2 | Develop skills in meal planning to catering institutions. | | | | | | | | K3 | |
| 3 | Evaluate the principles of sanitation and hygiene | | | | | | | | K5 | |
| 4 | Apply the principles and techniques of effective management | | | | | | | | K3 | |
| 5 | Analyze the cost control and its important | | | | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION** | | | | **19hours** | | | | |
| Different types of catering institutions and services, classifications of food service institutions according to Function and Method of processing: Conventional systems, Commissary system, fast food service system. c. Types of food services: English, French,  Russian, American, silver, buffet and cafeteria. | | | | | | | | | | |
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| **Unit:2** | | **ORGANISATION & MANAGEMENT** | | | | **20 hours** | | | | |
| Organisation - Types and principles, organizational structure for catering institutions. Management - Definition, principles and techniques of effective management, leadership and managerial abilities. Tools of management-organisational chart, work study and work  improvement. | | | | | | | | | | |
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| **Unit:3** | | **KITCHEN AREA** | | | **16 hours** | | | | | |
| Kitchen area- design, size, type, ventilation, lighting, flooring, carpets, wall covering and  sample layout of kitchen, Equipments- major and minor | | | | | | | | | | |
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| **Unit:4** | | **PERSONNEL MANAGEMENT** | | | **16 hours** | | | | | |
| Personnel Management - Methods of selection, orientation, training, supervision and  motivation of employees, importance of good human relations, legal aspects of catering. | | | | | | | | | | |
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| **Unit:5** | | **FRONT OFFICE & FINANCIAL MANAGEMENT** | **17 hours** |
| Front Office organisation, layout, planning, communication between the Front Office and the other departments. Cost control - Principles and methods of food cost control. Financial management –Factors affecting food, labour, operating and overhead cost, budget,  inventories. | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar on career opportunities in front office department of hospitality &business  management | | | |
|  | | **Total Lecture hours** | **90hours** |
| **Text Book(s)** | | | |
| 1 | West ,BB, Wood (1998)“Food service in Institutions” ,Johnwiley and Sons,New  York. | | |
| 2 | Sethi and Mahan S. (2015) Catering Management an integrated approach, John wiley  Eastern Limited, New Delhi. | | |
| 3 | Sethi and Mahan S.(2016 ) Institution Management, John wiley Eastern Limited, New  Delhi. | | |
| 4 | Khan MA (1987) “Food service operations”, AVI publishing Company Inc. ND. | | |
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| **Reference Books** | | | |
| 1 | Kotas R and Davis B “food cost control” Billing and Sons Ltd, Great Britian ,1976 | | |
| 2 | Dr. B.K. Chakravati, “ A Technical guide to Hotel operation” , Metropolitan, New Delhi India. | | |
| 3 | Earl R. Palan and Judity A. Stadler (1986) Preparing for the food service Industry,  AVI – Publishingand co | | |
| 4 | Mickey Warner (1989) Recreatoinal food service Management Van Nostrand  Reinhold, Newyork. | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | <http://www.ihmbbs.org/upload/CHAPTER->  0(THE%20HOTEL%20&%20CATERING%20INDUSTRY).pdf | | |
| 2 | <https://www.dodea.edu/edSpecs/upload/Food-Service-15-Nov-11.pdf> | | |
| 3 | <https://ncert.nic.in/textbook/pdf/lehe104.pdf> | | |
| 4 | <https://youtu.be/uHB3Hg9nWV8> | | |
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| Course Modified By: Dr. G.Suba | | | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | M | S | M | S | M | M | M | M |
| **CO3** | S | S | S | S | M | S | S | M | M | M |
| **CO3** | S | M | M | S | M | S | M | M | M | S |
| **CO4** | S | M | M | S | M | S | S | M | M | S |
| **CO5** | S | M | M | S | M | S | M | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **63B** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Core Paper: XI** | | | **FOOD PRESERVATION AND PROCESSING** | **90**  **hrs** |  |  | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020**  **-21** | |
| **Course Objectives:** | | | | | | | |
| The main objectives of this course are to: learn different food processing and preservation techniques. | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Understand the principles of various methods of food preservation | | | | | K2 | |
| 2 | Knowledge about some ready to eat food items | | | | | K2 | |
| 3 | Explain the principles of different methods of storage and processing | | | | | K3 | |
| 4 | Evaluate the novel technologies in food preservation | | | | | K5 | |
| 5 | Utilize the possible, recent preservation methods in the food processing sector. | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | |
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| **Unit:1** | | **INTRODUCTION** | | **20hours** | | | |
| Food preservation - Definition, General Principles and Methods of Food Preservation- Classification of foods for processing. Preservation by addition of sugar- General principles and methods of preparation of jams, jellies and Marmalades, theory of gel formation. Preparation of preserves, squashes and syrups. Preservation by addition of salt- Pickling.PreparationofIndianPickles,Sauerkraut.Statusandscopeoffoodprocessing  industry in India in developing Entrepreneur. | | | | | | | |
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| **Unit:2** | | **PRESERVATION BY USING HIGH TEMPERATURE** | | **20hours** | | | |
| Preservation by Use of High Temperature - Pasteurization, Sterilization and their types. Thermal death curve/Thermal Death time, methods of heat transfer. Canning - steps, types of cans, advantages, disadvantages. Bottling - steps, advantages, disadvantages. Food dehydration - concept of dehydration and sun drying. Types of driers their advantages and disadvantages. Principle of dehydration-heat and mass transfer. | | | | | | | |
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| **Unit:3** | | **PRESERVATION BY USING LOW TEMPERATURE** | **17 hours** |
| Preservation by use of Low Temperature, Types - Common types of cold storage, refrigeration- requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage. Freezing - Principles and methods of freezing,  Freeze drying. Advantages and disadvantages. | | | |
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| **Unit:4** | | **PRESERVATION WITH CHEMICALS** | **17 hours** |
| Preservation with chemicals a. Mechanism of microbial inhibition, mechanism and action of preservatives in processed food (Inorganic and Organic preservatives, Antibiotics, Mold inhibitors, Antioxidants and its role).  Radiation of Foods - Sources of radiation, units of radiation , Preservation of Semi moist  foods. | | | |
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| **Unit:5** | | **PROCESSING OF FOODS** | **14 hours** |
| Processing of foods – processing of mushroom, meat, poultry, egg and fish, Retort processing of Ready to Eat (RTE) products. Preparation of masala powders, essence and  honey based products. | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar on Impact of COVID-19 on Food Processing Industries and road Ahead | | | |
|  | | **Total Lecture hours** | **90hours** |
| **Text Book(s)** | | | |
| 1 | Sivasankar, B. (2013) Food Processing and preservation 2 nd edition, prentice Hall, Pvt, Ltd. | | |
| 2 | Srilakshmi, B. (2016) 6th Edition, Food Science, New Age International Private Ltd., New Delhi, 2002. | | |
| 3 | Swaminathan, M. (2014) Food Science, Chemistry and Experimental Foods, Bappco  Publishers, Bangalore. | | |
| 4 | Adams, M.R. and Moss, M.O. (2015) Food Microbiology, New Age International (P)  Ltd., New Delhi. | | |
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| **Reference Books** | | | |
| 1 | Chandrasekhar, U (2012) Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi | | |
| 2 | Fellow, P., (2010) Food Processing Technology – Principles and Practices, 3rd  Edition, CRC Press Woodland Publishers, England. | | |
| 3 | Sommers, C.H. and Xveteng Fan (2016) Food Irradiation Research and Technology,  Blackwell Publishing. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | https://edblog.hkedcity.netpdf- food preservation and method | | |
| 2 | [www.betterhealth.vic.gov.au-](http://www.betterhealth.vic.gov.au-/) preservation by food additives | | |
| 3 | https:/[/www.eufic.org/en/whats](http://www.eufic.org/en/whats-)- in- food/article | | |

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| 4 | <https://youtu.be/-F311eYU5QI> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | M | S | M | S | S | M | M | S |
| **CO3** | S | M | S | S | M | S | S | M | M | S |
| **CO3** | S | M | M | S | M | S | S | M | M | S |
| **CO4** | S | M | M | S | S | S | S | M | M | S |
| **CO5** | S | M | M | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **63P** | **TITLE OF THE COURSE** | **L** | **T** | **P** | | | **C** |
| **Core Practical: VII** | | | **FOOD PRESERVATION AND QUALITY CONTROL** |  |  | **45hrs** | | | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to: Includes a variety of techniques that allow food to be kept for extended periods of time and avoiding the growth of unwanted microorganisms | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Apply the principles of various methods of food preservation | | | | | | K3 | | |
| 2 | Increase the shelf-life of food products | | | | | | K4 | | |
| 3 | To make it attractive for the consumers. | | | | | | K3 | | |
| 4 | Analyze food adulteration test for common foods | | | | | | K4 | | |
| 5 | Evaluate the prepared products by using sensory analysis | | | | | | K5 | | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Contents:** | |  | | | **45hours** | | | | |
| 1. Methods of Food Preservation using salt andsugar. 2. Drying andDehydration 3. Food Adulteration tests for some commonfoods. 4. Preservation and bottling of fruit and vegetableproducts. 5. Preservation by usingchemicals 6. Sensory analysis of preserved and processedfoods | | | | | | | | | |

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| **Course code** | | **6ZD** | **TITLE OF THE COURSE** | **L** | | | **T** | **P** | **C** |
| **SBS:IV** | | | **HEALTH,FITNESS AND SPORTS NUTRITION** | **45**  **hrs** | | |  |  | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  Understand the importance of health for quality living and acquire knowledge about the role of food and exercise for sound health | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Understand the importance of health for quality living. | | | | | | | K2 | |
| 2 | Acquire knowledge about the role of food and exercise for sound health | | | | | | | K2 | |
| 3 | Analyze the importance of nutrition for sports personnel | | | | | | | K4 | |
| 4 | Evaluate the effect of exercise on health | | | | | | | K5 | |
| 5 | Discuss the techniques used in weight management | | | | | | | K4 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION** | | | | **10 hours** | | | |
| Health **–** Definition, concept/ meaning of health and factors affecting health. Health hazards  – environment, population explosion, explosives, adulteration, dampness and measures to prevent health hazard. Health insurance schemes (ESI, Mediclaim) | | | | | | | | | |
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| **Unit:2** | | **FUNCTIONS OF FOOD** | | | | **8 hours** | | | |
| Functions of food **–** Physiological, psychological and socio - cultural functions,  constituents of food and their functions. | | | | | | | | | |
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| **Unit:3** | | **PHYSICAL EDUCATION** | | | **9hours** | | | | |
| Physical education **–** Meaning and scope, role of gymnastic exercises and yoga in improving health. Difference between yoga and other gymnastic exercises. Health club equipments and activities – Tread mill, hammer strength, steppers, cycles, body sculpting,  kick boxing, Reebok ridge rocker, hanging, hand grips, swing, climbing and lifting weight. | | | | | | | | | |
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| **Unit:4** | | **SPORTS NUTRITION** | | | **8 hours** | | | | |
| Sports nutrition **–**Introduction to kinanthropometry, Requirements during training and | | | | | | | | | |

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| performance for athletes and endurance games, aerobic and anaerobic exercise, fuel for  exercise, glycogen load. Exercise to maintain fitness. | | | |
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| **Unit:5** | | **WEIGHT MANAGEMENT** | **8 hours** |
| Weight Management **-** Ideal body weight, weight loss – making weight and rapid weight loss strategies, Nutrition for special population: child athlete, ageing athlete, and athletic diabetes, vegetarian and disabled athlete. | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar for Sports, Nutrition and Immunity: A sustainable lifestyle | | | |
|  | | **Total Lecture hours** | **45 hours** |
| **Practicals:( No Examination)**   1. Food intake during culturalfestivals. 2. Visit to a health club / fitnesscentre 3. Assessment of fitness – simple test, Stepper technique 4. Guest lecture on health insuranceschemes. 5. Observation of / Compulsory yogaexercise. 6. Observation of physical training for sportsperson | | |  |
| **Text Book(s)** | | | |
| 1 | Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton  Publishing Company, Colorado. | | |
| 2 | Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi | | |
| 3 | Greenberg, S. J and Pargman, D (1989) Physical Fitness – A Wellness Approach  Prentice Hall International (UK) Limited, London | | |
| 4 | Swaminathan M. (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co. | | |
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| **Reference Books** | | | |
| 1 | McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996)Exercise Nutrition: Energy Nutrition and Human Performance. William & Wilkin PublishingUSA. | | |
| 2 | Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy  W.B Saunders Company, USA. | | |
| 3 | McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (2010) Essentials of Exercise Physiology, 7th edition. William & Wilkin Publishing USA. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | [https://www.sciencedaily.com](https://www.sciencedaily.com/) | | |
| 2 | [https://www.nutritionist-resource.org](https://www.nutritionist-resource.org/) | | |

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| 3 | https://youtu.be/NqJQ7iCepOg |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | S | S | M | M | S |
| **CO3** | S | S | S | S | M | S | S | M | M | S |
| **CO3** | S | S | S | S | M | S | S | M | M | S |
| **CO4** | S | S | S | S | M | S | S | M | M | S |
| **CO5** | S | S | S | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | | | **5EA** | | **TITLE OF THE COURSE** | **L** | | | | **T** | **P** | | **C** |
| **Elective Paper: I A** | | | | | | **BAKERY** | **75 hrs** | | | |  |  | | **3** |
| **Pre-requisite** | | | | | |  | **Syllabus Version** | | | | | **2021-**  **22** | | |
| **Course Objectives:** | | | | | | | | | | | | | | |
| The main objectives of this course are to: Understand the Role of automation, RPA, science and technology in bakery industry. Develop skills in planning and maintenance of a bakery institution. | | | | | | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | | | | |
| 1 | Understand the use of robotic process automation in bakery industry | | | | | | | | | | | | K2 | |
| 2 | Understand the science and technology of baking | | | | | | | | | | | | K2 | |
| 3 | Understand the role of different ingredients in baking | | | | | | | | | | | | K2 | |
| 4 | Develop skills in planning and maintenance of a bakery institution | | | | | | | | | | | | K3 | |
| 5 | Understand the packaging materials used in bakery industry | | | | | | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | | | | | | |
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| **Unit:1** | | | | **INTRODUCTION TO AUTOMATION** | | | | | | **14hours** | | | | |
| Introduction to Automation and RPA**:** Bascis of RPA- RPA benefits- Types of robots.  Automation and RPA concepts**:** Business models for implementing RPA- Centre of Excellence- Types and their applications- Building an RPA team- Approach for implementing RPA initiatives. Automation in food industry & uniqueness, Tools of Automation in food industry.  Advantages and Disadvantages of Automation in food Industry. Reason for automation process. Robotics in Packaging. | | | | | | | | | | | | | | |
| **Unit:2** | | | | | **BAKING** | | | | **13 hours** | | | | | |
| Baking - Definition, Principles of baking, classification of baked foods. Types of equipments in baking industry, cleaning and sanitizing methods of baking equipments, baking temperature of different products, operation techniques of different baking equipments. | | | | | | | | | | | | | | |
| **Unit:3** | | | | | **INGREGIENTS & THEIR ROLE IN BAKING** | | | **16hours** | | | | | | |
| Ingredients and Their Role in Baking - Flour, Yeast, sugar, egg, butter, salt, baking powder, colouring, flavouring agents. List of standard colouring and flavouring agents. Preparation of baked foods - Quick breads, cakes and its varieties, different typesof  biscuits, cookies and pastries. | | | | | | | | | | | | | | |
| **Unit:4** | | | | | **DECORATION OF BAKED FOODS** | | | **15 hours** | | | | | | |
| Decoration of baked foods - Icing- Types of Icing used in different bakery product. Role of other ingredients used in icing. | | | | | | | | | | | | | | |
| **Unit:5** | | | | | **PROCESS AUTOMATION IN BAKERY PRODUCTION AND PACKAGING.** | | | **15hours** | | | | | | |
| Baking unit/ plant layout and design of a baking unit sanitation and hygiene. Types of packaging materials used for bakery products, method of  Packaging | | | | | | | | | | | | | | |
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| **Unit: 6** | | | | | **CONTEMPORARY ISSUES** | | | **2 hours** | | | | | | |
| **Taste the future of bakery, Mithai & Namkeen Industry** | | | | | | | | | | | | | | |
|  | | | | | **Total Lecture hours** | | | **75hours** | | | | | | |
| **PRACTICALS: (To gain knowledge about bakery- No Examination)**   1. **Breads** 2. **Cakes** 3. **Biscuits andcookies** 4. **Pastries** 5. **Icing** | | | | | | | |  | | | | | | |
| **Text Book(s)** | | | | | | | | | | | | | | |
| 1 | | Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications  and Distributors, Daryaganji, New Delhi. | | | | | | | | | | | | |
| 2 | | Dubey, SC, (1979) Basic Baking Science and Craft, Jwalmukhi Job Press,  Bangalore | | | | | | | | | | | | |
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| **Reference Books** | | | | | | | | | | | | | | |
| 1 | | | Baker‟s Handbook on practical Baking . Wheat Associates, USA, New Delhi. | | | | | | | | | | | |
| 2 | | | Modern Pastry Chab, Vol.I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977. | | | | | | | | | | | |
|  | | | | | | | | | | | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | | | | | | | | | | | |
| 1 | | | https:/[/www.uipath.](http://www.uipath.com/landing/academic-studio-download)c[om/landing/academic-studio-download](http://www.uipath.com/landing/academic-studio-download) | | | | | | | | | | | |
| 2 | | | <https://www.uipath.com/rpa/robotic-process-automation> | | | | | | | | | | | |
| 3 | | | <https://www.uipath.com/rpa/academy> | | | | | | | | | | | |
| 4 | | | <https://youtu.be/Cd3ELHVCJJo> | | | | | | | | | | | |
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| Course Modified By:Ms.K.SubaLatha | | | | | | | | | | | | | | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | M | S | S | S | S | M | M | S |
| **CO3** | S | M | M | S | S | S | S | M | M | S |
| **CO3** | S | M | M | S | S | S | S | M | M | S |
| **CO4** | S | M | S | S | S | S | S | M | M | S |
| **CO5** | S | M | S | S | S | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **5EB** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Elective : I B** | | | **FOOD PRODUCT DEVELOPMENT AND ENTREPRENEURSHIP** | **75 hrs** |  |  | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | | |
| Themainobjectivesofthiscourseareto: focusing on creating or improved food products. Develop innovative and health foodproducts. | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | |
| 1 | Select ingredients needed for formulation of a new product | | | | | K3 | |
| 2 | Understand the importance of evaluation techniques for new products | | | | | K2 | |
| 3 | Develop new products based on the needs of customer | | | | | K3 | |

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| 4 | | Apply Automation and uses of Computer in food analysis | | | | | | | K4 |
| 5 | | Gain knowledge about entrepreneurship and its relevance in carrier growth. | | | | | | | K2 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | | | **INTRODUCTION** | | | **15 hours** | | |
| Definition and classification, characterization and factors shaping new product  development. Food needs and consumer preference: market survey and its importance. Advantages of processed foods in urbanized modern society. | | | | | | | | | |
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| **Unit:2** | | | | **SHELF LIFE REQUIREMENTS** | | | **16 hours** | | |
| Shelf life requirements and factors affecting shelf life. Evaluation of shelf life, sensory attributes and effects of environmental conditions;accelerated shelf life determination;  sensory attributes and effects of environmental conditions; accelerated shelf life determination selection and training of judges, development of score card analysis of data. | | | | | | | | | |
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| **Unit:3** | | | | **NEW PRODUCT DEVELOPMENT** | **14 hours** | | | | |
| Designing new products and new food product development (NPD) process and activities,  use of traditional recipe and modification, recent development. | | | | | | | | | |
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| **Unit:4** | | | | **ENTREPRENEURSHIP** | **15 hours** | | | | |
| Importance of entrepreneurship and its relevance in carrier growth.  Entrepreneur, entrepreneurship and enterprise, concept and development and characteristics of an entrepreneur. Types of enterprises and ownership, employment, self-employment and entrepreneurship. | | | | | | | | | |
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| **Unit:5** | | | **AUTOMATION AND USES OF COMPUTER IN FOOD ANALYSIS:** | | | | | **13hours** | |
| Tools of automation, automation in food industries and its example,Computer in food analysis and its application:Bar code technology,GSIsystemRFIDtechnology,Chromatography,Spectroscopy | | | | | | | | | |
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| **Unit: 6** | | | | **CONTEMPORARY ISSUES** | | **2 hours** | | | |
| Value addition in coconut International webinar | | | | | | | | | |
|  | | | | **Total Lecture hours** | **75 hours** | | | | |
| **Practicals : Formulation of new food products for( No Examination)**   1. **Infants** 2. **PreschoolChildren** 3. **Adolescents** 4. **Pregnant and nurshingmothers** 5. **Oldage** 6. **Sportsperson** | | | | | | | | | |
| **Text Book(s)** | | | | | | | | | |
| 1 | Sudhir Gupta (2017) Handbook of Packaging Technology, Engineers India Research  Institute, New Delhi | | | | | | | | |
| 2 | Daise, Frank, A. (Ed.) 2015, Modern Processing, Packaging and Distribution System  for Food, Blackie, Glasgow and London. | | | | | | | | |
| 3 | Suja, R. Nair(2014) Consumer Behaviour and Marketing Research, 1st Edition, | | | | | | | | |

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|  | Himalaya Publishers. |
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| **Reference Books** | |
| 1 | Food Packaging Technology Handbook, 2013, NIIR Board of Consultants and Engineers, National Institute of Research, New Delhi. |
| 2 | Modern Packaging Industries, 2014, NIIR Board of Consultants and  Engineers, National Institute of Industrial Research, New Delhi. |
| 3 | Potter, N.M., Food Science, The AVI Publishing Company Inc., West  Post, Connecticut, USA 2015, |
| 4 | Khanaka, S.S. (2016) Entrepreneurial Development, S. Chand and Company Ltd,  New Delhi. |
|  | Hmacfie (2017) Consumer led Food Product Development, Weedhead Publishing  Ltd., UK . |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | <http://mek.oszk.hu/11400/11406/11406.pdf> |
| 2 | <http://entrepreneuriat.inforoutefpt.org/documents/ang_nc-4328_projet.pdf> |
| 3 | [www.destechpub.com › wp-content › uploads › 2015/01](https://www.destechpub.com/wp-content/uploads/2015/01/Methods-for-Developing-New-Food-Products-preview.pdf) |
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| Course Modified By: Ms.K.SubaLatha | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | S | S | S | S | S | M | M | S |
| **CO3** | S | M | M | S | S | S | S | M | M | S |
| **CO3** | S | M | S | S | S | S | S | M | M | S |
| **CO4** | M | M | M | M | S | S | S | M | M | S |
| **CO5** | S | M | M | S | S | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | **6EA** | **TITLE OF THE COURSE** | **L** | **T** | **P** | **C** |
| **Elective: II A** | | **QUANTITY FOOD SERVICE AND PHYSICAL FACILITIES** | **90hrs** |  |  | **3** |
| **Pre-requisite** | |  | **Syllabus Version** | | **2020-**  **21** | |
| **Course Objectives:** | | | | | | |
| The main objectives of this course are to: Understand the layout of foodservice institution and basics of quantity food production. | | | | | | |
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| **Expected Course Outcomes:** | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | |

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| 1 | | Understand the physical requirements for quality food production | | | | K2 |
| 2 | | Gain knowledge and develop skills in handling food service equipment | | | | K2 |
| 3 | | Understand the basics of quantity food production and meal planning | | | | K2 |
| 4 | | Understand the basic principles of food storage, preparation, service and cleaning | | | | K3 |
| 5 | | Gain knowledge about floor planning and layout for a foodservice institution. | | | | K2 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | |
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| **Unit:1** | | | **FLOOR PLANNING AND LAYOUT** | | **20hours** | |
| Floor planning and layout – characteristics of typical food service facilities. Floor plan  – physical planning, space allocation for the various areas and flow of trafficthrough receiving, storage, preparation, service and dish washing areas. Working heights and dimensions of work centers, lighting, ventilation and pest – rodentcontrol. | | | | | | |
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| **Unit:2** | | | **MATERIALS** | | **14hours** | |
| Materials - Basic materials used in the manufacture of equipment, finishes and insulation.  Strength and limitation of materials. | | | | | | |
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| **Unit:3** | | | **EQUIPMENT** | **18hours** | | |
| Equipment - Equipment required for quantity food service-major and minor equipment with reference to food storage, preparation, service and cleaning. Factors influencing their selectionandpurchase.Arrangementofequipmentinworkcenters,use,careand  maintenance of equipment. Transition from traditional to modern equipment. | | | | | | |
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| **Unit:4** | | | **MEAL PLANNING** | **18 hours** | | |
| Meal Planning - Menu-principles involved in planning menu, types of menu. Fuel: Cooking fuels-selection, advantages, limitations, safety measures and fuelsaving  techniques. | | | | | | |
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| **Unit:5** | | | **QUANTITY FOOD PREPARATION** | **18hours** | | |
| Quantity food preparation – Selection, purchasing and storage of foods, standardization of  recipe, portion control, utilization of left over foods. Marketing of foods –Importance and need for advertisement. | | | | | | |
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| **Unit: 6** | | | **CONTEMPORARY ISSUES** | **2 hours** | | |
| Webinar on food product development | | | | | | |
|  | | | **Total Lecture hours** | **90hours** | | |
| **Text Book(s)** | | | | | | |
| 1 | Sethi and Mahan s. (2015) Catering Management and integrated approach ,Johnwiley  and Sons,New York . | | | | | |
| 2 | Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications  and Distributors, Daryaganji, New Delhi | | | | | |

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| 3 | West, B.B., Wood, L., Harger, C.F. and Shugart, G. (1988), Food Service in  Institutions, John Wiley and Sons, New York. |
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| **Reference Books** | |
| 1 | Glow,G.,(1977)”CateringEquipmentandSystemsDesign„‟,AppliedScience PublishersLtd. |
| 2 | Unkelsbay,NandUnkilesbay,k. (1982) ”Energy management in Food service : Ellis Harwood Ltd.,England 1982. |
| 3 | Kinton ,R and Ceserani ,V. (1985) ”The Theroy of catering “, Arnold – Heinemam. |
| 4 | Marian C.Spears , (1995) Food Service Organisation , III rd edition – Managerial and system approach ,prentice hall.inc.Osio,. |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | Psu.pb.unizin.org |
| 2 | epgp.inflibnet.ac.in |
| 3 | <https://youtu.be/BHGNy3i99Yo> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | M | M | S | M | S | S | M | M | S |
| **CO3** | S | M | M | S | M | S | S | M | M | S |
| **CO3** | S | M | M | S | M | S | S | M | M | S |
| **CO4** | S | S | S | S | M | S | S | M | M | S |
| **CO5** | M | M | M | S | M | S | S | M | M | M |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **6EB** | **TITLE OF THE COURSE** | **L** | | **T** | | **P** | **C** |
| **Elective Paper: II B** | | | **ELECTIVE PAPER II-B HUMAN DEVELOPMENT** | **90 hrs** | |  | |  | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2020-21** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  Develop an understanding of an individual from infancy to adolescence so that they  Can be guided effectively. Develop an awareness of the problems of children and adolescents and  old age. Learn about exceptional children and address their needs | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Familiarize with the growth process from conception to confinement | | | | | | | K2 | |
| 2 | Understand the physical, psychological and social development of the  individual from infancy to old age. | | | | | | | K2 | |
| 3 | Understand the human development in contemporary society | | | | | | | K2 | |
| 4 | Develop an awareness of the problems of children and adolescents and old age. | | | | | | | K3 | |
| 5 | Learn about exceptional children and address their needs | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION** | | | | | **16hours** | | |
| Introduction to Human Development- Definition, History, Multidisciplinary and Scientific  nature. Scope of Human Development in contemporary society. Domains and Stages of Human Development. Principles of growth and development. | | | | | | | | | |
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| **Unit:2** | | **PRENATAL DEVELOPMENT** | | | | | **20hours** | | |
| Prenatal Development and Post natal Care- Birth and the Neonate (newborn) - Reproductive health, planning and preparing for parenthood. Conception – signs and symptoms of pregnancy, prenatal development – stages of development, factors affecting development, birth process – signs of labour, stages, birth injuries, postnatal care – adjustment of the newborn. Infancy and - Development during infancy – Physical, social, emotional, cognitive and language. Infant care and hygiene – immunization schedule,habit  formation. Minor ailments and preventive measures. | | | | | | | | | |
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| **Unit:3** | | **EARLY AND LATE CHILDHOOD** | | | **19 hours** | | | | |
| Early and late childhood– Physiological and psychological. Role of Child care centres. Physical,motor,emotional,language,moral,socialandintellectualdevelopment.Child  and family member relationship. Habit formation. Behaviour problems – causes, | | | | | | | | | |

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| prevention and treatment. Preschool education – importance, objectives, programmes.Play  – definition, types, characteristics and play hazards. Children with special needs – definition,classificationofeachexceptionalchildren,characteristicsandrehabilitationof  children with special needs. | | | |
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| **Unit:4** | | **ADOLESCENCE** | **18 hours** |
| Adolescence **–** definition, physical, emotional, intellectual and motor development, personal adjustment and maladjustment. Delinquency – causes, prevention and rehabilitation. Role of Parents and Society. Factors influencing PersonalityDevelopment,  Drug addiction and alcoholism – rehabilitation. | | | |
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| **Unit:5** | | **ADULTHOOD AND OLD AGE** | **15hours** |
| 1. Adulthood – characteristics and developmental tasks, problems in middleage. 2. Old Age – physical and psychological changes, problems of the aged, familyattitude towards aged, place of the aged in IndianSociety. | | | |
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| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Webinar on Managing Common Pain and Movement problems in Elderly | | | |
|  | | **Total Lecture hours** | **90hours** |
| **Text Book(s)** | | | |
| 1 | Charles, S.P. ( 1983). Adolescent Psychology, New Delhi: Vikas House. | | |
| 2 | Duvall,M.E., (1972). Marriage and Family Development, New York: J.P. Lippincott  Co. | | |
| 3 | Rajammal P. Devadas and Jaya N. Muthu (2002). A Text Book of Child  Development, New Delhi: Macmillan Publishers. | | |
| 4 | Nanda V.K., (1998): Principles of Child Development, New Delhi: Anmol | | |
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| **Reference Books** | | | |
| 1 | Hurlock E.B., (1972). Child Development, New York : McGraw Hill Book company. | | |
| 2 | Hurlock, E.B., (1995): Developmental Psychology – A Life Span Approach, 5th (Ed.) New York: McGraw Hill Book Co.,. | | |
| 3 | Mussenetal.(1990). Child Development and Personality, New York: Harper and Row publishers. | | |
| 4 | Sapra, R. (2007): Integrated Approach to Human Development. New Delhi Vishwabharathi. | | |
| 5 | Singh, A. (2015). Foundations of Human Development: A Life Span Approach. New Delhi: Orient Black Swan. | | |
| 6 | Suriakanthi A., (1997). Child Development – An Introduction, Tamil Nadu: Kavitha Publishers. | | |
| 7 | Swaminathan, M (1998). The First Five Years : A Critical Perspective on Early Childhood Care and Education in India. New Delhi : Sage Publications. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | https://my.clevelandclinic.org- prenatal development | | |

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| 2 | https:/[/www.tuv.edu](http://www.tuv.edu-/)- child rearing practices |
| 3 | https://library.ccis.edu- exceptional children |
| 4 | https:/[/www.chil](http://www.childtrends.org-/)d[trends.org-](http://www.childtrends.org-/) adulthood characteristics |
| 5 | https:/[/www.ncbi.nl](http://www.ncbi.nlm.nih.gov-/)m[.nih.gov-](http://www.ncbi.nlm.nih.gov-/) old age problems social |
| 6 | <https://youtu.be/CNAUQj1Dg40> |
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| Course Modified By: Dr. G.Suba | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | M | S | S | M | M | S |
| **CO3** | S | M | S | M | M | S | M | M | M | S |
| **CO3** | S | M | S | S | M | S | S | M | M | S |
| **CO4** | S | M | S | S | M | S | S | M | M | S |
| **CO5** | S | M | S | S | M | S | S | M | M | S |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **6EC** | **TITLE OF THE COURSE** | **L** | **T** | **P** | | **C** |
| **Elective Paper : III A** | | | **FAMILY RESOURCE MANAGEMENT** | **90hrs** |  |  | | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2020-**  **21** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Understand concepts & principles of resource Management & its functions. Understand the significance of management in changing environment .Help students to learn to use resources  effectively | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Understand the use of IOT in home automation. | | | | | | K2 | |
| 2 | The significance of management applicable to families. | | | | | | K3 | |
| 3 | Recognize the importance of wise use of resources to achieve one’s goals. | | | | | | K4 | |
| 4 | Become a good home maker | | | | | | K2 | |
| 5 | Gain knowledge in various aspects in home economics | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION TO IOT** | | **14hours** |
| **Introduction to IoT**: Evolution of IoT- Definition & characteristics of IoT- Architecture ofIoT-TechnologiesforIoT-DevelopingIoTapplication-ApplicationofIoT-Industrial  IoT-Security in IoT, IoT in home automation. | | | | |
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| **Unit:2** | | **MANAGEMENT AND ITS CONCEPTS** | | **20hours** |
| Management – Definition, Principles and elements involved in management, Process – planning, controlling and evaluation. Motivation in management.(Introduction to values, goals and standards)  Management Concepts - Goals and Values – their relationship to decision-making  Standard of Living – Definition, constituents – Means for raising the standard of living of families. | | | | |
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| **Unit:3** | | **DECISION MAKING AND RESOURCES** | **18 hours** | |
| Decision Making – steps, importance, types of decisions, Habitual versus Conscious decision making. Individual and group decisions, resolving conflicts in group decisions. Resources – Human and non-human resources. Characteristics of Resources-utilized to  achieve family goals. | | | | |
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| **Unit:4** | | **FAMILY AND ENERGY MANAGEMENT** | **18 hours** | |
| Family - Concept, Role, life cycle changes and stages of family life cycle. Work simplification – Definition, importance, Mundel’s classes of change Time Management – Time Demands during different stages of the family life cycle, Time cost, Factors to be consider in making time and activities plans. Energy Management – Relation of energy to  the stages of the family life cycle, Fatigue – Forms and effects of fatigue. | | | | |
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| **Unit:5** | | **FAMILY INCOME** | **18 hours** | |
| Family Income – Definition, Types - Money, Real and Psychic income, various ways of improving the income of the family, Family finance management, family, Budget – Definition and meaning, importance of budgeting, steps, factors affecting the budget. Engles’s Law of Consumption.  Savings – Meaning, objectives, Needs for savings in the family, types of savings institutions and schemes. Consumer – Meaning and definition of consumer, consumer  rights. Problems faced by the consumer. | | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** | |
| Webinar on Living with COVID-19: Biochemical and physiological Considerations for  family | | | | |
|  | | **Total Lecture hours** | **90hours** | |
| **Text Book(s)** | | | | |
| 1 | Varghese,M.A et al. – “Home Management”, (Second Edition), New Age International (P) Limited, Publishers, 7/30 A, Daryaganj, New Delhi – 110002. | | | |
| 2 | Asay, S.M. and Moore, T.J. (2016) Family Resource Management, Third Edition,. | | | |
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| **Reference Books** | |
| 1 | Nickell.P. and Dorsey. J.M. – “Management in Family Living”, John Wiley and Sons, Inc, New York, 1960. |
| 2 | SingalSavita Prof. and GandotraVeena Prof. Family Resource Management. Historical and contemporary Developments, Dominant Publishers and Distributors, New Delhi – 110002. |
| 3 | NeeruGargSushma Gupta, Textbook of Family Resource Management, 9th Edition 2008. |
|  | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | |
| 1 | [http://download.nos.org/srsec321newE/321-E- Lesson-10.pdf](http://download.nos.org/srsec321newE/321-E-%20Lesson-10.pdf) |
| 2 | <http://cmsnew.pdst.ie/sites/default/files/Resource%20Mgt.pdf> |
| 3 | <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=122107> |
| 4 | <http://shodhganga.inflibnet.ac.in/jspui/bitstream/10603/129462/8/08_chapter3.pdf> |
| 5 | [http://www.yourarticlelibrary.com/home-management/home-science-work-](http://www.yourarticlelibrary.com/home-management/home-science-work-simplificationmethods-with-diagram/47806)  [simplificationmethods-with-diagram/47806](http://www.yourarticlelibrary.com/home-management/home-science-work-simplificationmethods-with-diagram/47806) |
| 6 | <https://youtu.be/g6P-OpXuMN4> |
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| Course Modified By: Ms.K.SubaLatha | |

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| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | M | M | S | S | S | S | M | M | S |
| **CO3** | M | M | S | S | S | S | S | M | M | M |
| **CO3** | M | M | M | S | S | S | S | M | M | M |
| **CO4** | S | M | S | S | S | S | S | M | M | M |
| **CO5** | S | M | S | S | S | S | S | M | M | M |
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\*S-Strong; M-Medium; L-Low

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| **Course code** | | **6ED** | **TITLE OF THE COURSE** | **L** | | **T** | | **P** | | **C** |
| **Elective Paper: III B** | | | **FOOD PACKAGING** | **90 hrs** | |  | |  | | **3** |
| **Pre-requisite** | | |  | **Syllabus Version** | | | | **2021-**  **22** | | |
| **Course Objectives:** | | | | | | | | | | |
| The main objectives of this course are to: Introduce artificial intelligence for food packaging. understand the need for food packaging and recent trends in packaging material | | | | | | | | | | |
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| **Expected Course Outcomes:** | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | |
| 1 | Understand the need for food packaging | | | | | | | | K2 | |
| 2 | Know the recent trends in packaging materials and labelling | | | | | | | | K2 | |
| 3 | Learn and gain knowledge on food packaging and applications during  Transportation | | | | | | | | K3 | |
| 4 | Compile about the different packaging materials | | | | | | | | K4 | |
| 5 | Understand the uses of robots in packaging | | | | | | | | K2 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; | | | | | | | | | | |
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| **Unit:1** | | **INTRODUCTION TO AI** | | | | | **14 hours** | | | |
| **Artificial Intelligence (AI):**Introduction to AI- Fundamentals- Need for AI- Foundations of AI –  AI environment-Applications domains of AI- AI tools- Challenges and future of AI. Types of Robots used in food packaging. Automation of packaging. Types of Equipment and technologies in automation of packaging System. | | | | | | | | | | |
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| **Unit:2** | | **FOOD PACKAGING AND ITS MATERIALS** | | | | | **20hours** | | | |
| Food packaging - Definition, functions of packaging materials for different foods, characteristics of packaging material. Food packages – bags, pouches, wrappers, tetra packs- applications.  Packaging materials - Introduction, purpose, requirements, types of containers. Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol  containers, rigid plastic packages, semi rigid packaging, flexible packaging. | | | | | | | | | | |
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| **Unit:3** | | **PACKAGES OF RADIATION STABILIZED FOODS** | | | **18hours** | | | | | |
| Packages of radiation stabilized foods **-** Introduction, rigid containers, flexible containers, general methods for establishing radiation stabilization. Radiation- measurement of  radiations. Biodegradable packaging material – biopolymer based edible firm. | | | | | | | | | | |
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| **Unit:4** | | **PACKAGES OF DEHYDRATED PRODUCTS** | | | **17 hours** | | | | | |
| Packages of dehydrated products Orientation, metallization, co-extrusion of multilayer films, stretch, package forms and techniques. Aspectic packaging, retortable containers, modified and controlled atmosphere packaging, skin, strink and cling film packaging,  micro-ovenable containers, other package forms and components of plastics. | | | | | | | | | | |

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| **Unit:5** | | **USES OF ROBOTS IN PACKAGING**. | **19 hours** |
| Packaging of finished goods weighing, filling, scaling, wrapping, cartooning, labeling, marking and trapping. Labeling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labeling, health claims, and mandatory labeling provision. | | | |
| **Unit: 6** | | **CONTEMPORARY ISSUES** | **2 hours** |
| Food Packaging | | | |
|  | | **Total Lecture hours** | **90 hours** |
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| **Text Book(s)** | | | |
| 1 | Potter, N.M. (2015) Food Science, The AVI Publishing Company Inc., West  Post, Connecticut, USA. | | |
| 2 | Daise, Frank, A. (2015) (Ed.) Modern Processing, Packaging and Distribution System for Food, Blackie, Glasgow and London. | | |
|  | | | |
| **Reference Books** | | | |
| 1 | Food Packaging Technology Handbook (2013) NIIR Board of Consultants and  Engineers, National Institute of Research, New Delhi. | | |
| 2 | Modern Packaging Industries (2014) NIIR Board of Consultants and Engineers, National Institute of Industrial Research, New Delhi. | | |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | [https://www.scielo.br](https://www.scielo.br/) | | |
| 2 | <https://www.uipath.com/rpa/robotic-process-automation> | | |
| 3 | egya;//nkosh.ac.in | | |
| 4 | <https://youtu.be/Nxla-0kwWnk> | | |
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| Course Modified By: Ms. K.SubaLatha | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | M | S | S | S | S | S | M | M | S |
| **CO3** | M | M | S | S | S | S | S | M | M | S |
| **CO3** | M | M | S | S | S | S | S | M | M | S |
| **CO4** | M | M | M | S | S | S | S | M | M | S |
| **CO5** | M | M | M | S | S | S | S | M | M | S |
|  |  |  |  |  |  |  |  |  |  |  |

\*S-Strong; M-Medium; L-Low